

# Compact Near Eye Display

## CNED Datasheet

### Product Highlights

- Ultra-Compact
- High Definition 1080p
- 40° FOV Per Eye
- Low-Power
- Easy Mounting
- High-Brightness
- Curved Construction
- Standard Eyeglass Vertex Eye Relief
- Ruggedized
- Designed for Impact Safety

Items covered in this datasheet:

Part Number	Product Description
TRI-50015 / 16	Eyeglass form factor CNED
TRI-50032 / 33	HUD form factor CNED

### Applications

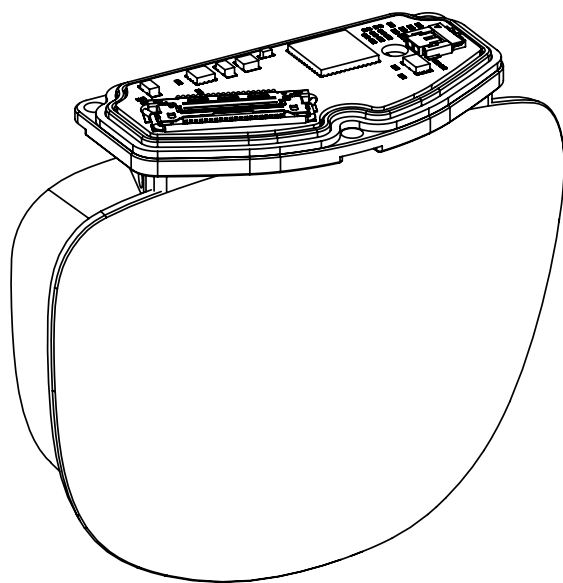
- Head Mounted Displays
- AR / XR / MR
- Heads-Up-Displays
- Smart Safety Glasses

### Abstract

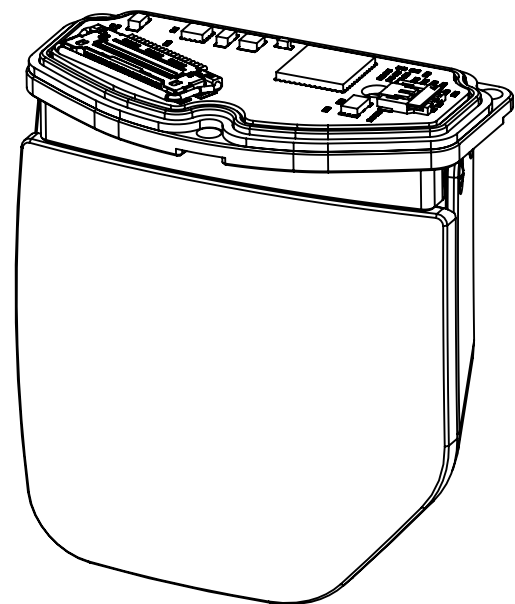
This document describes the hardware features and specifications of the VX Compact Near Eye Display (CNED). The CNED is a see-through display that is designed for Augmented Reality, Extended Reality, and Mixed Reality in head mounted displays (HMD) applications.

CNED integration is simple with the built-in driver and HBB backlight. Each CNED is rugged and waterproof.

TRI-50015 / 16



TRI-50032 / 33



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## Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

### 001 - Draft Release

Basic information added for a draft release.

### 002 - Initial Release

Updated information with engineering approval.

### 003 - Water Resistance Update

Updated information for new features and pinouts added.

## Part Number Ordering Information

**SSS - NNNNN - XX - VVV**

**(Series) - (Part Type & Number) - (Option Configuration) - (Version)**

# Hardware Overview

## Description

The VX CNED is a see-through display designed for Augmented Reality applications. It is a fully contained system needing only a signal and power. This rugged optic is built for mission-critical applications that require waterproofing and eye-safety.

The CNED is smaller than other systems of similar FOV and brightness. It will outperform waveguides in both size and safety. Waveguides manufacturers often like to claim a 2mm thickness, however, they always seem to leave out the added bulk of the projector. Once the display driver, projector, and eye-protection are added, waveguides are not so small. The CNED holds its own weight.

VX CNEDs offer good image quality, high-brightness, and impact resistance. The small package is easily integrated into a variety of headset form factors.

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## Features

The CNED features a high-efficiency polymer optical engine, LCoS microdisplay, and integrated MIPI DSI display driver. The optic is only 15mm thick leaving a generous 2mm for a waterproof gasket and rock-solid mounting.

The CNED doesn't require tinting to be day-light visible and it can be dimmed for low-light use. This makes it the go-to choice for digital night vision and snowfield applications. This RGB Sequential Color technology is perfect for low-power applications. Each sub-pixel fills 90% of the pixel making the "screen-door effect" nearly undetectable.

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## Feature List

- **High Definition 1080p**
- **40° FOV**
- **RGB Sequential Color**
- **Low-Power**
- **Curved Construction**
- **15mm Center Thickness**
- **Light-Weight**
- **Standard Eyeglass Vertex Eye Relief**
- **Designed for Impact Safety**
- **Low-Light to Daylight Brightness Adjustable**
- **Water-Resistant**
- **Ruggedized**
- **High-Brightness**

# Specifications

## Functional Specifications

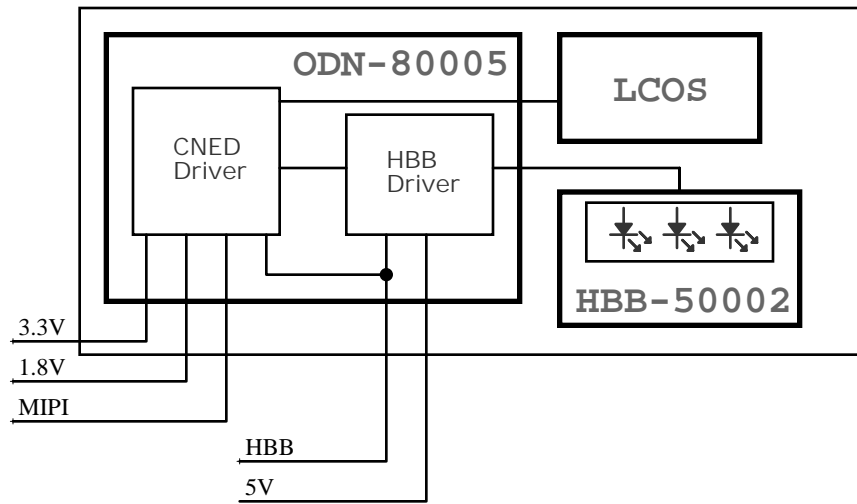
Feature	Description	Typical	Units
Mass	Completed CNED assembly mass	35	g
VLT	CNED visible light transmittance at 550nm	46	%
Field of View	Diagonal field of view per eye	40	Degrees
Eye Vertex	Recommended eye distance for best image	9 - 12	mm
Frame Rate	RGB frame rate (sequential)	120	Hz
Resolution	CNED display resolution	1920 x 1080	px
Pixel Fill	Pixel size for each sub-pixel.	90	%
Luminous Intensity	High-Brightness Backlight	3600	mcd
Focus Distance	Factory configurable display focus distance	1 to ∞	m
Center Thickness	Center thickness of CNED from back lens surface to the front	15.2	mm
Ruggedized	Designed for drop survival from 1m. (Customer to verify)		
Water Resistance	Designed to meet IP67 when integrated into a headset. (Customer to verify)		
Impact Rating	Designed for high-mass impact. (Customer to verify)		

## Absolute Maximum Ratings

Exceeding the Absolute Maximum Rating may cause permanent damage to the device. Continuous use at the absolute maximum rating for extended periods may affect device reliability. Absolute maximum ratings are based on environmental conditions of 22°C and 50% relative humidity. Use outside of these conditions will require independent testing and verification by the customer.

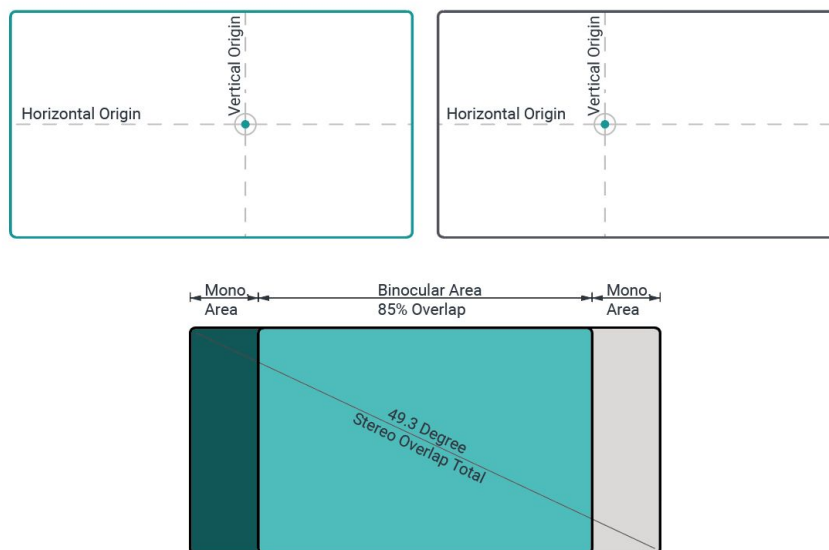
Name	Description	Minimum	Maximum	Units
VDD12 Voltage	1.2 volt system power	1.14	1.26	VDC
DVDD18 Voltage	1.8 volt supply for digital circuitry	1.65	1.95	VDC
TUSE	Operating temperature range	-10	45	°C
TSTG	Storage temperature range	-18	38	°C

## Functional Block Diagram



## Recommended overlap

Virtual display overlap is recommended to be 85% or greater. This will ensure a good 3D experience while still allowing for greater immersion. When the overlap is set lower than 100%, the image origin for each eye's module will need to shift inward for proper stereo alignment.



## Pinout Tables

The following tables define the basic pin functions. Full pin definitions are available in the reference package. The following tables are for information only. Schematics are available with the reference package.

Connector - Pin	Name	Type	Description
J10 - 1	VDD12	Power	1.2 volt system power
J10 - 2	DVDD18	Power	1.8 volt supply for digital circuitry
J10 - 3	AVDD33	Power	3.3 volt supply for analog circuitry
J10 - 4	Reserved	-	Reserved
J10 - 5	Reserved	-	Reserved
J10 - 6	Reserved	-	Reserved
J10 - 7	Reserved	-	Reserved
J10 - 8	Reserved	-	Reserved
J10 - 9	Reserved	-	Reserved
J10 - 10	Reserved	-	Reserved
J10 - 11	MIPI_CLK_N	Output	MIPI Clock Negative
J10 - 12	MIPI_CLK_P	Output	MIPI Clock Positive
J10 - 13	MIPI_L3_N	Output	MIPI Lane 3 Negative
J10 - 14	MIPI_L3_P	Output	MIPI Lane 3 Positive
J10 - 15	MIPI_L2_N	Output	MIPI Lane 2 Negative
J10 - 16	MIPI_L2_P	Output	MIPI Lane 2 Positive
J10 - 17	MIPI_L1_N	Output	MIPI Lane 1 Negative
J10 - 18	MIPI_L1_P	Output	MIPI Lane 1 Positive
J10 - 19	MIPI_L0_N	Output	MIPI Lane 0 Negative
J10 - 20	MIPI_L0_P	Output	MIPI Lane 0 Positive
J10 - Shield	DGND	Ground	Device Ground
J13 - 1	DGND	Ground	Device Ground
J13 - 2	5V_SYS	Power	5 volt system power

## Mating Connector

**J13** - Hirose Electric Co:

**J10** - IPEX:

DF58-2S-1\_2C

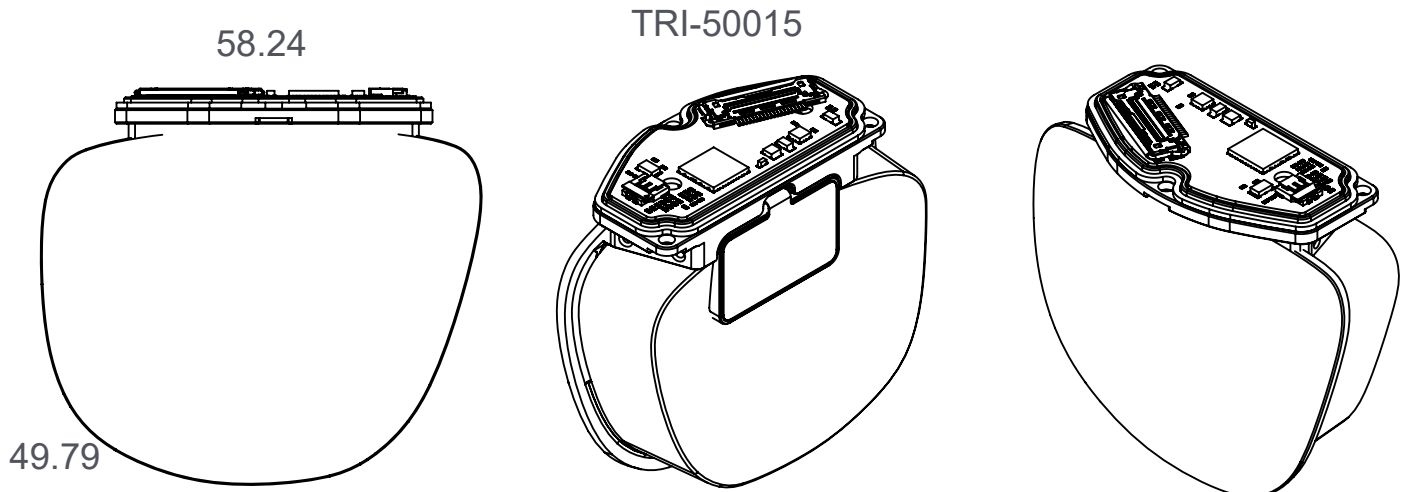
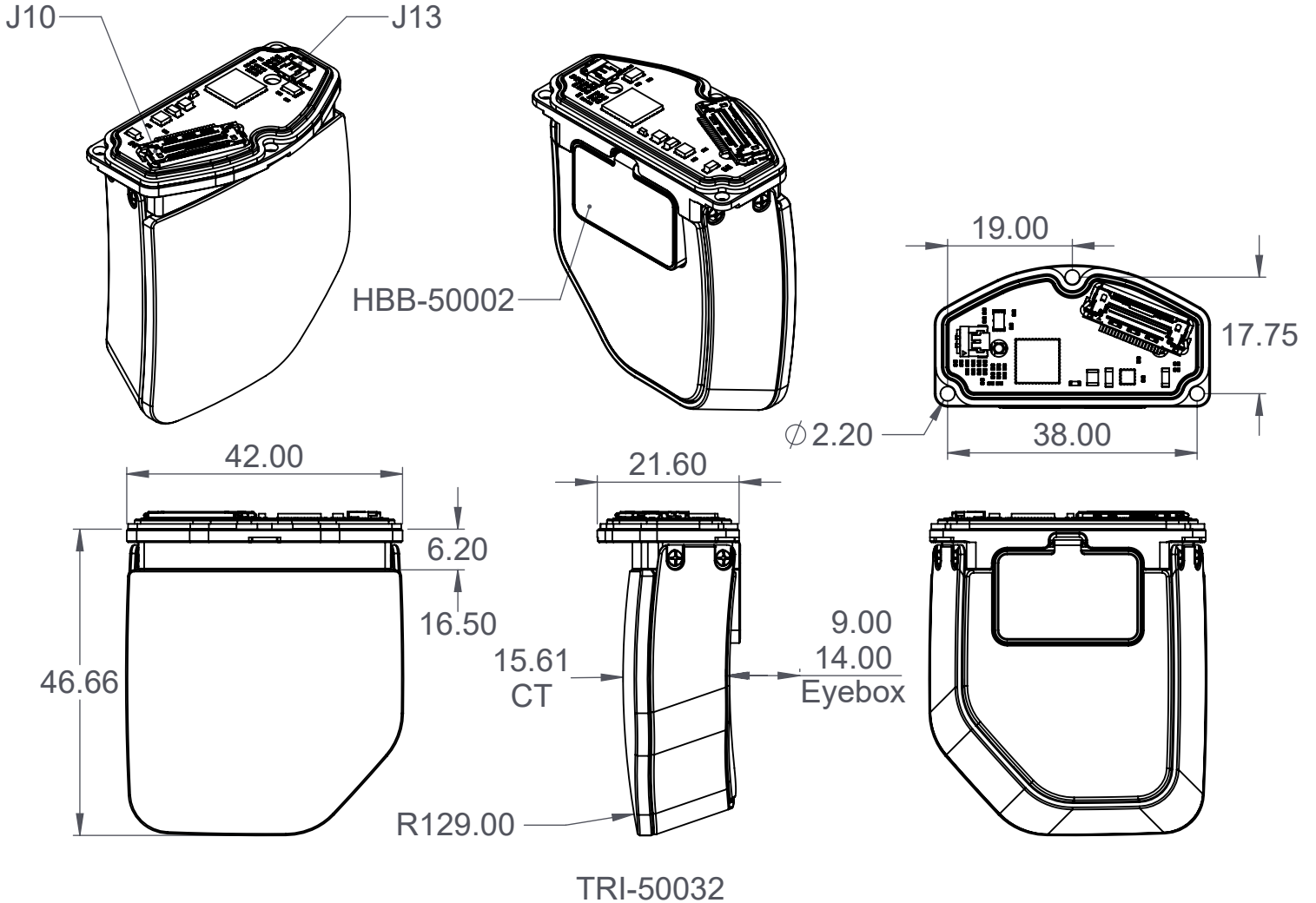
20453-320T-13S

# Mechanical Drawings

This is a limited dimension drawing to be used for part information and reference. 3D CAD takes precedence over these drawings.

Global tolerance is 0.3mm unless otherwise stated.

3D STEP models are available under NDA.



## Important Notice – Please Read Carefully

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All international customers will be required to fill out an End Use Statement document before shipment.

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Due to the manufacturing processes, values can differ by +-15%.

Customers should obtain the latest information, by contacting VX, before placing orders.

Customers are solely responsible for the use of VX products and VX assumes no liability for application assistance or the design of Customers' products.

Storage: 22°C at 50% relative humidity is recommended. Prolonged storage is not recommended.

Resale of VX products shall void any warranty granted by VX for such products.

This product shall not be used in life-support devices or other medical systems. Customer to independently verify information and shall test for all required certifications, including but not limited to, RoHS, ANSI Z87, and FDA.

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Augmented Reality  
Design  
Displays  
Integration