

MARS & BlueShift Development Kits

MARS Datasheet

Product Highlights

- Modularized Design
- USB 3.1 Type-C +DP-ALT Mode
- Auto Enumerate Plug-n-Play
- Supports: Windows 10, Android, & Linux
- Onboard MCU for Data Processing
- Lightweight
- Expandable
- High Definition 1080p CNEDs
- 40° FOV
- Ruggedized
- Designed To Meet IP67 Rating

Applications

- Reference Integration
- Field Testing
- White Label Rebranding
- Custom Device Design

Abstract

This document describes the hardware features and specifications of the VX BlueShift Development Headset and the VX Modular Augmented Reality System (MARS). The VX MARS and BlueShift include everything needed for basic AR, MR, and XR functionality. The system allows for flexibility and simplicity during headset development.

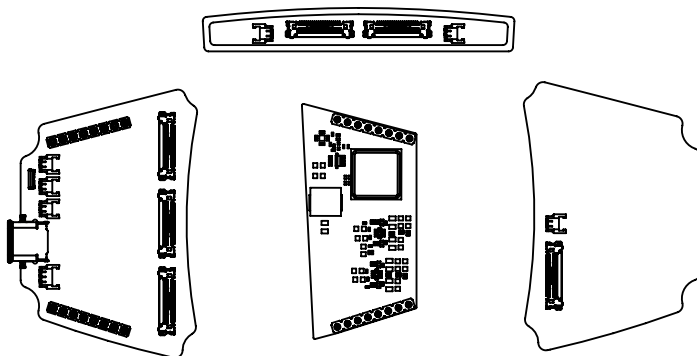
Items covered in this datasheet:

Part Number	Product Description
ODN-50001	MARS BlueShift Headset Dev-Kit
ODN-50101	MARS Barebones Dev-Kit
ODN-50005	Imaging Sensor Module
ODN-50007	INS, IMU, and GPS Tracking Module
ODN-50018	Depth Module with Intel D430

A ready to manufacture reference design is available for users that have specific applications in mind. VX offers support for customers looking to develop a custom headset. A VX led design has a typical development time of 14 weeks.

The VX MARS works with fully-featured USB Type-C devices. The displays and sensors will enumerate automatically on supported devices.

MARS Barebones Kit



MARS BlueShift Headset

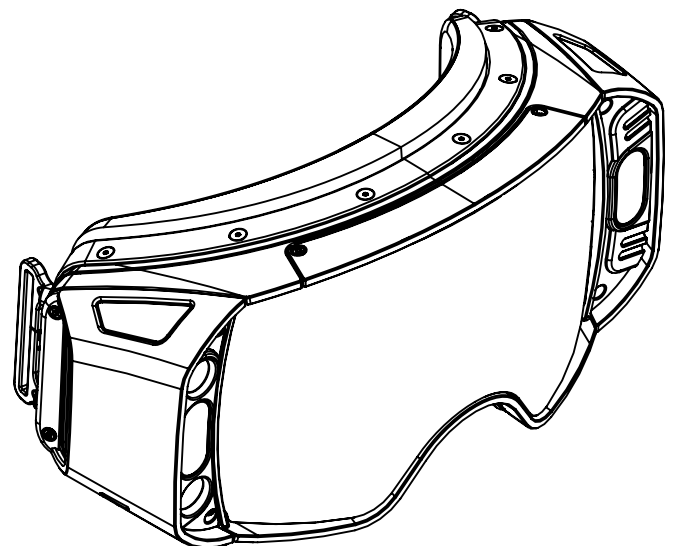


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Revision History

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. Supplementary data will be published later.

Part Number Ordering Information

SSS - NNNNN - XX - VVV

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

Hardware Overview

Description

The VX modular augmented reality system (MARS) is a complete, ready to integrate, AR reference. The device offers everything needed for USB Type-C PD negotiation, sensor integration, and onboard data processing for plug-n-play accessory modules. The reference supports two FHD CNED displays, 5 Gbit/s data bus, high-speed multiplexing, and full device control via the serial, MIPI, and I²C interfaces.

The VX BlueShift is a finished headset dev-kit with all of the MARS features integrated into a rugged, outdoor-ready package. This dev-kit is meant for field testing in demanding environments. The BlueShift is ready for customization for high-performance applications. The Type-C interface supports Windows 10, Android, and Linux systems.

Features

The full range of hardware features on the VX MARS includes a mainboard, USB-C Power Delivery, peripheral accessory boards, and interface to VX CNED AR optical modules. The system is designed for modularity and efficiency. Sensor integration is easy with three data protocols and power available at each modular interface point.

This distinctive system is available in three versions: **(1) Barebones Development Boards** ready for integration into a headset. **(2) The VX BlueShift**, a complete headset dev-kit. **(3) As a customized white-label headset** designed for your needs. Customers looking for a head-start on their own development should inquire about licensing the reference design.

The onboard microcontroller handles communication and sensor fusion of the integrated sensors, peripheral devices, and human-machine-interface. Application firmware examples are provided with each kit. Additional support is available through service packages.

Feature List

- Modularized Design
- USB 3.1 Type-C PD with DP-ALT Mode
- Auto Enumerate Plug-n-Play
- Supports Windows 10, Android, & Linux
- Onboard MCU for Data Processing
- Lightweight
- Two High Definition 1080p CNEDs
- 40° FOV
- Low-light to daylight brightness adjustable
- Ruggedized
- Impact Resistant
- Water-Resistant
- Three VX Modular Interfaces

Specifications

Functional Specifications

Feature	Description	Typical	Units
Frame Material	Material of the enclosure frame	Aluminum	-
Mass	Base headset mass w/o strap, modules, or shield	270	g
IPD	Interpupillary distance	63	mm
VLT@CNED	CNED visible light transmittance at 550nm	40	%
VLT@Shield	Untinted shield visible light transmittance at 550nm	88	%
FOV	Diagonal field of view	40	°
Resolution	CNED display resolution	1920 x 1080	px
Luminous Intensity	High-Brightness Backlight (HBB-50002)	3600	mcd
Type-C	USB-PD 2.0 with DP-ALT Mode	USB 3.1	-
DP-ALT	DisplayPort version support	1.2	-
Device Bandwidth	Maximum data rate for displays and modules combined	10	Gbit/s
Module Bandwidth	Maximum data rate for all modules combined	5	Gbit/s
Display Bandwidth	Maximum data rate for DisplayPort 1.2	8	Gbit/s
Ruggedized	Designed for drop survival from 1m. (Customer to verify)		
Water Resistance	Designed to meet IP67 (Customer to verify)		
Impact Rating	Designed for high-mass impact (Customer to verify)		

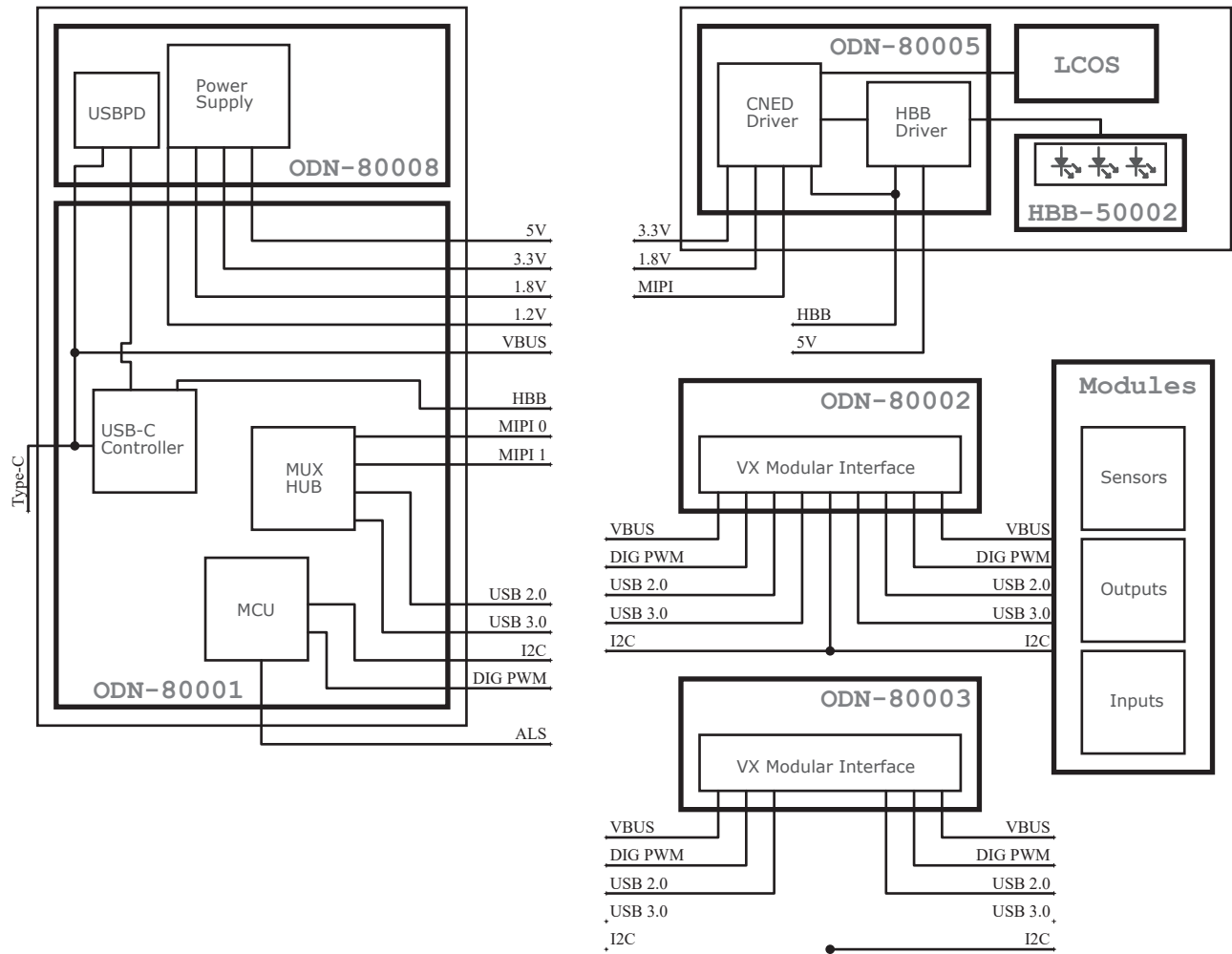
Absolute Maximum Ratings

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.

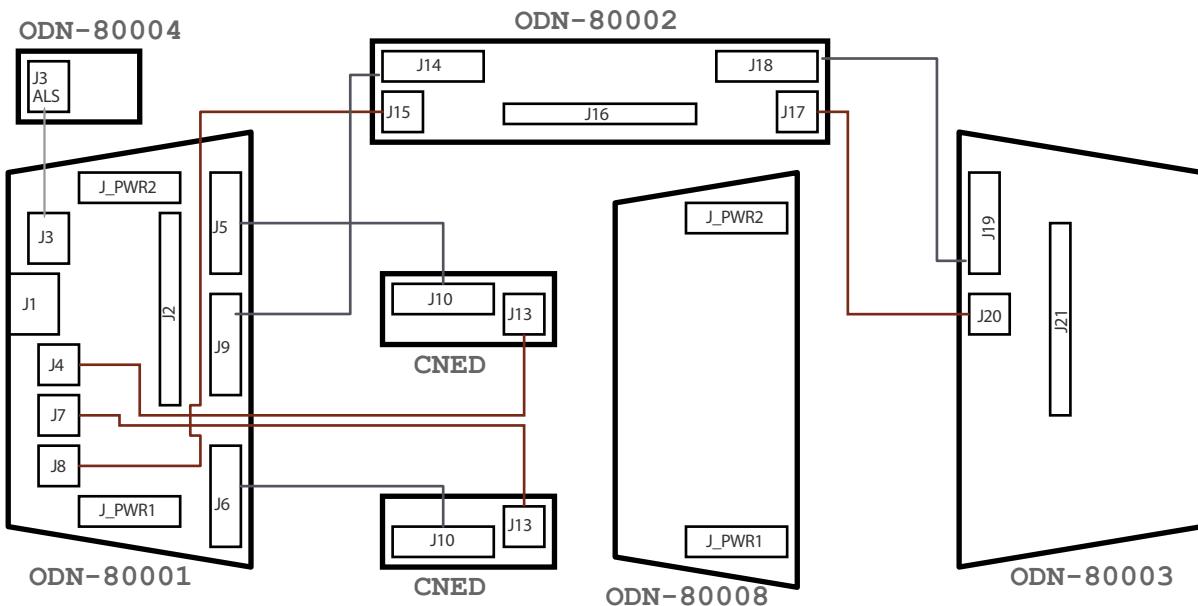
Name	Description	Minimum	Maximum	Units
VBUS	Device current draw from VBUS	-	3	A
	Voltage for Type-C port VBUS	5	20	VDC
CC1, CC2	Voltage for Type-C port pins	-0.6	22	VDC
TX1, TX2, RX1, RX2	Voltage for Type-C port differential pins	-0.3	4	VDC
SUB1, SUB2	Voltage for Type-C port I/O pins	-0.3	4	VDC
Modular Interface	Connection cycles	-	1,000	-
	*Module (combined) current draw from VBUS	-	2	A
	Voltage for digital pins 8 and 9	-0.5	5	VDC
	Current on digital pins 8 and 9	-	40	mA
	Voltage on differential and I/O pins	-0.3	5.5	VDC
TSTG	Storage temperature range	-18	38	°C

* Modules will need additional thermal consideration when using more than 0.3A.

Functional Block Diagram



Interconnectivity Diagram



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.

ODN-80001 Mainboard

Connector - Pin	Name	Type	Description
J2 - 1	DGND	Ground	Device Ground
J2 - 2	USB_RMOD_N	Input / Output	Right Module USB 2.0, Negative
J2 - 3	USB_RMOD_P	Input / Output	Right Module USB 2.0, Positive
J2 - 4	USB_RMOD_TX_P	Input / Output	Right Module USB 3.0 Transmit, Positive
J2 - 5	USB_RMOD_TX_N	Input / Output	Right Module USB 3.0 Transmit, Negative
J2 - 6	USB_RMOD_RX_P	Input / Output	Right Module USB 3.0 Receive, Positive
J2 - 7	USB_RMOD_RX_N	Input / Output	Right Module USB 3.0 Receive, Negative
J2 - 8	RMOD_PWM_D5	Input / Output	Sensor Input/Output for Right Module
J2 - 9	RMOD_PWM_D6	Input / Output	Sensor Input/Output for Right Module
J2 - 10	SDA	Input / Output	I ² C Data
J2 - 11	SCL	Input	I ² C Clock
J2 - 12	VBUS_15V	Power	USBPD VBUS Power
J3 - 1	SIG (ALS)	Analog Input	Ambient Light Sensor Input
J3 - 2	DGND	Ground	Ambient Light Sensor Ground
J3 - 3	5V_SYS	Power	5.0 Volt System Power
J4 - 1	5V_SYS	Power	5.0 Volt System Power
J4 - 2	DGND	Ground	Device Ground
J5 - 1	MIPI_10_L0_P	Output	MIPI Lane 0, Positive
J5 - 2	MIPI_10_L0_N	Output	MIPI Lane 0, Negative
J5 - 3	MIPI_10_L1_P	Output	MIPI Lane 1, Positive
J5 - 4	MIPI_10_L1_N	Output	MIPI Lane 1, Negative
J5 - 5	MIPI_10_L2_P	Output	MIPI Lane 2, Positive
J5 - 6	MIPI_10_L2_N	Output	MIPI Lane 2, Negative
J5 - 7	MIPI_10_L3_P	Output	MIPI Lane 3, Positive
J5 - 8	MIPI_10_L3_N	Output	MIPI Lane 3, Negative
J5 - 9	MIPI_10_CLK_P	Output	MIPI Clock, Positive
J5 - 10	MIPI_10_CLK_N	Output	MIPI Clock, Negative
J5 - 11	Reserved	-	Reserved
J5 - 12	Reserved	-	Reserved

Continued - ODN-80001 Mainboard

Connector - Pin	Name	Type	Description
J5 - 13	Reserved	-	Reserved
J5 - 14	Reserved	-	Reserved
J5 - 15	Reserved	-	Reserved
J5 - 16	Reserved	-	Reserved
J5 - 17	Reserved	-	Reserved
J5 - 18	AVDD33	Power	3.3 Volt Supply for Analog Circuitry
J5 - 19	DVDD18	Power	1.8 Volt Supply for Digital Circuitry
J5 - 20	VDD12	Power	1.2 Volt System Power
J6 - 1	MIPI_00_L0_P	Output	MIPI Lane 0, Positive
J6 - 2	MIPI_00_L0_N	Output	MIPI Lane 0, Negative
J6 - 3	MIPI_00_L1_P	Output	MIPI Lane 1, Positive
J6 - 4	MIPI_00_L1_N	Output	MIPI Lane 1, Negative
J6 - 5	MIPI_00_L2_P	Output	MIPI Lane 2, Positive
J6 - 6	MIPI_00_L2_N	Output	MIPI Lane 2, Negative
J6 - 7	MIPI_00_L3_P	Output	MIPI Lane 3, Positive
J6 - 8	MIPI_00_L3_N	Output	MIPI Lane 3, Negative
J6 - 9	MIPI_00_CLK_P	Output	MIPI Clock, Positive
J6 - 10	MIPI_00_CLK_N	Output	MIPI Clock, Negative
J6 - 11	Reserved	-	Reserved
J6 - 12	Reserved	-	Reserved
J6 - 13	Reserved	-	Reserved
J6 - 14	Reserved	-	Reserved
J6 - 15	Reserved	-	Reserved
J6 - 16	Reserved	-	Reserved
J6 - 17	Reserved	-	Reserved
J6 - 18	AVDD33	Power	3.3 Volt Supply for Analog Circuitry
J6 - 19	DVDD18	Power	1.8 Volt Supply for Digital Circuitry
J6 - 20	VDD12	Power	1.2 Volt System Power
J7 - 1	5V_SYS	Power	5.0 Volt System Power
J7 - 2	DGND	Ground	Device Ground
J8 - 1	VBUS_15V	Power	USBPD VBUS Power
J8 - 2	DGND	Ground	Device Ground

Continued - ODN-80001 Mainboard

Connector - Pin	Name	Type	Description
J9 - 1	USB_FMOD_N	Input / Output	Front Module USB 2.0, Negative
J9 - 2	USB_FMOD_P	Input / Output	Front Module USB 2.0, Positive
J9 - 3	USB_FMOD_TX_P	Input / Output	Front Module USB 3.0 Transmit, Positive
J9 - 4	USB_FMOD_TX_N	Input / Output	Front Module USB 3.0 Transmit, Negative
J9 - 5	USB_FMOD_RX_P	Input / Output	Front Module USB 3.0 Receive, Positive
J9 - 6	USB_FMOD_RX_N	Input / Output	Front Module USB 3.0 Receive, Negative
J9 - 7	FMOD_DIG_D7	Input / Output	Sensor Input/Output for Front Module
J9 - 8	FMOD_DIG_D8	Input / Output	Sensor Input/Output for Front Module
J9 - 9	Reserved	-	Reserved
J9 - 10	SDA	Input / Output	I ² C Data
J9 - 11	SCL	Input	I ² C Clock
J9 - 12	Reserved	-	Reserved
J9 - 13	LMOD_PWM_D9	Input / Output	Sensor Input/Output for Left Module
J9 - 14	LMOD_PWM_D10	Input / Output	Sensor Input/Output for Left Module
J9 - 15	USB_LMOD_N	Input / Output	Left Module USB 2.0, Negative
J9 - 16	USB_LMOD_P	Input / Output	Left Module USB 2.0, Positive
J9 - 17	USB_LMOD_TX_P	Input / Output	Left Module USB 3.0 Transmit, Positive
J9 - 18	USB_LMOD_TX_N	Input / Output	Left Module USB 3.0 Transmit, Negative
J9 - 19	USB_LMOD_RX_P	Input / Output	Left Module USB 3.0 Receive, Positive
J9 - 20	USB_LMOD_RX_N	Input / Output	Left Module USB 3.0 Receive, Negative
J_PWR1 - 1	DGND	Ground	Device Ground
J_PWR1 - 2	TCPP_CC2	Signal	USBPD Type-c Controller CC2
J_PWR1 - 3	TCPP_CC1	Signal	USBPD Type-c Controller CC1
J_PWR1 - 4	CC2c	Signal	USBPD CC2 Port Over-voltage Protection
J_PWR1 - 5	CC1c	Signal	USBPD CC1 Port Over-voltage Protection
J_PWR1 - 6	DB_CC2	Signal	Low Voltage Fault Reporting
J_PWR1 - 7	FLT_CC1	Signal	USBPD Fault Reporting
J_PWR1 - 8	VBUS_15V	Power	USBPD VBUS Power
J_PWR2 - 1	AVDD10	Power	1.0 Volt Supply for Analog Circuitry
J_PWR2 - 2	DVDD10	Power	1.0 Volt Supply for Digital Circuitry
J_PWR2 - 3	VDD12	Power	1.2 Volt System Power
J_PWR2 - 4	DVDD18	Power	1.8 Volt Supply for Digital Circuitry
J_PWR2 - 5	DVDD33	Power	3.3 Volt Supply for Digital Circuitry
J_PWR2 - 6	5V_SYS	Power	5.0 Volt System Power
J_PWR2 - 7	AVDD33	Power	3.3 Volt Supply for Analog Circuitry
J_PWR2 - 8	AVDD18	Power	1.8 Volt Supply for Analog Circuitry

ODN-80008 USB Power Board

Connector - Pin	Name	Type	Description
J_PWR1 - 1	VBUS_15V	Power	USBPD VBUS Power
J_PWR1 - 2	FLT_CC1	Signal	USBPD Fault Reporting
J_PWR1 - 3	DB_CC2	Signal	Low Voltage Fault Reporting
J_PWR1 - 4	CC1c	Signal	USBPD CC1 Pin Controller Side
J_PWR1 - 5	CC2c	Signal	USBPD CC2 Pin Controller Side
J_PWR1 - 6	TCPD_CC1	Signal	USBPD CC1 Pin Port Side
J_PWR1 - 7	TCPD_CC2	Signal	USBPD CC2 Pin Port Side
J_PWR1 - 8	DGND	Ground	Device Ground
J_PWR2 - 1	AVDD18	Power	1.8 Volt Supply for Analog Circuitry
J_PWR2 - 2	AVDD33	Power	3.3 Volt Supply for Analog Circuitry
J_PWR2 - 3	5V_SYS	Power	5.0 Volt System Power
J_PWR2 - 4	DVDD33	Power	3.3 Volt Supply for Digital Circuitry
J_PWR2 - 5	DVDD18	Power	1.8 Volt Supply for Digital Circuitry
J_PWR2 - 6	VDD12	Power	1.2 Volt System Power
J_PWR2 - 7	DVDD10	Power	1.0 Volt Supply for Digital Circuitry
J_PWR2 - 8	AVDD10	Power	1.0 Volt Supply for Analog Circuitry

Front module Interface Board

Connector - Pin	Name	Type	Description
J14 - 1	USB_LMOD_RX_N	Input / Output	Left Module USB 3.0 Receive, Negative
J14 - 2	USB_LMOD_RX_P	Input / Output	Left Module USB 3.0 Receive, Positive
J14 - 3	USB_LMOD_TX_N	Input / Output	Left Module USB 3.0 Transmit, Negative
J14 - 4	USB_LMOD_TX_P	Input / Output	Left Module USB 3.0 Transmit, Positive
J14 - 5	USB_LMOD_P	Input / Output	Left Module USB 2.0, Positive
J14 - 6	USB_LMOD_N	Input / Output	Left Module USB 2.0, Negative
J14 - 7	LMOD_PWM_D10	Input / Output	Sensor Input Or 8-bit Pwm Output for Left Module
J14 - 8	LMOD_PWM_D9	Input / Output	Sensor Input Or 8-bit Pwm Output for Left Module
J14 - 9	Reserved	-	Reserved
J14 - 10	SCL	Input	I ² C Clock
J14 - 11	SDA	Input / Output	I ² C Data
J14 - 12	Reserved	-	Reserved
J14 - 13	FMOD_DIG_D8	Input / Output	Sensor Input Or Digital Output for Front Module
J14 - 14	FMOD_DIG_D7	Input / Output	Sensor Input Or Digital Output for Front Module
J14 - 15	USB_FMOD_RX_N	Input / Output	Front Module USB 3.0 Receive, Negative
J14 - 16	USB_FMOD_RX_P	Input / Output	Front Module USB 3.0 Receive, Positive
J14 - 17	USB_FMOD_TX_N	Input / Output	Front Module USB 3.0 Transmit, Negative
J14 - 18	USB_FMOD_TX_P	Input / Output	Front Module USB 3.0 Transmit, Positive
J14 - 19	USB_FMOD_P	Input / Output	Front Module USB 2.0, Positive
J14 - 20	USB_FMOD_N	Input / Output	Front Module USB 2.0, Negative
J15 - 1	DGND	Ground	Device Ground
J15 - 2	VBUS_15V	Power	USBPD VBUS Power
J16 - 1	DGND	Ground	Device Ground
J16 - 2	USB_FMOD_N	Input / Output	Front Module USB 2.0, Negative
J16 - 3	USB_FMOD_P	Input / Output	Front Module USB 2.0, Positive
J16 - 4	USB_FMOD_TX_P	Input / Output	Front Module USB 3.0 Transmit, Positive
J16 - 5	USB_FMOD_TX_N	Input / Output	Front Module USB 3.0 Transmit, Negative
J16 - 6	USB_FMOD_RX_P	Input / Output	Front Module USB 3.0 Receive, Positive
J16 - 7	USB_FMOD_RX_N	Input / Output	Front Module USB 3.0 Receive, Negative
J16 - 8	FMOD_DIG_D7	Input / Output	Sensor Input Or Digital Output for Front Module
J16 - 9	FMOD_DIG_D8	Input / Output	Sensor Input Or Digital Output for Front Module
J16 - 10	SDA	Input / Output	I ² C Data
J16 - 11	SCL	Input	I ² C Clock
J16 - 12	VBUS_15V	Power	USBPD VBUS Power
J17 - 1	VBUS_15V	Power	USBPD VBUS Power
J17 - 2	DGND	Ground	Device Ground

Continued - Front module Interface Board

Connector - Pin	Name	Type	Description
J18 - 1	USB_FMOD_N	Input / Output	Front Module USB 2.0, Negative
J18 - 2	USB_FMOD_P	Input / Output	Front Module USB 2.0, Positive
J18 - 3	USB_FMOD_TX_P	Input / Output	Front Module USB 3.0 Transmit, Positive
J18 - 4	USB_FMOD_TX_N	Input / Output	Front Module USB 3.0 Transmit, Negative
J18 - 5	USB_FMOD_RX_P	Input / Output	Front Module USB 3.0 Receive, Positive
J18 - 6	USB_FMOD_RX_N	Input / Output	Front Module USB 3.0 Receive, Negative
J18 - 7	FMOD_DIG_D7	Input / Output	Sensor Input/Output for Front Module
J18 - 8	FMOD_DIG_D8	Input / Output	Sensor Input/Output for Front Module
J18 - 9	Reserved	-	Reserved
J18 - 10	SDA	Input / Output	I ² C Data
J18 - 11	SCL	Input	I ² C Clock
J18 - 12	Reserved	-	Reserved
J18 - 13	LMOD_PWM_D9	Input / Output	Sensor Input/Output for Left Module
J18 - 14	LMOD_PWM_D10	Input / Output	Sensor Input/Output for Left Module
J18 - 15	USB_LMOD_N	Input / Output	Left Module USB 2.0, Negative
J18 - 16	USB_LMOD_P	Input / Output	Left Module USB 2.0, Positive
J18 - 17	USB_LMOD_TX_P	Input / Output	Left Module USB 3.0 Transmit, Positive
J18 - 18	USB_LMOD_TX_N	Input / Output	Left Module USB 3.0 Transmit, Negative
J18 - 19	USB_LMOD_RX_P	Input / Output	Left Module USB 3.0 Receive, Positive
J18 - 20	USB_LMOD_RX_N	Input / Output	Left Module USB 3.0 Receive, Negative

Left Module Interface Board

Connector - Pin	Name	Type	Description
J19 - 1	USB_LMOD_RX_N	Input / Output	Left Module USB 3.0 Receive, Negative
J19 - 2	USB_LMOD_RX_P	Input / Output	Left Module USB 3.0 Receive, Positive
J19 - 3	USB_LMOD_TX_N	Input / Output	Left Module USB 3.0 Transmit, Negative
J19 - 4	USB_LMOD_TX_P	Input / Output	Left Module USB 3.0 Transmit, Positive
J19 - 5	USB_LMOD_P	Input / Output	Left Module USB 2.0, Positive
J19 - 6	USB_LMOD_N	Input / Output	Left Module USB 2.0, Negative
J19 - 7	LMOD_PWM_D10	Input / Output	Sensor Input/Output for Left Module
J19 - 8	LMOD_PWM_D9	Input / Output	Sensor Input/Output for Left Module
J19 - 9	Reserved	-	Reserved
J19 - 10	SCL	Input	I ² C Clock
J19 - 11	SDA	Input / Output	I ² C Data
J19 - 12	Reserved	-	Reserved
J19 - 13	Reserved	-	Reserved
J19 - 14	Reserved	-	Reserved
J19 - 15	Reserved	-	Reserved
J19 - 16	Reserved	-	Reserved
J19 - 17	Reserved	-	Reserved
J19 - 18	Reserved	-	Reserved
J19 - 19	Reserved	-	Reserved
J19 - 20	Reserved	-	Reserved
J20 - 1	DGND	Ground	Device Ground
J20 - 2	VBUS_15V	Power	USBPD VBUS Power
J21 - 1	DGND	Ground	Device Ground
J21 - 2	USB_LMOD_N	Input / Output	Left Module USB 2.0, Negative
J21 - 3	USB_LMOD_P	Input / Output	Left Module USB 2.0, Positive
J21 - 4	USB_LMOD_TX_P	Input / Output	Left Module USB 3.0 Transmit, Positive
J21 - 5	USB_LMOD_TX_N	Input / Output	Left Module USB 3.0 Transmit, Negative
J21 - 6	USB_LMOD_RX_P	Input / Output	Left Module USB 3.0 Receive, Positive
J21 - 7	USB_LMOD_RX_N	Input / Output	Left Module USB 3.0 Receive, Negative
J21 - 8	LMOD_PWM_D9	Input / Output	Sensor Input/Output for Left Module
J21 - 9	LMOD_PWM_D10	Input / Output	Sensor Input/Output for Left Module
J21 - 10	SDA	Input / Output	I ² C Data
J21 - 11	SCL	Input	I ² C Clock
J21 - 12	VBUS_15V	Power	USBPD VBUS Power

Modular Interface

Modular Interface Overview

The VX Modular Interface is an extensible peripheral connection for sensors and accessories utilizing a wide range of communication protocols. Full USB PD power is provided to each of the three Modular Interfaces in the system. Each modular interface can handle a data throughput of up to 5 Gbit/s. Each interface also includes access to I²C and is expandable for input and output.

(Note that only a total of 5 Gbits/s can be used system-wide at any given time.)

Available Modules

VX currently offers a limited number of modules. Custom modules are available with NRE.

Sensor Module

The ODN-50005 Sensor Module contains a 5MP auto-focus camera, a FLIR Lepton LWIR thermal camera, and two flashlights. The 5MP camera is an HD color sensor that provides 30FPS video. The Lepton LWIR sensor offers auto-calibration and a resolution of 160 x 120 at 57° FOV. The flashlights output in either visible white or far-red light for low detection use.

Depth Module

The ODN-50018 Depth Module contains an Intel RealSense D430 in a waterproof enclosure. It can be field swapped quickly via the VX modular interface. The D430 is one of the best depth sensors available on the market. The high-quality imaging sub-system features a wide field of view (FOV) stereo image sensors with a maximum depth resolution of 1280 x 720.

Tracking Module

The ODN-50007 Tracking Module offers combined processing of 6 DOF+GPS with integrated INS, IMU, and GNSS GPS sensors. This module provides real-time positioning rates of up to 20 Hz with sub-1-meter accuracy.

Modular Interface Breakout Boards

Breakout boards are available for reference design customers. These boards conveniently break out the signals to a standard 2.54mm pitch header. These boards are great for prototyping and development of custom modules.

Module Functional Specifications

ODN-50005 Sensor Module

Feature	Description	Typical	Units
RGB Resolution	5MP camera, HD resolution at 30FPS	1920 x 1080 (1080p)	Pixels
Thermal Spectral range	Longwave infrared range	8 - 14	µm
Thermal Resolution	Progressive scan, auto-calibration	160 x 120	Pixels
Thermal FOV	Diagonal field of view	71	Degrees
White Flashlight	Cree XPG2	200	mW
Far-Red Illuminator	720nm - 740nm	200	mW

ODN-50007 Tracking Module

Feature	Description	Typical	Units
Real-Time Clock	Backup power life for constellation tracking	24	Hours
Fix Time	Time to first GPS fix. Cold/Hot	30 / 3	Sec.
Real-time positioning rate		20	Hz
Sensor measurement output rate		100	Hz
Position Error	Position error during GNSS loss over distance	10	%
Antenna	Taoglass patch antenna	1559-1610	MHz
White Flashlight	Cree XPG2	200	mW
Far-Red Illuminator	720nm - 740nm	200	mW

ODN-50018 Depth Module

Feature	Description	Typical	Units
Depth FOV	Depth camera diagonal field of view	94	Degrees
Minimum Distance	Minimum distance from depth camera to the scene	280	mm
Laser (IR) Power	Depth camera laser power	330	mW
Resolution	Resolution of depth	1280 x 720	Pixels



Important Notice:

Customers to review the Intel Realsense D430 datasheet.

This product is classified as a Class 1 Laser Product under the EN/IEC 60825-1, Edition 3 (2014) internationally and IEC60825-1, Edition 2 (2007) in the US.

This product complies with US FDA performance standards under 21 CFR 1040.10 for laser products except for deviations pursuant to Laser Notice No. 50 dated June 24, 2007.

Customers should refer to their respective regulatory and compliance regulations. Owner to finalize regulatory requirements for a specific geography.

Caution - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Software Integration

Firmware

The VX MARS comes with a base firmware package that allows customers to control integrated sensors via the onboard microcontroller. Programming functionality can be done through the Atmel Studio or the Arduino IDE.

Supplementary documents will be provided with each versioned firmware package. Please visit www.vx-inc.com for more information.

Supported Operating Systems

The VX MARS supports Windows 10, Linux, and Android.

Host System Hardware Recommendations

Customers are responsible for confirming DisplayPort Alternate Mode support with the manufacturer of the host system. Most USB Type-C devices fail to meet full USB-PD requirements.

Windows

Component	Recommended System Requirements	Minimum System Requirements
Processor	Intel i7 Comet Lake or newer	Intel i5 Comet Lake
GPU	NVIDIA Pascal or RTX	Gen12 Intel Integrated Graphics
Memory	16 GB RAM or more	8 GB RAM or more
Video output	Thunderbolt DP-ALT Mode	USB PD DP-ALT Mode

Android

Component	Recommended System Requirements	Minimum System Requirements
SOC	Snapdragon 845	Snapdragon 800 Family
Memory	16 GB RAM or more	8 GB RAM or more
Video output	Thunderbolt DP-ALT Mode	USB PD DP-ALT Mode

Mechanical Drawings

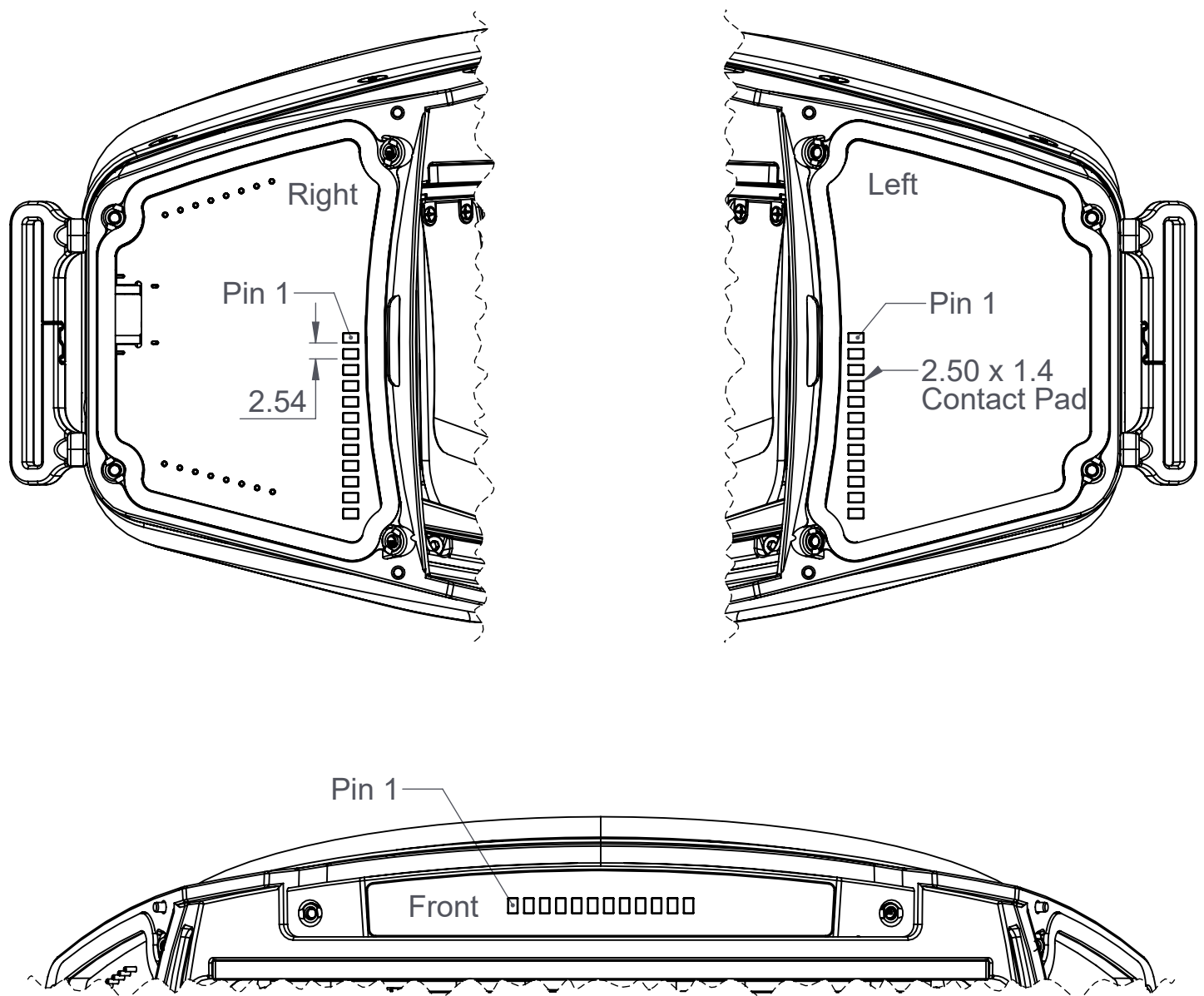
This is a limited dimension drawing to be used for part information and reference. 3D CAD takes precedence over these drawings.

Global tolerance is 0.3mm unless otherwise stated.

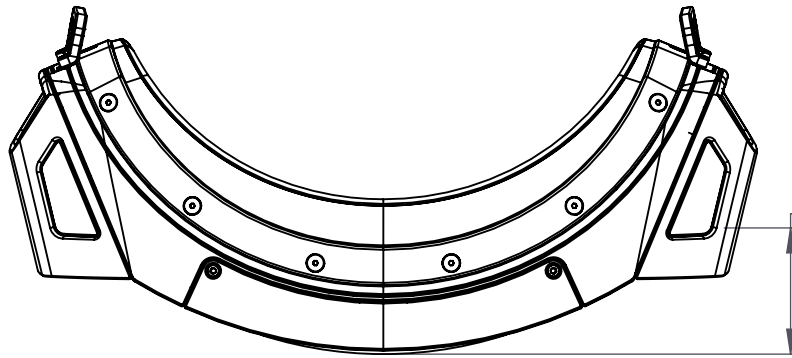
Detail drawings are available upon request.

3D STEP models are available under NDA.

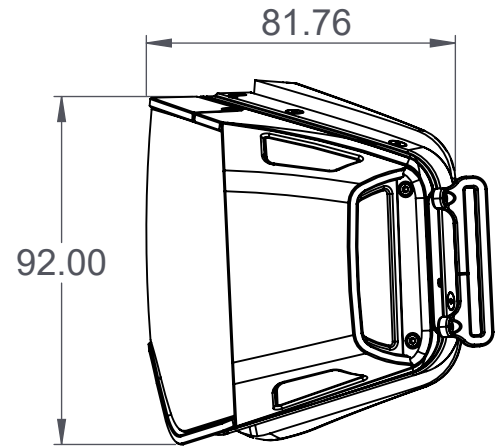
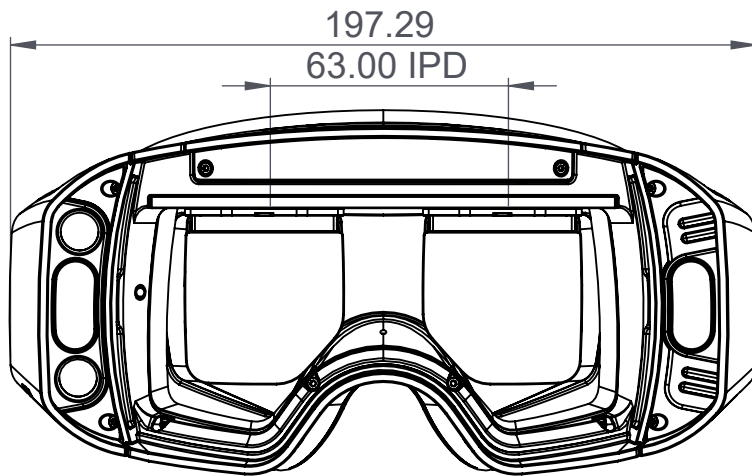
VX Modular Interface



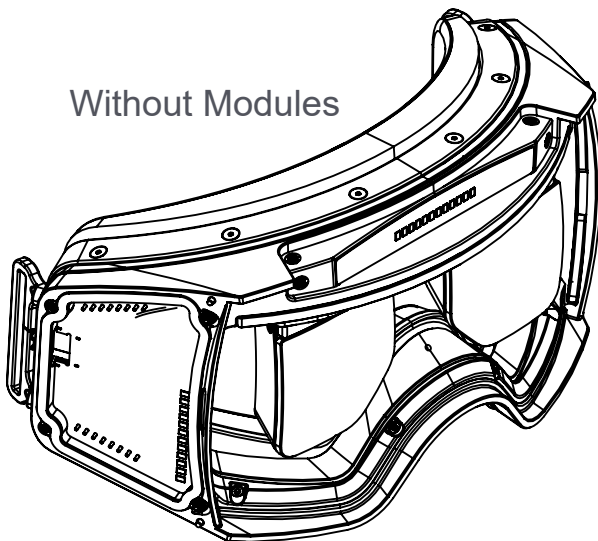
ODN-50001- MARS BlueShift Headset Dev-Kit



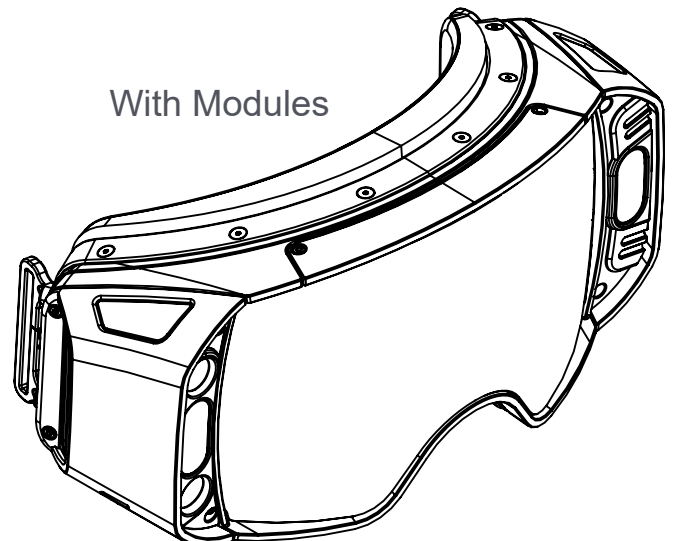
33.39 Thickness From Face



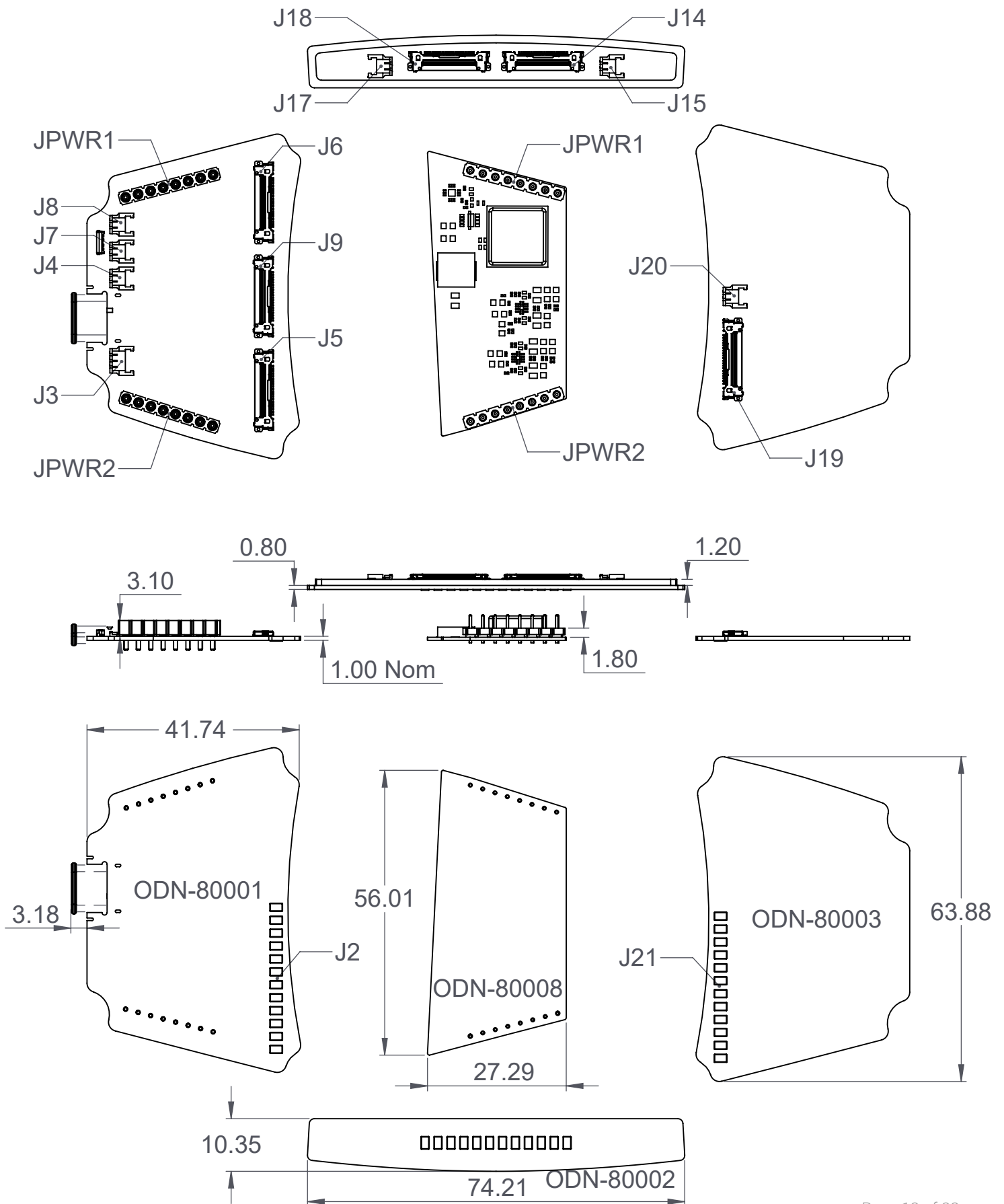
Without Modules



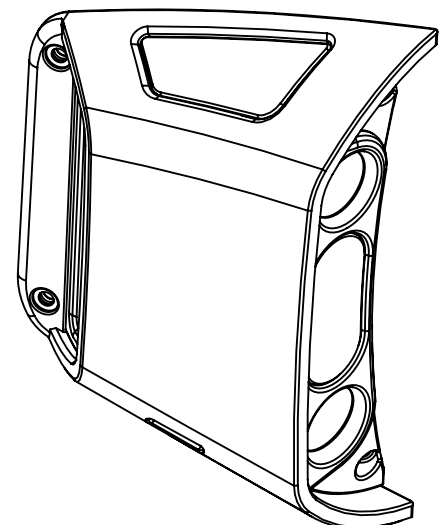
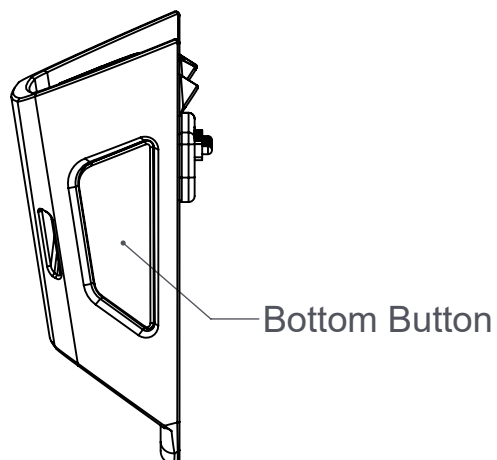
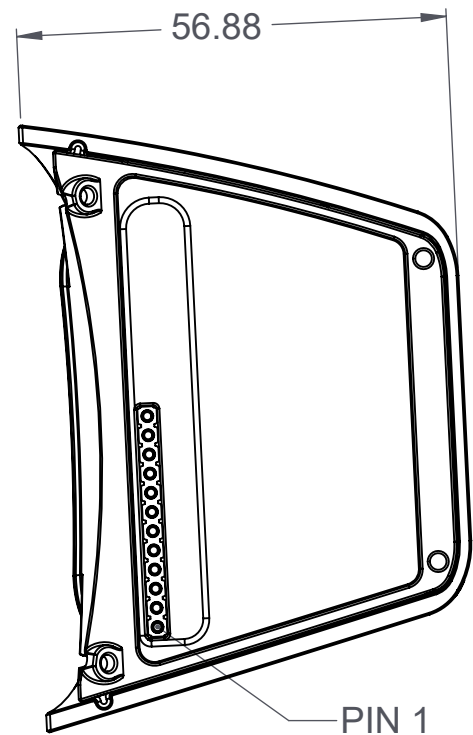
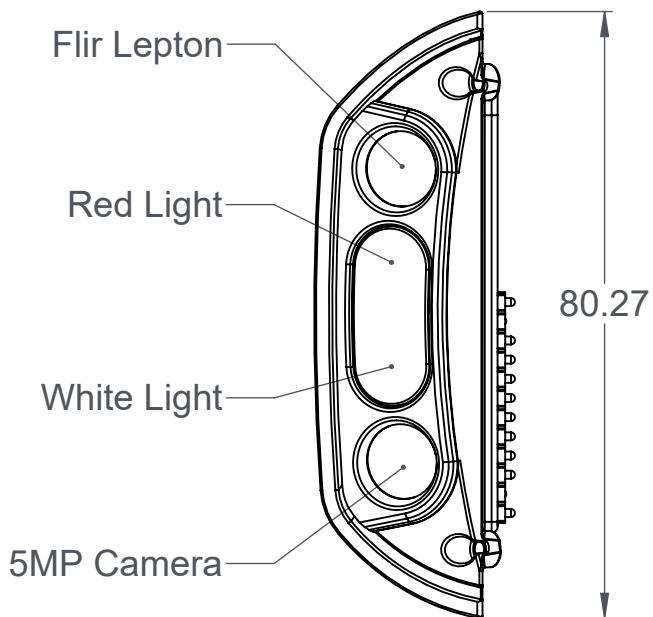
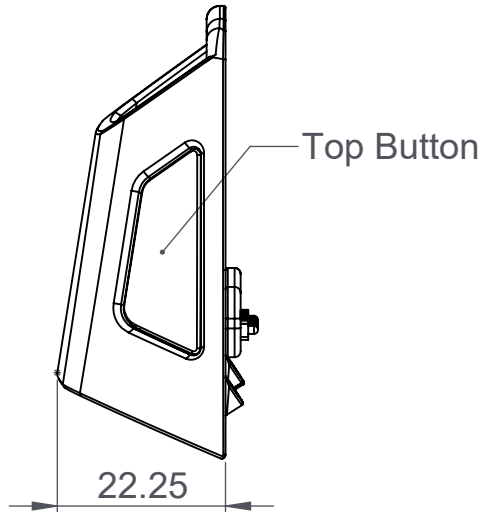
With Modules



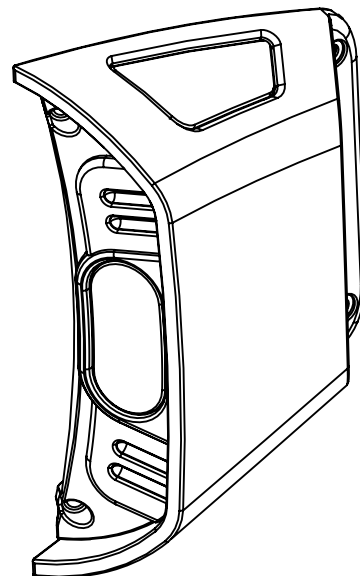
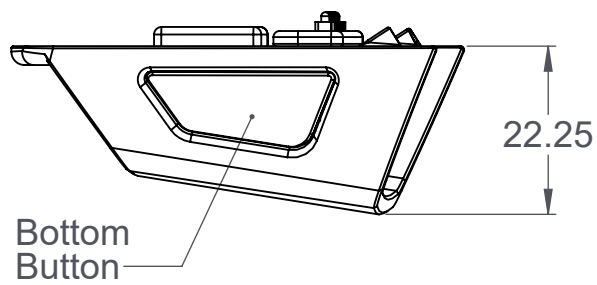
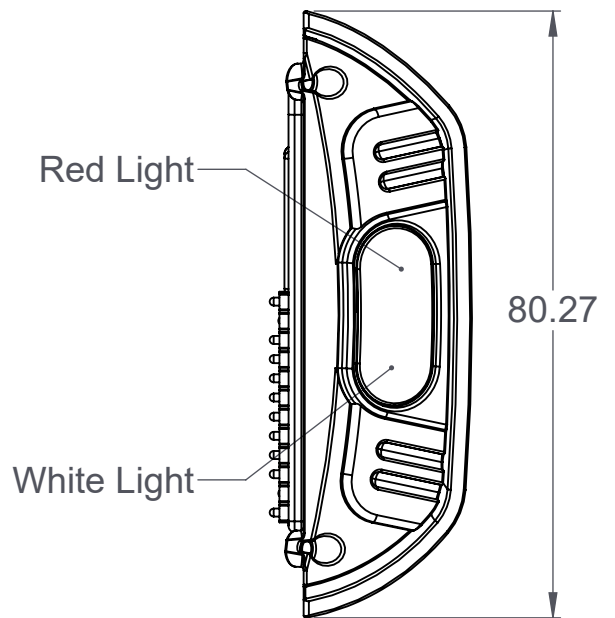
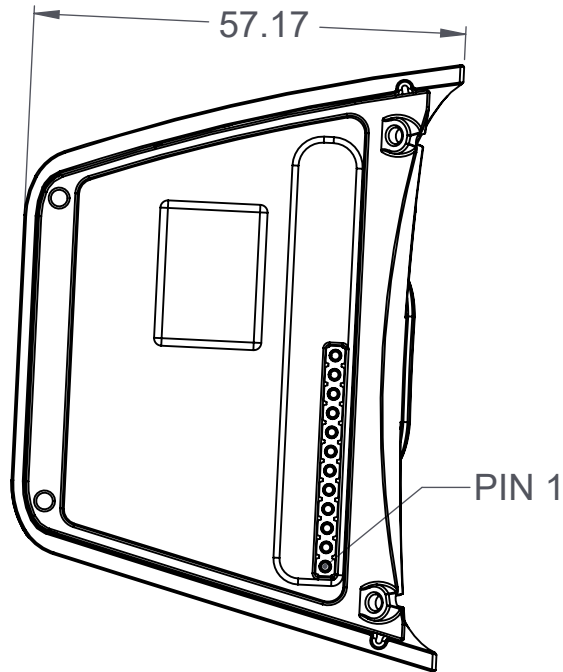
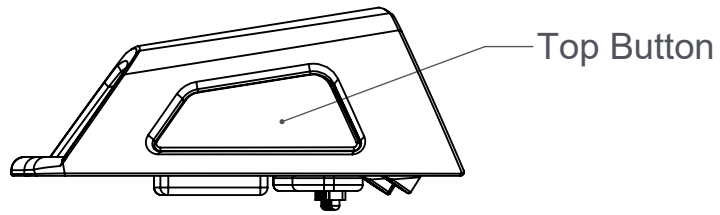
ODN-50101- MARS Barebones Dev-Kit



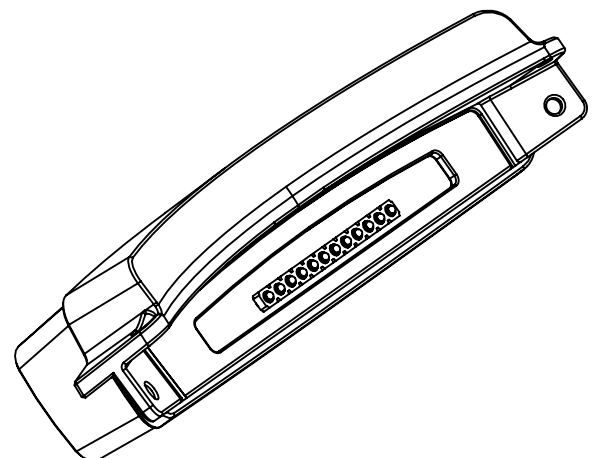
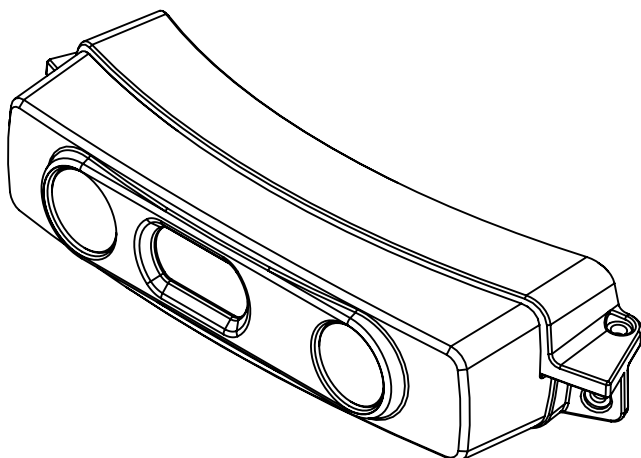
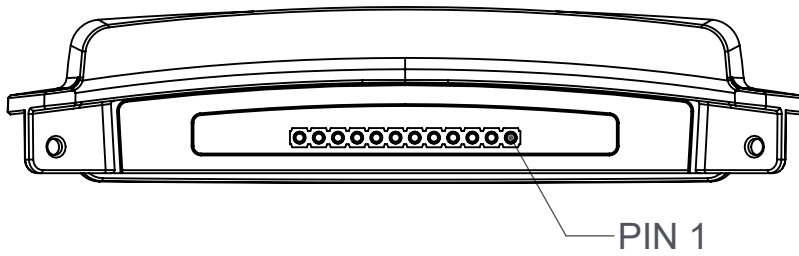
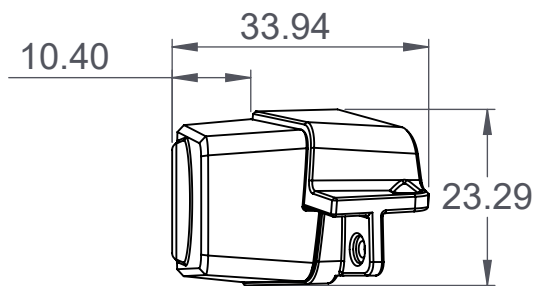
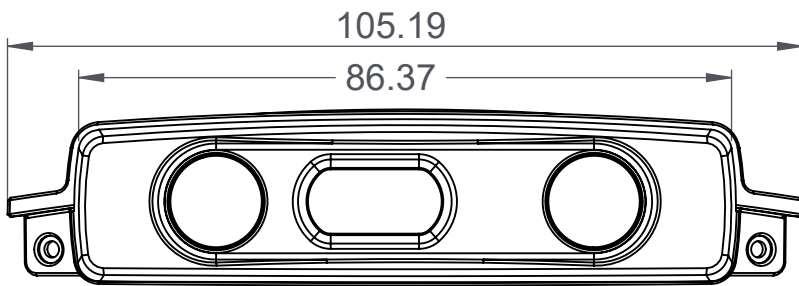
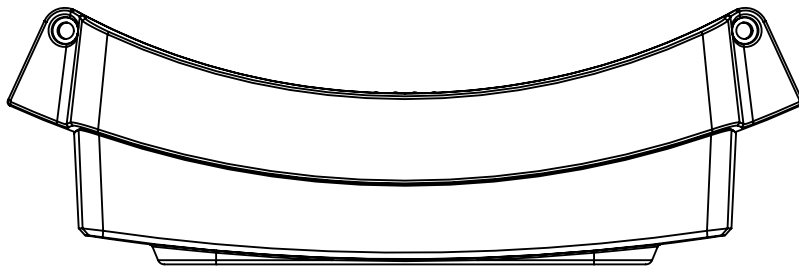
ODN-50005 - Imaging Sensor Module



ODN-50007 - INS, IMU, and GNSS GPS Tracking Module



ODN-50018 - Depth Module with Intel D430



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

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

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Augmented Reality
Design
Displays
Integration