



AEDR-9820/9820E/9830/9830E

Evaluation Board

User Guide

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1 Overview

The Broadcom® AEDR-98xx series is a three-channel reflective optical encoder. It can be configured to analog or digital outputs employing reflective technology for motion control purposes. The selectable options available are as follows:

- A two-channel differential analog with a third channel differential digital or analog index output
- A three-channel digital differential A, B, and I output

The AEDR-98xx series in analog encoder modes, with two-channel differential analog outputs (Sin, /Sin, Cos, /Cos), can be interfaced directly with external interpolators available.

The AEDR-98xx series in digital encoder mode offers two-channel (AB) quadrature digital outputs and a third channel digital index output. Being TTL compatible, the outputs of the AEDR-98xx series encoder can be interfaced with most of the signal processing circuitries. Therefore, the encoder provides easy integration and flexible design into existing systems.

2 Top and Bottom Views

Figure 1: Bottom Side of the PCB

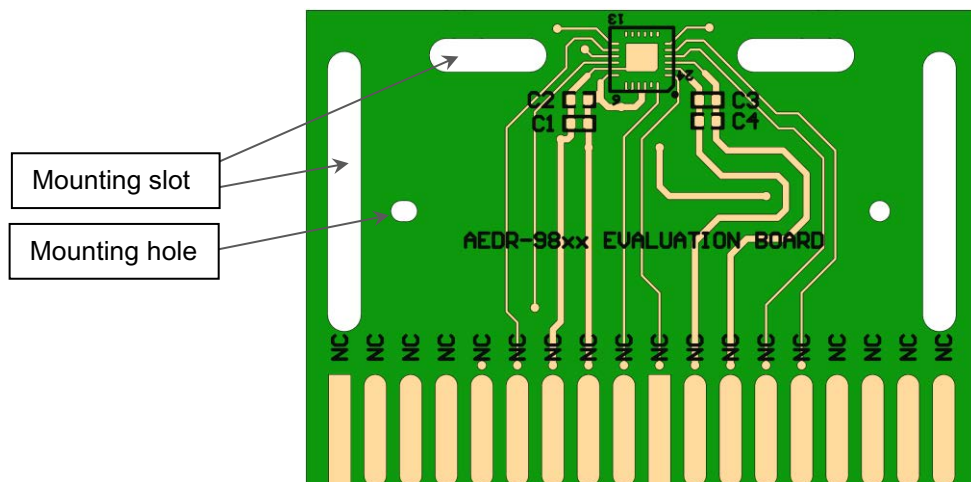
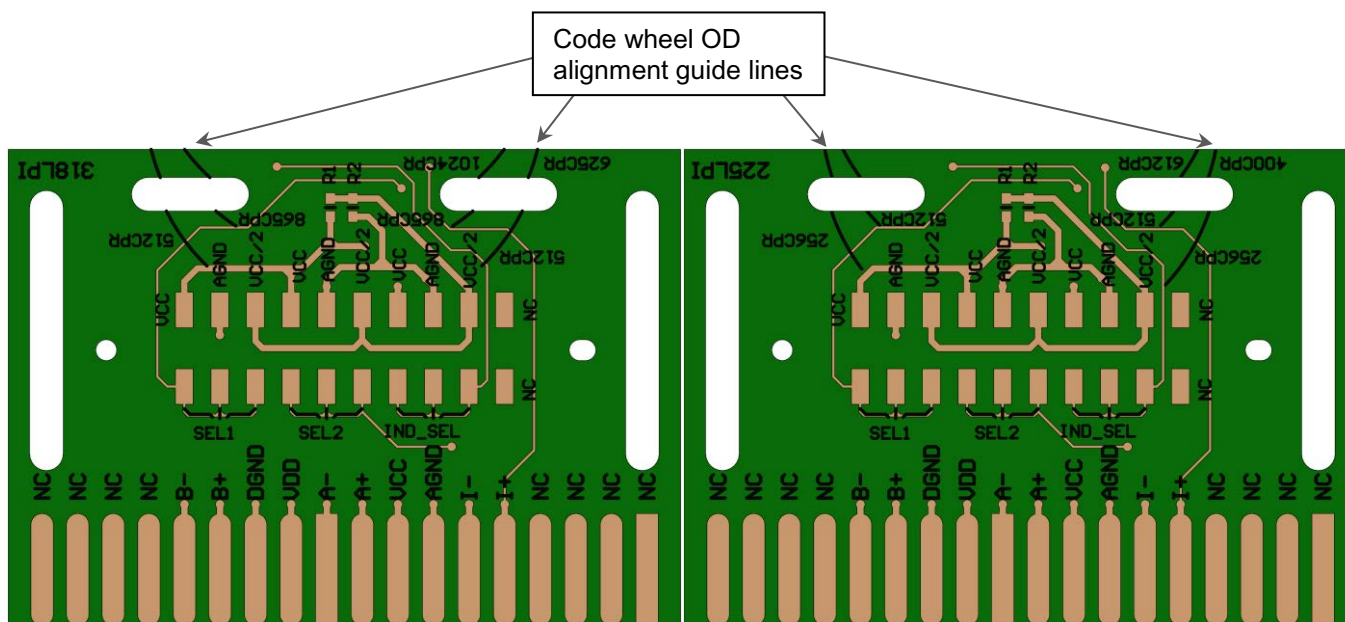


Figure 2: Top Side of the PCB (Left 318 LPI and Right 225 LPI)



NOTE: Remove the protective kapton tape covering the encoder ASIC before use.

The silk screen printed guide line on the PCB is to help provide visual alignment of the code wheel edge (outer diameter) for each of the different R_{OP} (CPR) track. [Figure 3](#) is a sample diagram showing the position when encoder is aligned to 625 CPR track.

Figure 3: Bottom Side of the PCB

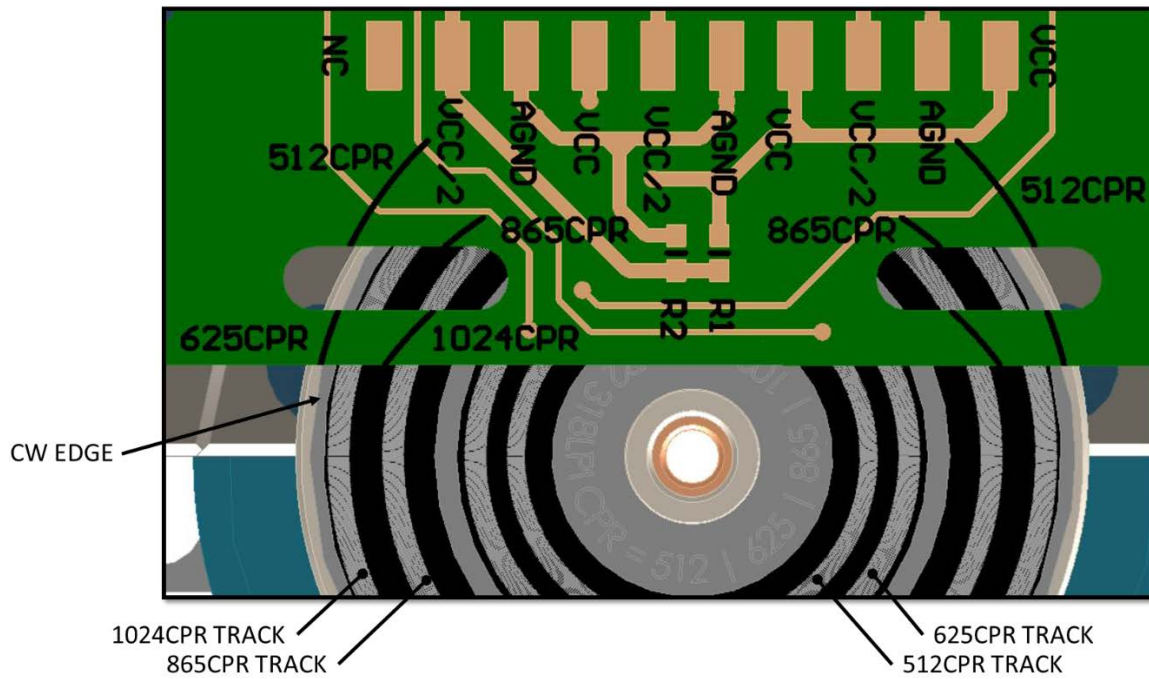
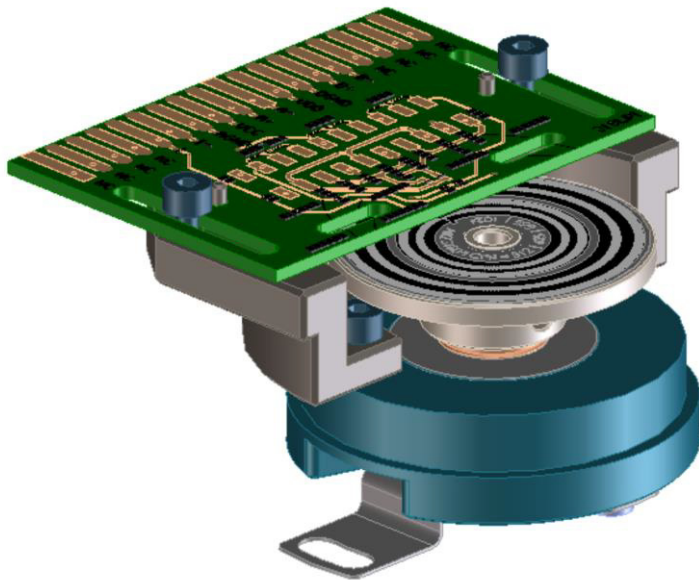


Figure 4: Sample Evaluation Board Mounting with Reference to Code Wheel



3 Select Options

The digital (with different interpolation factor) or analog (Vpeak to peak) selection table is configurable using three physical pins.

Table 1: Selection Table for 318 LPI AEDR-9830 Variant

SEL1	SEL2	INDEX SEL	Interpolation Factor	Index	Max. Output Frequency	CPR at ROP 7.95 mm	CPR at ROP 11 mm
Open	Open	Low	1X	Gated 90°	200 kHz	625	865
		High		Gated 180°			
		Open		Ungated raw			
Open	Low	Low	2X	Gated 90°	400 kHz	1250	1730
		High		Gated 180°			
		Open		Gated 360°			
High	High	Low	4X	Gated 90°	800 kHz	2500	3460
		High		Gated 180°			
		Open		Gated 360°			
Low	Low	Low	8X	Gated 90°	1.6 MHz	5000	6920
		High		Gated 180°			
		Open		Gated 360°			
High	Low	Low	16X	Gated 90°	2.0 MHz	10,000	13,840
		High		Gated 180°			
		Open		Gated 360°			
Open	High	NA	Analog (500 mVpp)	Analog	200 kHz	NA	NA
Low	High	NA	Analog 1 Vpp	Ungated Digital			
High/Low	Open	NA	Analog 1 Vpp	Analog			

Table 2: Selection Table for 318 LPI AEDR-9830E Variant

SEL1	SEL2	INDEX SEL	Interpolation Factor	Index	Max. output frequency	CPR at ROP 7.95 mm	CPR at ROP 11 mm
Open	Open	Low	1X	Gated 90°	200 kHz	625	865
		High		Gated 180°			
		Open		Ungated raw			
Open	Low	Low	2X	Gated 90°	400 kHz	1250	1730
		High		Gated 180°			
		Open		Gated 360°			
High	High	Low	4X	Gated 90°	800 kHz	2500	3460
		High		Gated 180°			
		Open		Gated 360°			
Low	Low	Low	8X	Gated 90°	1.6 MHz	5000	6920
		High		Gated 180°			
		Open		Gated 360°			
High	Low	Low	16X	Gated 90°	3.2 MHz	10,000	13,840
		High		Gated 180°			
		Open		Gated 360°			
High	Open	Low	32X	Gated 90°	4.0 MHz	20,000	27,680
		High		Gated 180°			
		Open		Gated 360°			
Open	High	NA	Analog (500 mVpp)	Analog	200 kHz	NA	NA
Low	High	NA	Analog 1 Vpp	Ungated Digital			
Low	Open	NA	Analog 1 Vpp	Analog			

Table 3: Selection Table for 225 LPI AEDR-9820 Variant

SEL1	SEL2	INDEX SEL	Interpolation Factor	Index	Max. Output Frequency	CPR at ROP 4.6 mm	CPR at ROP 11 mm
Open	Open	Low	1X	Gated 90°	200 kHz	256	612
		High		Gated 180°			
		Open		Ungated raw			
Open	Low	Low	2X	Gated 90°	400 kHz	512	1224
		High		Gated 180°			
		Open		Gated 360°			
High	High	Low	4X	Gated 90°	800 kHz	1024	2448
		High		Gated 180°			
		Open		Gated 360°			
Low	Low	Low	8X	Gated 90°	1.6 MHz	2048	4896
		High		Gated 180°			
		Open		Gated 360°			
High	Low	Low	16X	Gated 90°	2.0 MHz	4096	9792
		High		Gated 180°			
		Open		Gated 360°			
Open	High	NA	Analog (500 mVpp)	Analog	200 kHz	NA	NA
Low	High	NA	Analog 1 Vpp	Ungated Digital			
High/Low	Open	NA	Analog 1 Vpp	Analog			

Table 4: Selection Table for 225 LPI AEDR-9820E Variant

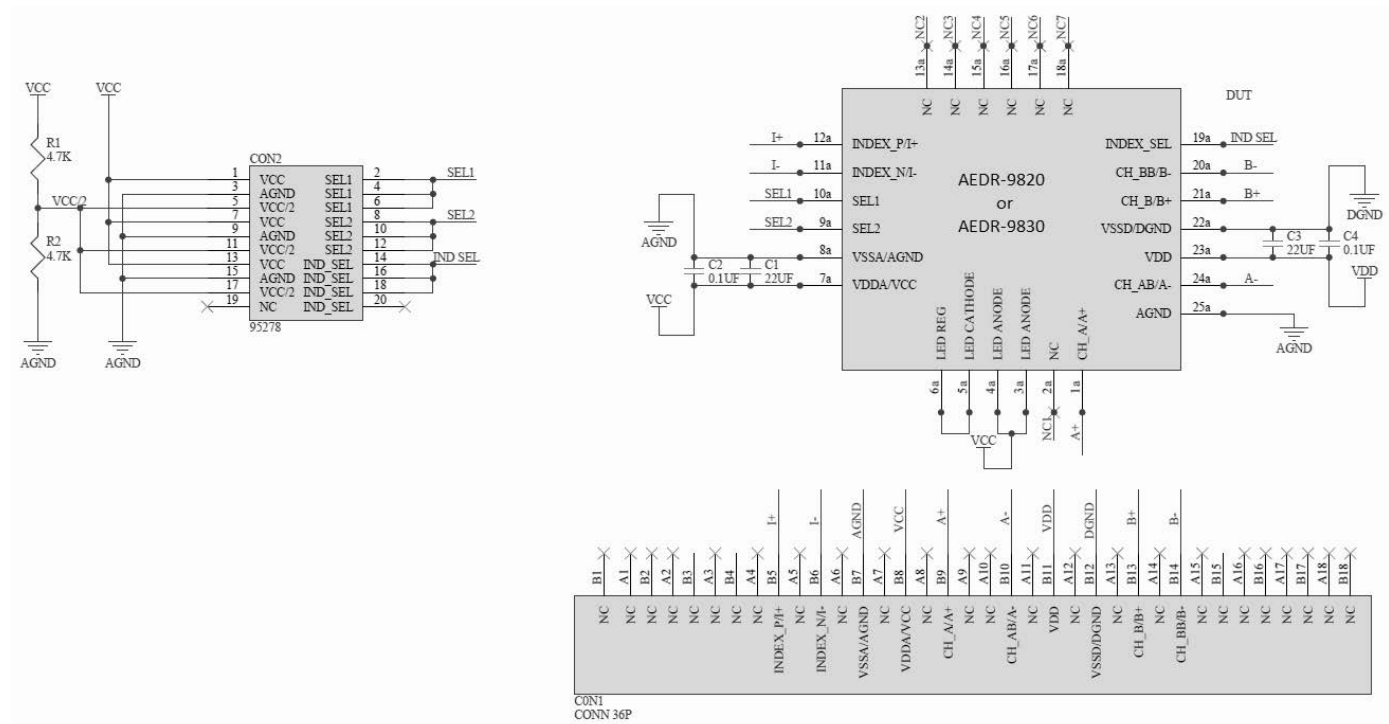
SEL1 ^a	SEL2 ^a	INDEX SEL	Interpolation Factor	Index	Max. Output Frequency	CPR at ROP 4.6 mm	CPR at ROP 11 mm
Open	Open	Low	1X	Gated 90°	200 kHz	256	612
		High		Gated 180°			
		Open		Ungated raw			
Open	Low	Low	2X	Gated 90°	400 kHz	512	1224
		High		Gated 180°			
		Open		Gated 360°			
High	High	Low	4X	Gated 90°	800 kHz	1024	2448
		High		Gated 180°			
		Open		Gated 360°			
Low	Low	Low	8X	Gated 90°	1.6 MHz	2048	4896
		High		Gated 180°			
		Open		Gated 360°			
High	Low	Low	16X	Gated 90°	3.2 MHz	4096	9792
		High		Gated 180°			
		Open		Gated 360°			
High	Open	Low	32X	Gated 90°	4.0 MHz	8192	19584
		High		Gated 180°			
		Open		Gated 360°			
Open	High	N/A	Analog (500 mVpp)	Analog	200 kHz	N/A	N/A
Low	High	N/A	Analog 1 Vpp	Ungated Digital			
Low	Open	N/A	Analog 1 Vpp	Analog			

a. Open selection must be connected to the middle of a voltage divider circuit.

4 Board Schematic and Pin Assignments

4.1 Board Schematic

Figure 5: Evaluation Board Schematic



4.2 Pin Assignments

Table 5: Connector 1 Pin Assignments

Connector 1 (Top Side)	Label
1	NC
2	NC
3	NC
4	NC
5	INDEX_P/I+
6	INDEX_P/I-
7	VSSA/AGND
8	VDDA/VCC
9	CH_A/A+
10	CH_AB/A-
11	VDD
12	VSSD/DGND
13	CH_B/B+
14	CH_BB/B-
15	NC

Table 5: Connector 1 Pin Assignments (Continued)

Connector 1 (Top Side)	Label
16	NC
17	NC
18	NC

The finger design of Connector 1 is a match to either one of the following card edge connectors:

- EDAC, CONN EDGE DUAL FEMALE 36POS 0.100, P/N# 395-036-520-202
- SULLINS, CONN EDGE DUAL FEMALE 36POS 0.100, P/N# EBC18DREH

The use of these card edge connectors is not needed if necessary connections can be made via manual soldering to the relevant card edge fingers.

Table 6: Connector 2 Pin Assignments

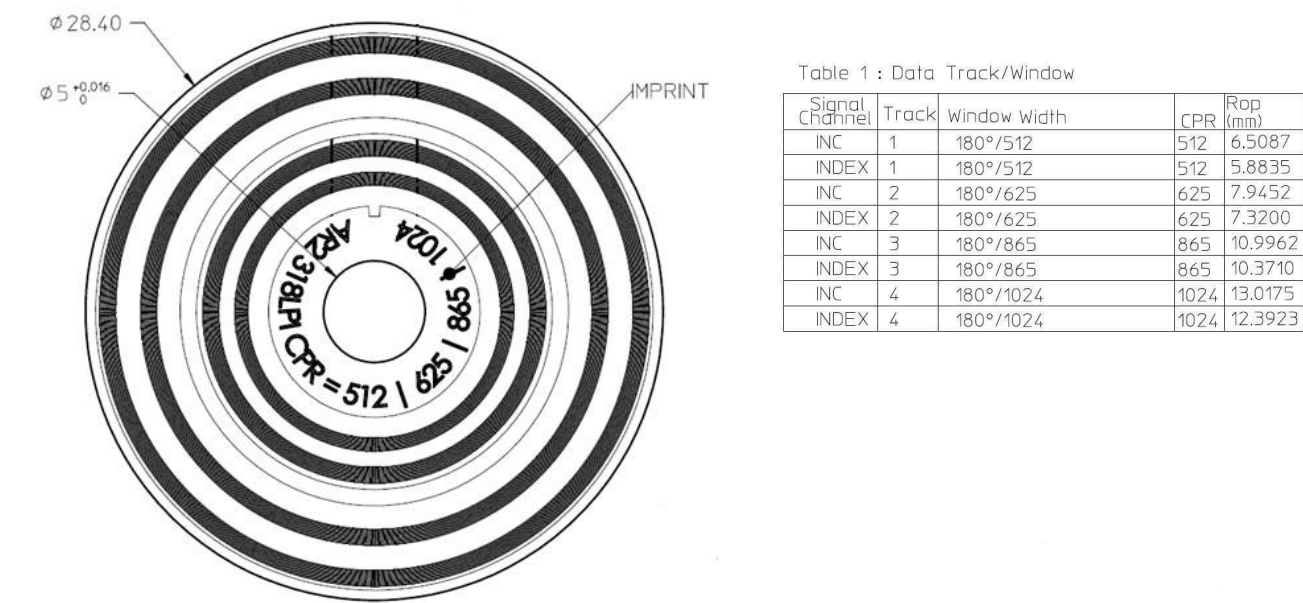
Connector 1 (Top Side)	Label	State
1	SEL1	VCC
2		AGND
3		OPEN
4	SEL2	VCC
5		AGND
6		OPEN
7	INDEX_SEL	VCC
8		AGND
9		OPEN
10	NC	—

NOTE: Refer to [Table 1, Selection Table for 318 LPI AEDR-9830 Variant](#), [Table 2, Selection Table for 318 LPI AEDR-9830E Variant](#), [Table 3, Selection Table for 225 LPI AEDR-9820 Variant](#), or [Table 4, Selection Table for 225 LPI AEDR-9820E Variant](#) for the various selection options available by changing the respective jumper position.

5 Code Wheel Drawing

The following figure shows a matching code wheel sample drawing for the AEDR-9830/9830E evaluation board.

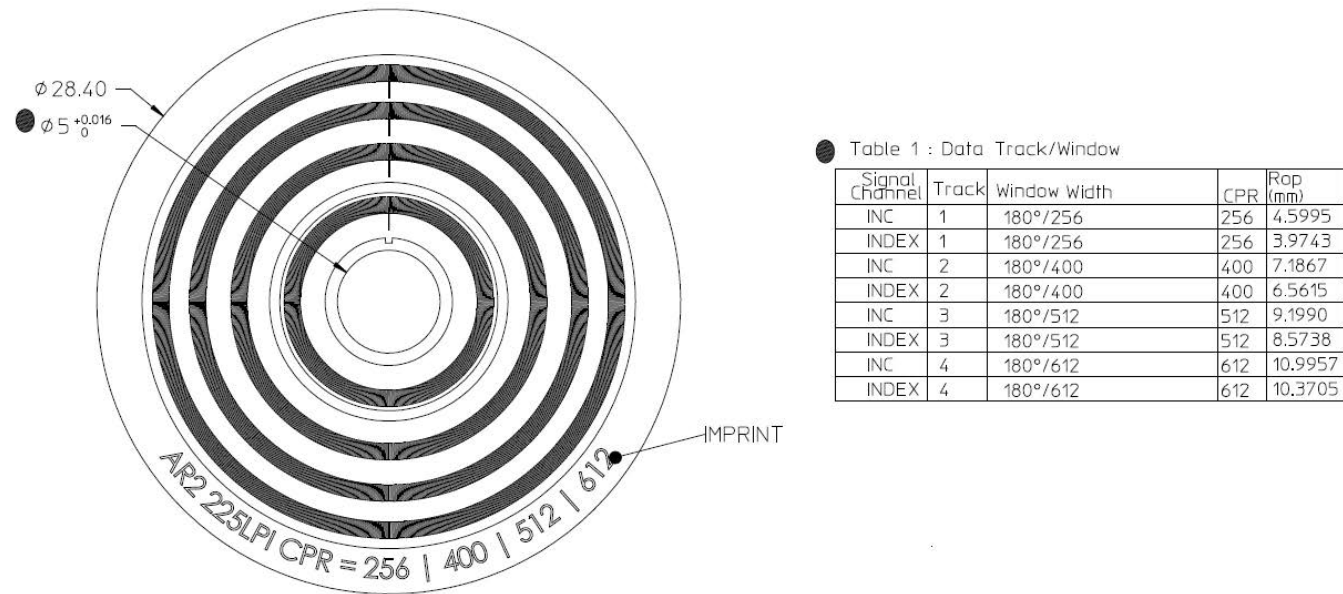
Figure 6: 318 LPI 4-Track (CPR) Code Wheel Drawing



NOTE: Ignore the 512CPR / ROP 6.5087mm; performance is not per data sheet and is not applicable for customer applications.

The following figure shows a matching code wheel sample for the AEDR-9820 evaluation board.

Figure 7: 225 LPI 4-Track (CPR) Code Wheel Drawing



6 Ordering Information

Part Number	Product Description
HEDS-9820EVB	AEDR-9820, 225 LPI evaluation board and code wheel
HEDS-9820EEVB	AEDR-9820E, 225 LPI evaluation board and code wheel
HEDS-9830EVB	AEDR-9830, 318 LPI evaluation board and code wheel
HEDS-9830EEVB	AEDR-9830E, 318 LPI evaluation board and code wheel
HEDS-9830EEVBL	AEDR-9830E, 318 LPI evaluation board and code strip

