

ESK-Edge Perception Development Kit

ADLINK Robotic Controller based on NVIDIA® Jetson™ AGX and Tier IV's C1 GMSL2 camera based on ISX021 sensor



Introduction

ADLINK has partnered with Tier IV, an open source autonomous driving provider, to offer the ESK-Edge Perception Development Kit, an integrated turn-key solutions for autonomous driving applications.

The DevKit combines ADLINK RQX-58G robotic controller with Tier IV Automotive HDR Camera C1, while featuring camera perception functionality provided by Autoware*, and is specifically suited for autonomous driving applications requiring high-AI computing workloads with minimal power consumption.

Utilizing Tier IV's C1 camera, this Edge Perception Development kit provides users with a powerful GMSL2 controller package, which allows users to start building R&D environments with less time and effort, significantly reducing costs and shortening time-to-market.

Features

ADLINK RQX-58G:

- Powerful AI computing for intelligent robotics development
- Excellent performance per watt with power consumption as low as 30W
- Ruggedized, secure connectivity with locking USB ports
- Comprehensive I/O for connecting to a wide range of devices
- Time synchronization with GMSL2 camera

Tier IV C1 Camera:

- 2.5MP resolution, 120dB HDR, LED flicker mitigation
- Integrated ISP, on-board lens distortion correction
- GMSL2 direct connection, HW/SW triggering
- IP69K, -40 to 85°C operation, FuSa support up to ASIL B
- Autoware compatible, with Linux kernel driver and ROS1/2 support



Product Page

Software Support

- Ubuntu 18.04 L4T
- Neuron SDK, Neuron IDE, Neuron Library
- NVIDIA Jetson SDK
- C1 camera driver

Development Kit Content

- RQX-58G
- Tier IV C1 camera
- Mini FAKRA jack to FAKRA jack cable or FAKRA jack to FAKRA plug

Specifications

ADLINK RQX-58G

System Core	Processor	NVIDIA® Jetson AGX Xavier™
	CPU	Carmel ARMv8.2 2.26GHz
	GPU	512-core 1.37GHz
	Memory	32GB on module
	eMMC	32GB on module
	Display	1x HDMI 2.0a
Front Panel I/O Interface	Ethernet	2x GbE
	USB 3.0	4x USB Type A 2x USB Type A with lockable connector
	Serial Port	COM1: RS-232/485; COM2: RS-232
	OTG	1x OTG port for flashing OS image
Side Panel I/O Interface	DB-50 connector	UART, SPI, CANbus x1, I2C, PWM, 20-bit GPIO
	Audio IN/OUT	1x audio input/output
Internal I/O connectors	M.2 Extension	1x Socket 2, Key M 2280 for Storage (need NVMe SSD) 1x Socket 1, Key E 1630/2230 for Wifi
	Mini PCIe	1x Mini PCIe socket for LTE, GPS
	USIM	1x USIM socket
	RTC	3V 550mAh
Sensor	9-axis sensor	Time sync with GMSL2 camera
External Storage	SD Card	1x microSD card slot

Ordering Information

- **RQX-58G + C1 camera + FAKRA cable**
Embedded Robotic Controller Powered by NVIDIA®
Jetson AGX Xavier™ with GMSL2 C1 camera /
mini FAKRA jack to FAKRA jack cable or FAKRA jack to
FAKRA plug

Optional Accessories

- **Wireless Module**
Intel® Wireless-AC 9260 M.2 2230, Dual-Band 2x2 Wi-Fi +
Bluetooth+ 5 kit (P/N: 91-95266-0010)
- **FAKRA cable for GMSL2 camera**
- **AC/DC Power Adapter**
220W AC/DC Power Adapter (P/N: 31-62149-0000)
160W AC/DC Power Adapter (P/N: 31-62120-0010)

Specifications





LED indicator	User Defined	5x user-defined LEDs Green: U1,U2,U3 Amber: U5 Yellow: U4
	Power LED	1x Power on LED
Camera Interfaces	FAKRA connectors	2x mini FAKRA connectors, Quad port (for GMSL2 camera, driver support AR0233-GMSL2 and Sony ISX021 cameras)
Power Requirements	DC Power Input	9-36V (±5% tolerance, reverse polarity protection)
	AC/DC Power Adapter	160W/220W AC/DC power adapter with Molex lockable connector to Phoenix terminal block connector (see optional accessory)
	Power Switch	1x power button
	Recovery and Reset	1x Recovery 1x Hardware Reset button
Mechanical	Dimensions	190(W) x 210(D) x 80(H) mm (7.48 x 8.27 x 3.149 inch) With Expansion: 322(W) x 210(D) x 80(H) mm (12.68 x 8.27 x 3.149 inch)
	Mounting	Wall mount kit
	Weight	RQX-580: 3330g (7.34lb); RQX-58G: 3385g(7.46lb) RQX-580-E:4415g (9.74lb); RQX-58G-E: 4470g (9.85lb)
Environmental	Operating Temperature	0 to 50°C at full CPU frequency with 0.6m/s airflow -20 to 70°C (-4°F to 158°F with 1.4GHz CPU) with 0.6m/s airflow
	Operating Humidity	Approx. 95% @40°C (non-condensing)
	Storage Temperature	-40 to 85°C
	Vibration	IEC 60068-2-64: Operating 3Grms, 5-500 Hz, 3 axes
	Shock	MIL-STD-202G Method 213B, Table 213-I condition A Operating: 30G, half sine 11ms duration. (w/o expansion)
	EMI	CE & FCC class A (EN61000-6-4/-6-2)
	EMS	IEC 61000-4-2 (ESD, contact: ±4kV, air: ±8kV w/ expansion) IEC 61000-4-3 (RS, 10V/m from 80-1000MHz, 3V/m from 1400-2000MHz, 1V/m from 2000-2700MHz, 1kHz sine wave, 80% AM) IEC 61000-4-4 (EFT, ±2kV at 5KHz on power port, ±1kV at 5KHz on signal port) IEC 61000-4-5 (Surge, ±2kV line to earth CM on power port, ±1kV line to earth CM on signal port) IEC 61000-4-6 (CS, 10Vrms with 1kHz sine wave, 80% AM from 0.15MHz-80MHz) IEC 61000-4-8 (power-frequency magnetic fields) IEC 61000-4-11 (voltage DIPS & voltage interruptions)
	Safety	LVD
Software	SDK	ADLINK Neuron SDK, NVIDIA Jetson SDK
	Environment	Ubuntu 18.04 L4T
	Middleware	ROS/ROS 2, Neuron Library

Specifications

Tier IV C1 camera	
Image Sensor	Sony ISX021
ISP	On-chip
Serializer	Maxim MAX9295A
Resolution	1920 x 1280 (2.5 MPix)
Shutter type	Rolling
Dynamic Range (dB)	120 (Max.)
Frame rate (fps)	Up to 30
LED Flicker mitigation	Yes
Lens distortion correction	Yes (ISP)
Output Image format	YUV422
Power consumption (W)	1.7 (at 30 fps, DC 9-12V Input)
Output interface	GMSL2 (up to 6 Gbps, power over coax)
Synchronization	HW/SW triggering over GMSL2
Ingress protection	IP69K (water/ dust proof)
Operating Temperature (°C)	- 40 to 85
FuSa support	Up to ASIL B
Driver support	Linux kernel driver, ROS 1/2 driver
Lens FoV options (HFOV)	46, 85, 120


Ordering Information

DevKit Options

DevKit part number	Controller	C1 camera number	Mini FAKRA to 4X FAKRA cable	Mini FAKRA to 4X FAKRA cable picture	Purpose
93-45R00-0A00	RQX-58G	1 pc HFOV 85 1 pc HFOV 120	3 meters x 1 pc		This cable set is for quick start purpose and can connect to C1 camera directly. If users need to extend the cable length, we also provide FAKRA plug to FAKRA jack extension cable.
93-45R00-0C00	RQX-58G	2 pcs HFOV 85 2 pcs HFOV 120	3 meters x 2 pcs		This cable set is for quick start purpose and can connect to C1 camera directly. If users need to extend the cable length, we also provide FAKRA plug to FAKRA jack extension cable.
93-45R00-0B00	RQX-58G	1 pc HFOV 85 1 pc HFOV 120	0.5 meters x 1 pc		This cable set cannot connect to C1 camera directly. Users have to purchase customized extension FAKRA cable with different lengths based on the needs - 1M, 3M, 6M, 9M, and 12M.
93-45R00-0D00	RQX-58G	2 pcs HFOV 85 2 pcs HFOV 120	0.5 meters x 2 pcs		This cable set cannot connect to C1 camera directly. Users have to purchase customized extension FAKRA cable with different lengths based on the needs - 1M, 3M, 6M, 9M, and 12M.

Optional Accessories

Camera part number	Camera sensor	Serializer	HFOV	Output image format	Resolution	Frame Sync	ISP	LFM (LED Flicker Mitigation)	HDR (Dynamic Range) (dB)
TBD	ISX021	Maxim MAX9295A	46	YUV422	1920 x 1280 (2.5 MPix)	Yes	Yes	Yes	120 (Max)
TBD	ISX021	Maxim MAX9295A	85	YUV422	1920 x 1280 (2.5 MPix)	Yes	Yes	Yes	120 (Max)
TBD	ISX021	Maxim MAX9295A	120	YUV422	1920 x 1280 (2.5 MPix)	Yes	Yes	Yes	120 (Max)

Cable part number	Length (meters)	Type	Description
30-60185-0010-A0 30-60185-1010-A0	1 M 3 M		Mini Fakra B Jack (TE Rev.) 180° Z code to Fakra Jack 180° Z code cable
30-60189-0000-A0	0.5 M		Mini Fakra B Jack (TE Rev.) 180° Z code to Fakra plug*4 180° Z code cable
30-60217-0000-A0 30-60217-1000-A0 30-60217-2000-A0 30-60217-3000-A0 30-60217-4000-A0	1 M 3 M 6 M 9 M 12 M		Fakra Jack 180° Z code to Fakra Jack 180° Z code cable , IP69K
30-60218-0000-A0 30-60218-1000-A0 30-60218-2000-A0 30-60218-3000-A0 30-60218-4000-A0	1 M 3 M 6 M 9 M 12 M		Fakra Plug 180° Z code to Fakra Jack 180° Z code cable , IP69K