EAXVA05
Datasheet

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Revision History

Date	Version	Description
2021.10	V1.0	First Release

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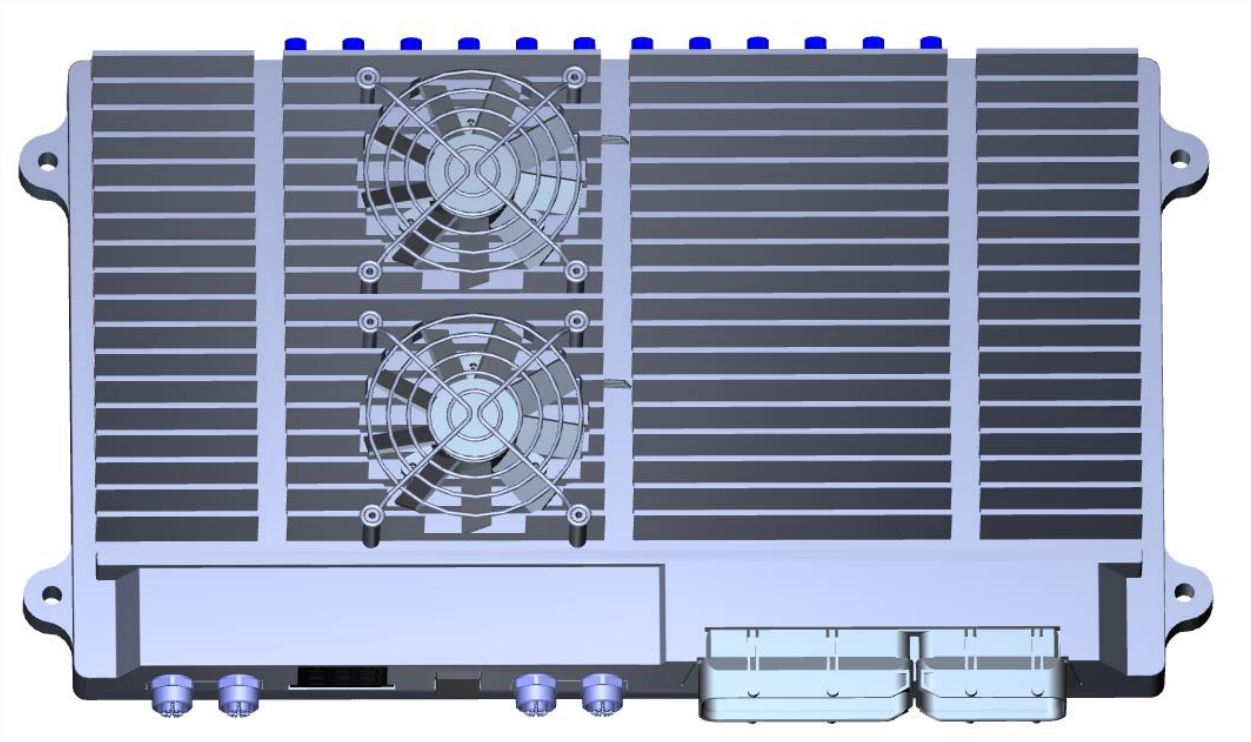
Chapter 1 General Information

Ecotron's newest generation Robot Contol Unit (RCU), EAXVA05, is an intelligent computing platform designed specifically for robotic systems. EVXVA05 is equipped with 2 NVIDIA Xavier chips and 1 Infineon TC297 chip. With basic software and development tools, developers can safely, conveniently, and efficiently build machine learning based robot control systems in confined areas.

NVIDIA designs Xavier particularly for embedded intelligent systems. Xavier supports robotics related functions such as sensor fusion, environment perception, and path planning. Infineon TC297 has a TriCore™ architecture and has an operating frequency of 300MHz. Moreover, it has 728KB + 8MB capacity and ECC (error correction coding) RAM protection. Engineers can develop robotic control and functional safety-related strategies based on this RCU.



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Chapter 2 Interface Description

EAXVA05 (NVIDIA Xavier * 2 + Infineon TC297)				
Interface Type	**Quantity**	**Function**	**Chip**	**Connector**
M.2 KEY M	2	Extended storage	SOC	Internal
Camera Interface	12	FPDlink III	SOC	FAKRA
Gigabit Standard Ethernet	4	100BASE-T/1000BASE-T Standard	Switch	4*Aviation Connectors
Gigabit Automotive Ethernet	5	100Base-T1/1000Base-T1	Switch	1*Automotive Ethernet Connector
HDMI	2		SOC	HDMI Connector
USB	2	TYPE-A*2	SOC	TYPE-A Connector
RS232	8	One channel used for debug	SOC	121PIN-CMC
RS485	2		SOC	
CAN	4		SOC	
PPS_IN	2	Support 3.3V-16V Hardware configuration	SOC	
PPS_OUT	8	2 Channels 5V or 3.3V output 2 Channels 12V output	SOC	
CANFD	6	2 Channels with specific frame wake-up	MCU	
LIN	4	No wake-up needed	MCU	
KEYON	4	2 Channel for SOC 2 Channels for MCU		
Digital Input	6	Default configuration, 4 channels active high, 2 channels active low	MCU	
Analog Input	6	Default configuration, 2 channels 5V voltage type, 2 channels 36V voltage type, 2 channels resistance type	MCU	
Digital Low Side Output	8	8 Channels @250mA	MCU	
Digital High Side Output	4	4 Channels @1A	MCU	
5V Sensor Supply	2	Maximum current 100mA	MCU	
Positive Power Supply	4			
Power Ground	4			
Signal Ground	8			

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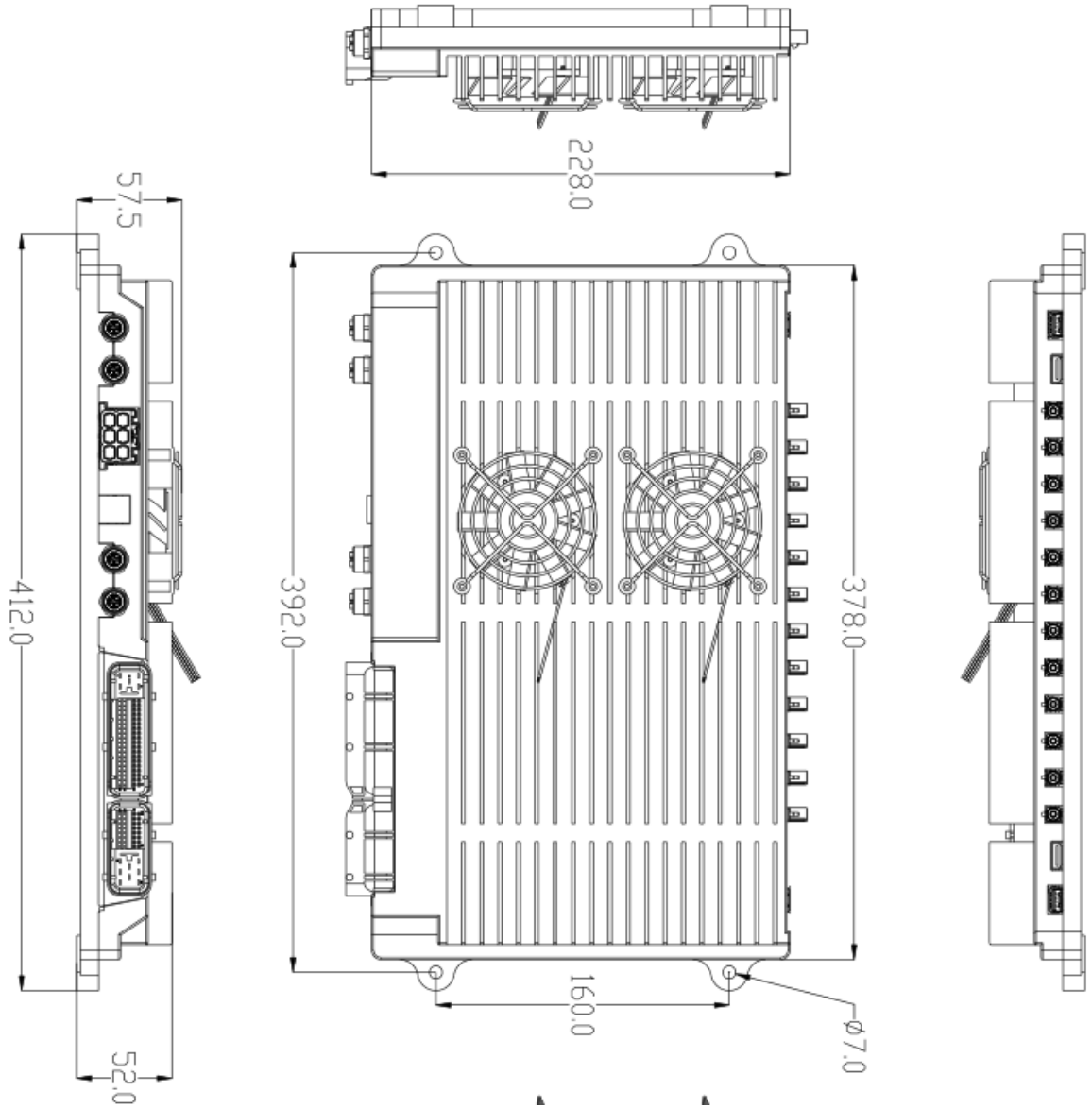
Chapter 3 Mechanical Structure

3.1 Dimensions



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3.2 Connectors

The connectors used by EAXVA05 are qualified products. The connector models are as follows:

#	Connector	Name	Type	Supplier	Link
1	121P	PCB Header	1746979-1	TE	https://www.te.com/usa-en/product-1746979-1.html
2		81P Housing	1473244-1	TE	https://www.te.com/usa-en/product-1473244-1.html
3		40P Housing	1473252-1	TE	https://www.te.com/usa-en/product-1473252-1.html
4		Terminal	964273-2	TE	https://www.te.com/usa-en/product-964273-2.html
5		Terminal	968220-1	TE	https://www.te.com/usa-en/product-968220-1.html
6		81P Covers	1473247-1	TE	https://www.te.com/usa-en/product-1473247-1.html
7		40P Covers	1473255-1	TE	https://www.te.com/usa-en/product-1473255-1.html
8		81P TPA	368382-1	TE	https://www.te.com/usa-en/product-368382-1.html
9		40P TPA	368388-1	TE	https://www.te.com/usa-en/product-1473244-1.html
10	FAKRA	FAKRA Connector	KH-FAK-K509-B	Kinghelm	https://www.oneyac.net/product/26257576.html
11	Automotive Ethernet	Automotive Ethernet connector	ESN032-BRMXP	Amphenol	
12	Aviation Plug	Board side	M12-8L-S-X	YINGWEI	
13		Harness side	M12-8L-M-X	YINGWEI	
14	USB	Receptacle	1932258-1	TE	https://www.te.com/usa-en/product-1932258-1.html?q=1932258-1&source=header
15	HDMI	Receptacle	10029449	Amphenol	https://www.amphenol-icc.com/hdmi-10029449001rlf.html

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Chapter 4 Quick Start

4.1 Prepare in Advance

Before using this device, please prepare the following items:

- Stable power supply, 12V DC/ 20A min or 24V DC/ 10A min
- USB to RS-232 adapter
- Laptop

4.2 Basic Knowledge

If you are a Linux beginner, it is helpful to learn how to use Linux command line tools. Here is a good Linux tutorial: tutorial.

4.3 Get Started

1. Connection

   Connect the positive and negative of the RCU to a DC power source, and then connect the RS232-1 of the device to the computer through the USB to RS-232 adapter. Please make sure that the computer can use the serial port normally.

2. Configuration

   Configure serial port:

   Baud rate: 115200

   8 data bits

   No parity checks

   1 stop bit

   Please use Putty or Minicom to open the serial port.

3. Start RCU

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Turn on the RCU KeyOn switch first and turn on the device power. The device first starts U-Boot, then runs the Linux system.

If you see the login dialog in the serial terminal window, it indicates that the system starts normally. The default username and password are as follows:

Username: *nvidia* **Password: *nvidia***

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Chapter 5 Hardware

The hardware circuit of the computing platform is designed according to the application requirements of the advanced robotic system. This RCU has a variety of data transmission interfaces to meet the needs of multi-sensor fusion of the robotic system. The main chip contains a variety of high-performance computing units to adapt to the computation-intense characteristics of computer-vision based algorithms, including sequential and parallel computing.

5.1 Specifications

Item	Parameter
Operating voltage	DC 9-32V
Operation memory	64GB
Storage memory	64GB
Operating temperature	-25 to 70 °C
Operating humidity	0 - 95%, no condensation
Storage temperature	-40 to 85 °C
Dimensions	412mm*251mm*57.5mm
Weight	⩽3700g

5.2 Device Ports

5.2.1 Port Placement

The distribution of input and output ports of the RCU is shown in the figure below. All the figures are shown in the front view.

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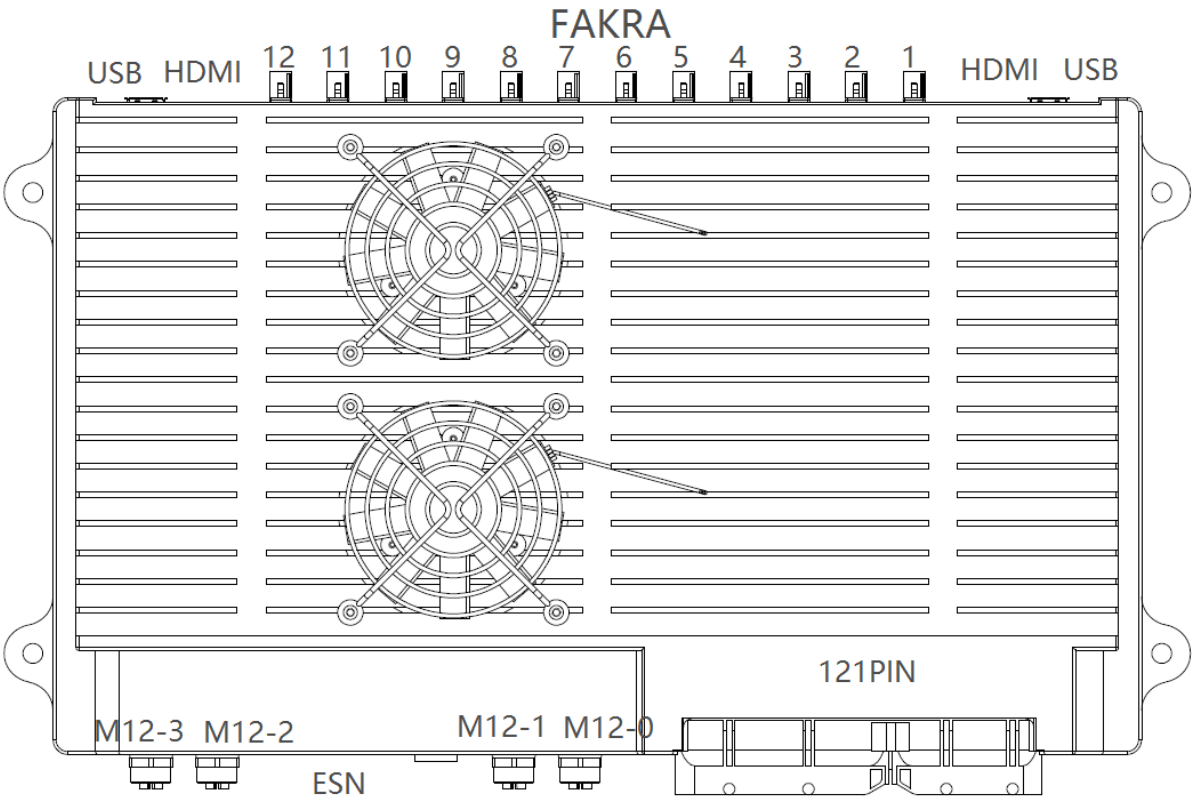
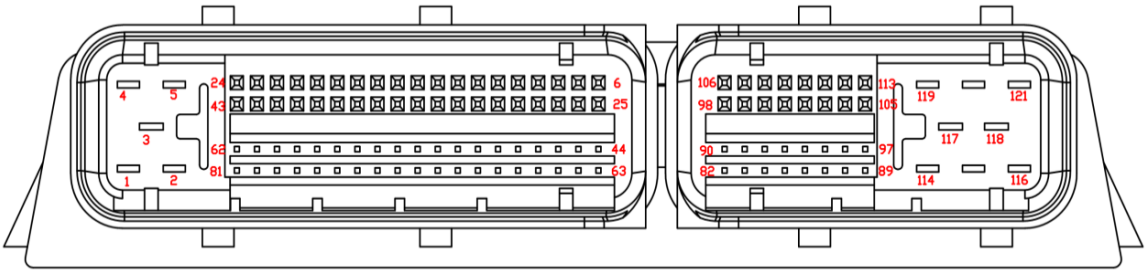
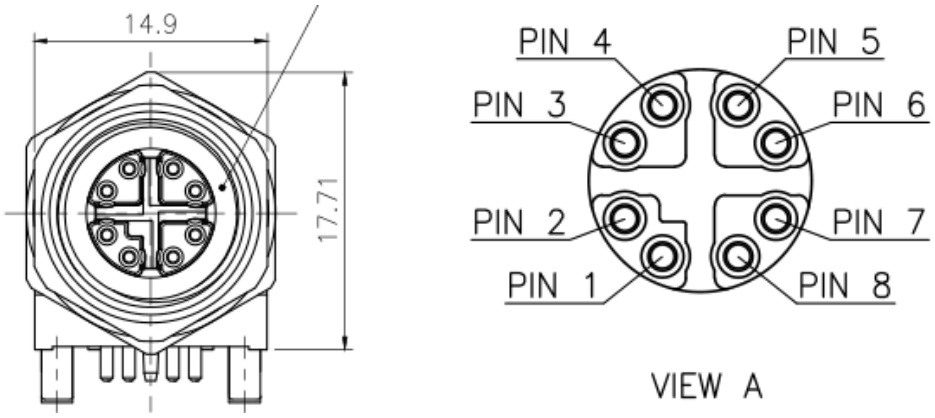


121PIN:



M12:



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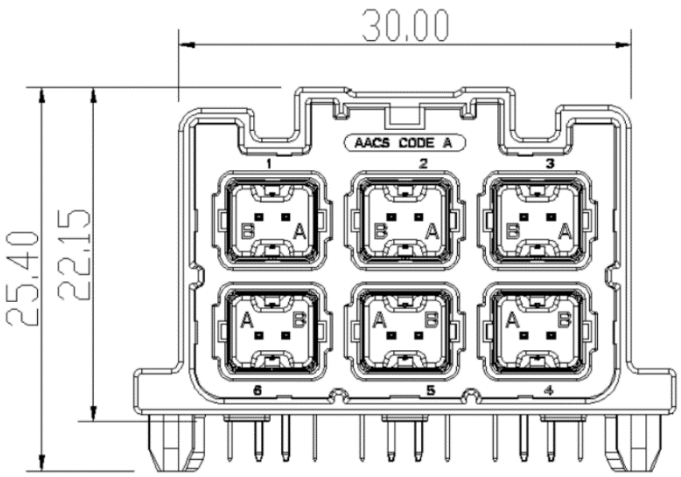
Car ethernet socket:



5.2.2 Pinout

The input and output pin definition are shown in the following table:

Signal Name	PIN	Socket discription	Note
Car ethernet			
ENet0_N	B1	Car ethernet connector 0	1000Base-T1/100Base-T1
ENet0_P	A1		
ENet1_N	B2	Car ethernet connector 1	1000Base-T1/100Base-T1
ENet1_P	A2		
ENet2_N	B3	Car ethernet connector 2	1000Base-T1/100Base-T1
ENet2_P	A3		
Enet3_N	B5	Car ethernet connector 3	1000Base-T1/100Base-T1
Enet3_P	A5		
Enet4_N	B6	Car ethernet connector 4	1000Base-T1/100Base-T1
Enet4_P	A6		
Normal Ethernet			
APort3_BI_DD+	M12-0-1	Normal ethernet connector 0	100BASE-TX/1000BASE-T
APort3_BI_DD-	M12-0-2		
APort3_BI_DC+	M12-0-3		
APort3_BI_DC-	M12-0-4		
APort3_BI_DB+	M12-0-5		
APort3_BI_DB-	M12-0-6		
APort3_BI_DA+	M12-0-7		
APort3_BI_DA-	M12-0-8		
APort4_BI_DD+	M12-1-1	Normal ethernet connector 1	100BASE-TX/1000BASE-T
APort4_BI_DD-	M12-1-2		

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APort4_BI_DC+	M12-1-3		
APort4_BI_DC-	M12-1-4		
APort4_BI_DB+	M12-1-5		
APort4_BI_DB-	M12-1-6		
APort4_BI_DA+	M12-1-7		
APort4_BI_DA-	M12-1-8		
BPort3_BI_DD+	M12-2-1	Normal ethernet connector 2	100BASE-TX/1000BASE-T
BPort3_BI_DD-	M12-2-2		
BPort3_BI_DC+	M12-2-3		
BPort3_BI_DC-	M12-2-4		
BPort3_BI_DB+	M12-2-5		
BPort3_BI_DB-	M12-2-6		
BPort3_BI_DA+	M12-2-7		
BPort3_BI_DA-	M12-2-8		
BPort4_BI_DD+	M12-3-1	Normal ethernet connector 3	100BASE-TX/1000BASE-T
BPort4_BI_DD-	M12-3-2		
BPort4_BI_DC+	M12-3-3		
BPort4_BI_DC-	M12-3-4		
BPort4_BI_DB+	M12-3-5		
BPort4_BI_DB-	M12-3-6		
BPort4_BI_DA+	M12-3-7		
BPort4_BI_DA-	M12-3-8		
Camera connector			
Camera-1	FAKRA-1	FPD-Link III Serial camera connector 1	P Type
Camera-2	FAKRA-2	FPD-Link III Serial camera connector 2	P Type
Camera-3	FAKRA-3	FPD-Link III Serial camera connector 3	P Type
Camera-4	FAKRA-4	FPD-Link III Serial camera connector 4	P Type
Camera-5	FAKRA-5	FPD-Link III Serial camera connector 5	P Type
Camera-6	FAKRA-6	FPD-Link III Serial camera connector 6	P Type
Camera-7	FAKRA-7	FPD-Link III Serial camera connector 7	P Type
Camera-8	FAKRA-8	FPD-Link III Serial camera connector 8	P Type
Camera-9	FAKRA-9	FPD-Link III Serial camera connector 9	P Type

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Camera-10	FAKRA-10	FPD-Link III Serial camera connector 10	P Type
Camera-11	FAKRA-11	FPD-Link III Serial camera connector 11	P Type
Camera-12	FAKRA-12	FPD-Link III Serial camera connector 12	P Type
BATT			
BATT	121P-1 121P-3 121P-113 121P-115 121P-116 121P-118 121P-121	BATT	
Ground			
PGND	121P-2 121P-4 121P-5 121P-105 121P-114 121P-117 121P-119 121P-120	Ground	
Signal ground			
GND	121P-36 121P-45 121P-57 121P-59 121P-65 121P-84 121P-87 121P-92 121P-95 121P-100 121P-108	Signal ground	
5V sensor power output			
5V-1	121P-107	5V-1 sensor power output	Maximum current 100mA
5V-2	121P-99	5V-2 sensor power output	Maximum current 100mA
KEYON			
KEYON1	121P-56	KEYON1	High effective, Control TC297 rising edge triggering

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KEYON2	121P-39	KEYON2	High effective, control TC297 high voltage level triggering
KEYON3	121P-44	KEYON3	High effective, High effective, control Xavier-A high voltage level triggering
KEYON4	121P-63	KEYON4	High effective, High effective, control Xavier-B high voltage level triggering
Analog input			
AI01	121P-42	Analog input 0~5V (Voltage type)	12 bits
AI02	121P-60	Analog input 0~5V (Voltage type)	12 bits
AI03	121P-43	Analog input (Resistor type)	12 bits
AI04	121P-24	Analog input (Resistor type)	12 bits
AI13	121P-62	Analog input 0~36V (Voltage type)	12 bits
AI14	121P-40	Analog input 0~36V (Voltage type)	12 bits
Digital input			
DI01	121P-20	Digital input 0~BATT	High effective
DI02	121P-58	Digital input 0~BATT	High effective
DI03	121P-77	Digital input 0~BATT	Low effective
DI04	121P-38	Digital input 0~BATT	Low effective
DI21	121P-74	Digital input 0~BATT	High effective
DI22	121P-16	Digital input 0~BATT	High effective
High-side output			
HSO01	121P-88	Rated 0.5A, maximum 1A	
HSO02	121P-89	Rated 0.5A, maximum 1A	
HSO03	121P-97	Rated 1A, maximum 1.5A	
HSO04	121P-96	Rated 1A, maximum 1.5A	
LSO01	121P-101	Rated 250mA	
LSO02	121P-102	Rated 250mA	
LSO03	121P-111	Rated 250mA	
LSO04	121P-112	Rated 250mA	
LSO05	121P-110	Rated 250mA	
LSO06	121P-103	Rated 250mA	
LSO07	121P-109	Rated 250mA	
LSO08	121P-104	Rated 250mA	
Serial communication			
CAN_0_H	121P-31	Includes 120 Ω end resistor	

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CAN_0_L	121P-32		Support CANFD, optional terminal resistance, Corresponds to CANA in EcoCoder
CAN_1_H	121P-11	Includes 120 Ω end resistor	Support CANFD, optional terminal resistance, Corresponds to CANB in EcoCoder
CAN_1_L	121P-12		
CAN_2_H	121P-29	Includes 120 Ω end resistor	Support CANFD, optional terminal resistance, Corresponds to CANC in EcoCoder
CAN_2_L	121P-30		
CAN_3_H	121P-13	Includes 120 Ω end resistor	Support CANFD, optional terminal resistance, Corresponds to CAND in EcoCoder
CAN_3_L	121P-14		
CAN_R0_H	121P-27	does not Include 120 Ω end resistor	Support CANFD, optional terminal resistance, Corresponds to CANE in EcoCoder
CAN_R0_L	121P-28		
CAN_R1_H	121P-9	does not Include 120 Ω end resistor	Support CANFD, optional terminal resistance, Corresponds to CANF in EcoCoder
CAN_R1_L	121P-10		
CAN_AX0_H	121P-47	Includes 120 Ω end resistor	Optional terminal resistance Corresponds to CAN0 in Xavier-A
CAN_AX0_L	121P-66		
CAN_AX1_H	121P-48	Includes 120 Ω end resistor	Optional terminal resistance Corresponds to CAN1 in Xavier-A
CAN_AX1_L	121P-67		
CAN_BX0_H	121P-18	Includes 120 Ω end resistor	Optional terminal resistance Corresponds to CAN0 in Xavier-B
CAN_BX0_L	121P-17		
CAN_BX1_H	121P-22	Includes 120 Ω end resistor	Optional terminal resistance Corresponds to CAN1 in Xavier-B
CAN_BX1_L	121P-21		
CAN_SHILD-1	121P-46	CAN shielding	
CAN_SHILD-2	121P-8	CAN shielding	
LIN0	121P-6	LIN0 bus	
LIN1	121P-26	LIN1 bus	
LIN2	121P-7	LIN2 bus	
LIN3	121P-25	LIN3 bus	
RS232_1_TXD	121P-52	RS-232 serial port 1	Xavier-A *ttyTHS0*
RS232_1_RXD	121P-71		
RS232_2_TXD	121P-69	RS-232 serial port 2	Xavier-A *ttyTHS1*
RS232_2_RXD	121P-50		

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RS232_3_TXD	121P-51	RS-232 serial port 3	Xavier-A ttyTCU0 defaulted for Debug
RS232_3_RXD	121P-70		
RS232_4_TXD	121P-68	RS-232 serial port 4	Xavier-A *ttyTHS6*
RS232_4_RXD	121P-49		
RS232_5_TXD	121P-83	RS-232 serial port 5	Xavier-B *ttyTHS0*
RS232_5_RXD	121P-82		
RS232_6_TXD	121P-94	RS-232 serial port 6	Xavier-B *ttyTHS1*
RS232_6_RXD	121P-93		
RS232_7_TXD	121P-86	RS-232 serial port 7	Xavier-B ttyTCU0 defaulted for Debug
RS232_7_RXD	121P-85		
RS232_8_TXD	121P-91	RS-232 serial port 8	Xavier-B *ttyTHS6*
RS232_8_RXD	121P-90		
RS485_1_A	121P-34	RS485 serial port 1	Xavier-A *ttyTHS4*
RS485_1_B	121P-33		
RS485_2_A	121P-54	RS485 serial port 2	Xavier-B *ttyTHS4*
RS485_2_B	121P-53		
The Remained Ones			
PPS_IN1	121P-23	Second pulse synchronization input signal	Xavier-A，supports 3.3V-16V，hardware configuration
PPS_IN2	121P-55	Second pulse synchronization input signal	Xavier-B，supports 3.3V-16V，hardware configuration
PPS_OUT1	121P-81	Second pulse synchronization output signal	Xavier-A，12V output
PPS_OUT2	121P-80	Second pulse synchronization output signal	Xavier-A，12V output
PPS_OUT3	121P-79	Second pulse synchronization output signal	Xavier-A，3.3V or 5V output
PPS_OUT4	121P-78	Second pulse synchronization output signal	Xavier-A，3.3V or 5V output
PPS_OUT5	121P-106	Second pulse synchronization output signal	Xavier-B，12V output
PPS_OUT6	121P-98	Second pulse synchronization output signal	Xavier-B，12V output
PPS_OUT7	121P-19	Second pulse synchronization output signal	Xavier-B，3.3V or 5V output
PPS_OUT8	121P-37	Second pulse synchronization output signal	Xavier-B，3.3V or 5V output

5.3 System Main Chip

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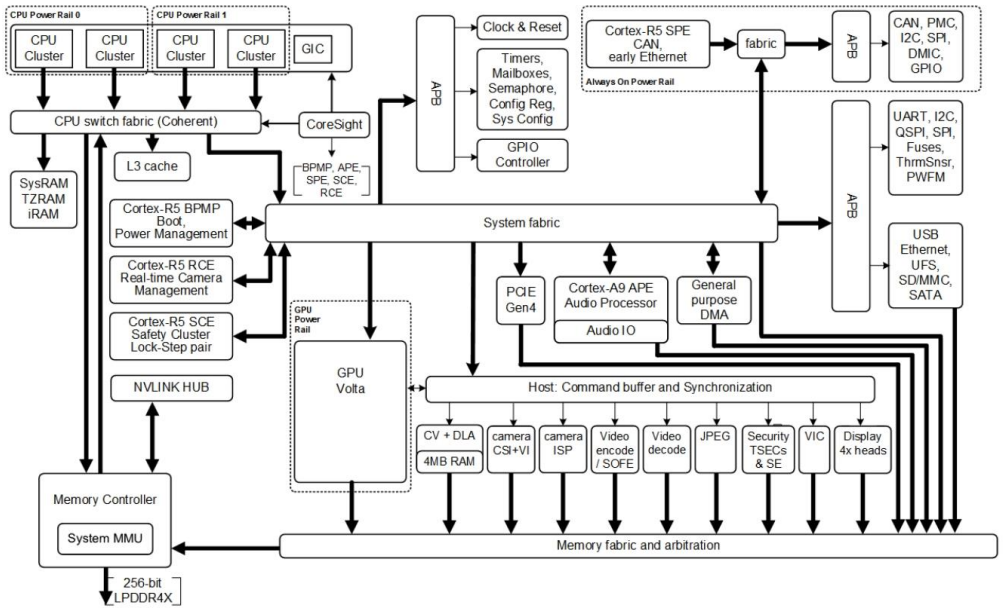
The main chip of EAXVA05 is NVIDIA Jetson AGX Xavier which is designed for embedded robotic control systems. The computing performance of different internal processors is listed below.

- 8-Core CPU: 8-Core Carmel CPU based on ARMv8 ISA
- Deep Learning Accelerator (DLA): 5 TFLOPS (FP16) | 10 TOPS (INT8)
- Volta GPU： 512 CUDA cores | 20 TOPS (INT8) | 1.3 TFLOPS (FP32)
- Vision Processor: 1.6 TOPS
- Stereo and Optical Flow Engine (SOFE): 6 TOPS
- Image Signal Processor (ISP): 1.5 Giga Pixels/s
- Video Encoder: 1.2 GPix/s
- Video Decoder: 1.8 GPix/s

The internal structure of the chip is shown below:



The microcontroller used in EAXVA05 is Infineon TC297 which has a TriCore™ architecture, working at 300MHz and has an ECC (Error Correction Code) protected RAM with a capacity of up to 728KB + 8MB, designed based on ISO26262, supporting up to ASIL-D. By working with a system basic chip (SBC), a hardware core security architecture design is realized. The resources of the chip are as follows:

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Feature	Detail
Micro Control Core	32-bit Infineon TC297TP
Maximum Frequency	300MHz
Flash	8M
SRAM	728K
EEPROM	128K
Float Point Capability	Yes
SBC	TLF35584

5.4 Circuit Structure

The internal circuit structure of EAXVA05 is shown below:

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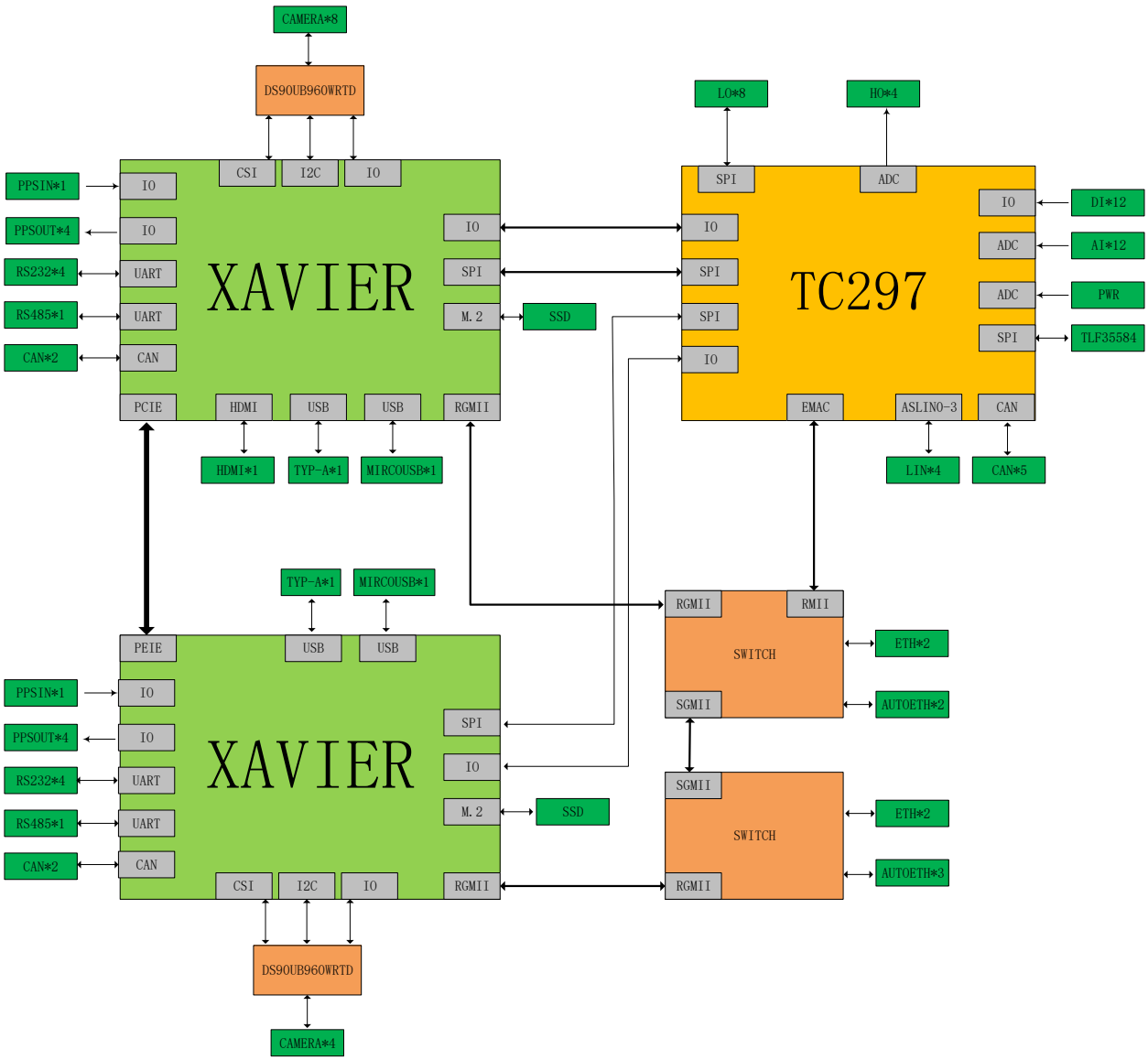

5.5 Circuit Description

5.5.1 Analog Input

The analog input channel circuit has the same structure. The circuit schematic and circuit details are shown below:

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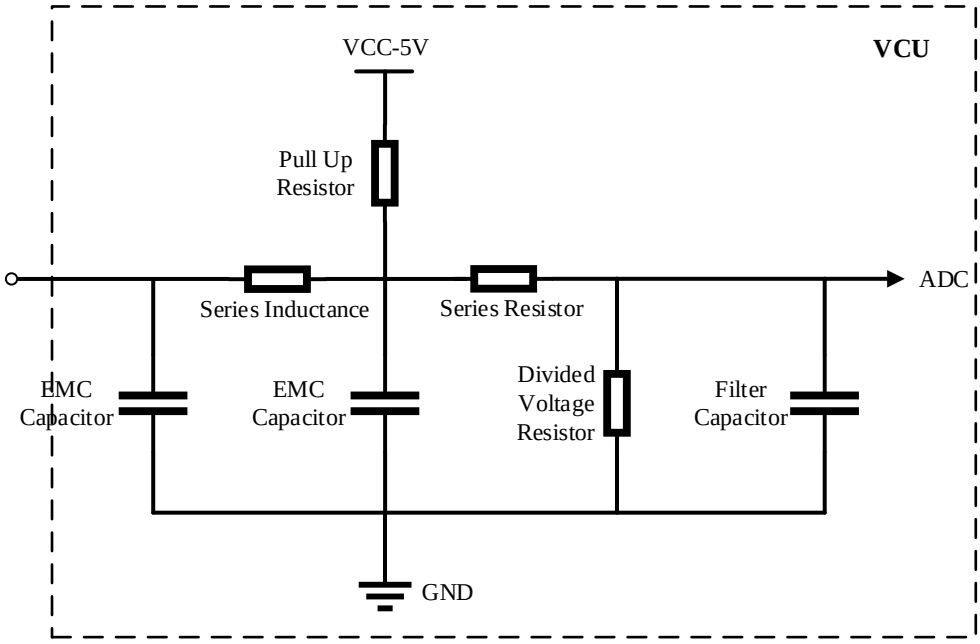

Note: 1. "--" means not soldered; 2. UB means power supply BATT voltage; 3. AI28 collects BATT voltage signal.

Pin #	AI	EMC Capacitor	Pull Up Resistor	Series Resistor	Divided Voltage Resistor	Filter Capacitor	Input Range		Conditions / Remarks
		(F)	to 5V (Ohm)	(Ohm)	(Ohm)	(F)	Min	Max	
42	AI01	100n	--	22k	--	1n	0V	5V	
60	AI02	100n	--	22k	--	1n	0V	5V	
43	AI03	100n	10k	22k	--	1n	--	--	Resistance type
24	AI04	100n	10k	22k	--	1n	--	--	Resistance type
62	AI13	100n	--	22k	3.48k	1n	0V	32V	
40	AI14	100n	--	22k	3.48k	1n	0V	32V	
--	AI28	100n	--	22k	3.48k	1n	0V	32V	BATT

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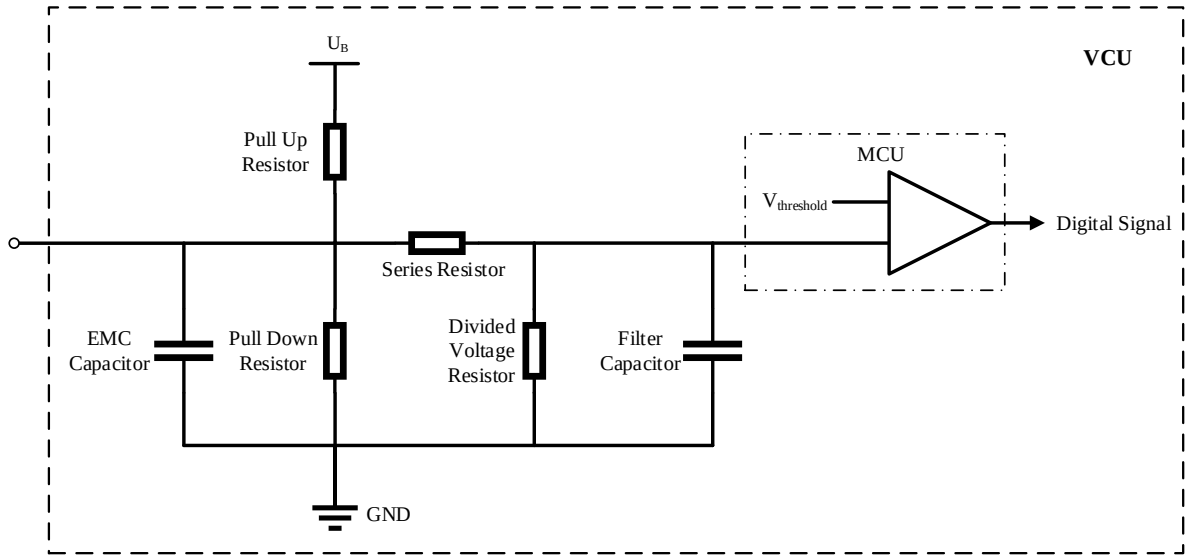
5.5.2 Digital Input

The digital input channel circuit has the same structure. The circuit schematic and circuit details are shown below:



Note: 1. "--" means not welded. 2. UB represents the power supply BATT voltage. 3. KEYON and DC_WAKE only make hard-wire wake-up signal. 4. Digital input DI21, DI22 can be configured as frequency input SPEED1, SPEED2.

Pin #	DI	Pull Up Resistor	Pull Down Resistor	Operation Threshold for Input Signal		Input Range		Conditions/ Remarks
		to U_B(Ohm)	(Ohm)	V_{low}	V_{high}	Min	Max	
20	DI01	--	10k	3V	8.5V	0V	U_B	High effective
58	DI02	--	10k	3V	8.5V	0V	U_B	High effective
77	DI03	10k	--	3V	8.5V	0V	U_B	Low effective
38	DI04	10k	--	3V	8.5V	0V	U_B	Low effective
74	DI21	--	10k	3V	8.5V	0V	U_B	High effective

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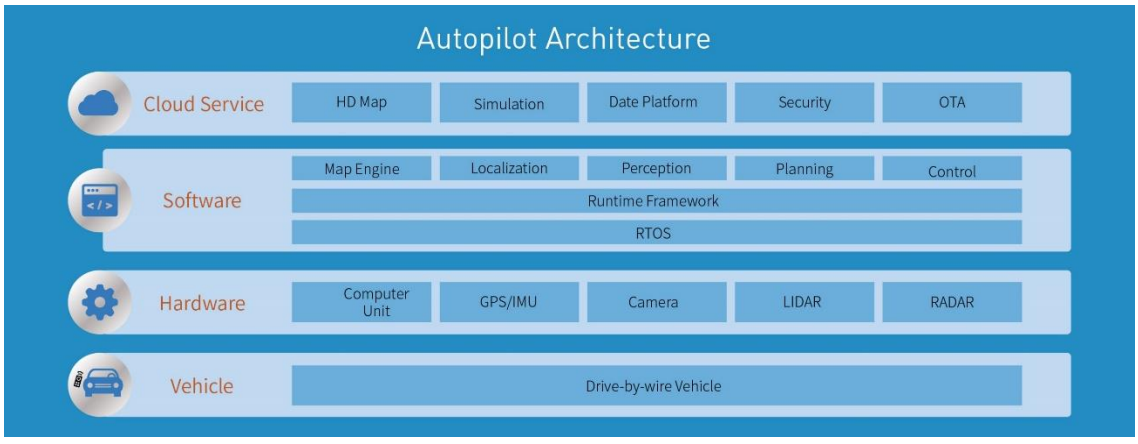
16	DI22	--	10k	3V	8.5V	0V	U_B	High effective

Chapter 6 SoC Basic Software

The SOC software system of the computing platform is customized for the robotic system. A typical framework of a robotic is displayed below. The SoC software system of EAXVA05 consists of RTOS and Runtime Framework. RTOS is a Linux operating system. Runtime Framework is ROS (Robot Operating System) Melodic.

Linux connectsthe hardware and the users, providing functions such as Process Management, Memory Management, File System, Network, Security, User Interface, and Device Drivers. Users can enter commands through the user interface of the operating system. The operating system interprets the commands, drives the hardware devices, and implements user requirements. ROS provides some standard operating system services, such as Hardware Abstraction, Low-Level Device Control, Inter-Process Messaging, and Message Packet Management. ROS is built on a graph architecture. Various nodes can publish, subscribe, and aggregate all kinds of information, e.g., sensing, control, status, planning.



The software architecture of the MCU inside EAXVA05 is designed according to AUTOSAR, which is divided into Application Software Layer and Basic Software Layer. Basic Software Layer consists of a microcontroller abstraction layer, an ECU abstraction layer, a service layer, and a complex driver. Application software and basic software are connected and integrated through EcoCoder.

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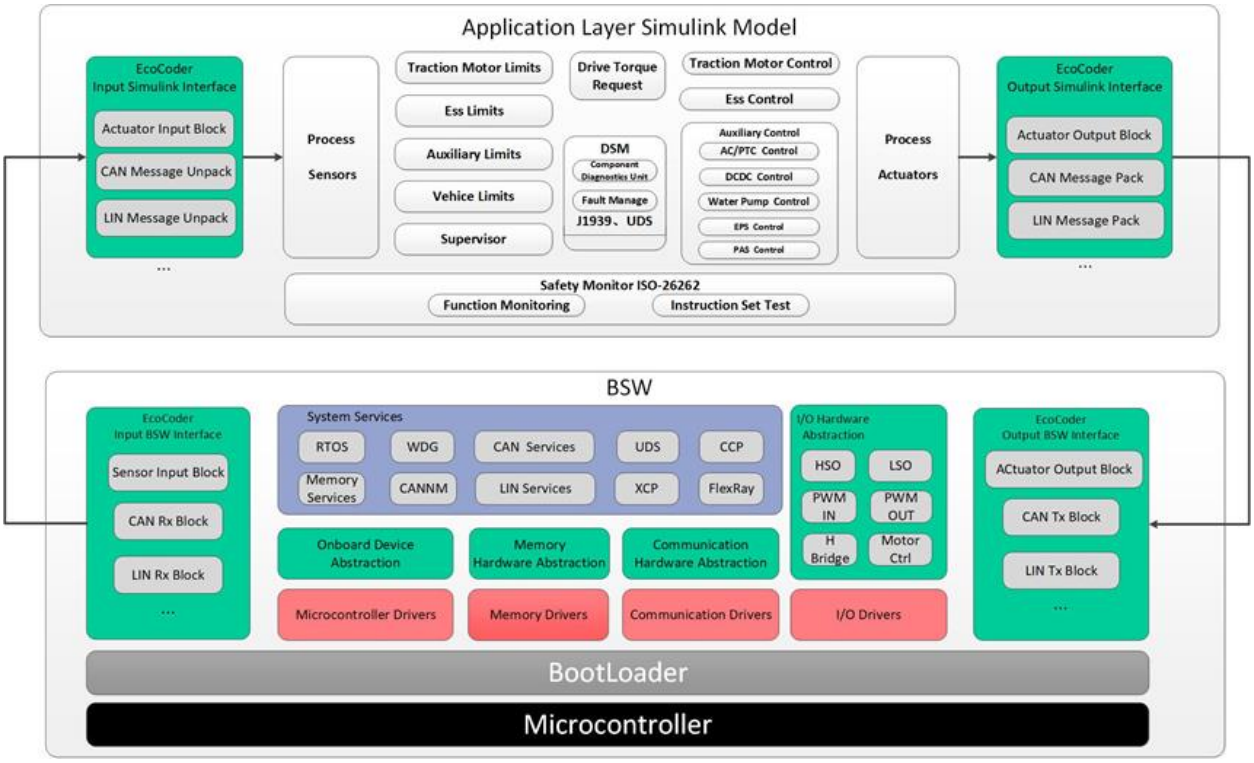
EcoCoder encapsulates the low-level software interfaces into the Simulink library via s-functions. Application developers can use Simulink to build the model and generate executable program files for TC297 via Simulink with just one click.

The basic software interfaces that EcoCoder encapsulates can read digital and analog input signals, control high and low side outputs, support .dbc file interpretation, implement CCP and UDS protocols, and define the measurement, calibration, and NVM variables. MCU application development is implemented with the calibration software EcoCAL and the flashing software EcoFlash.



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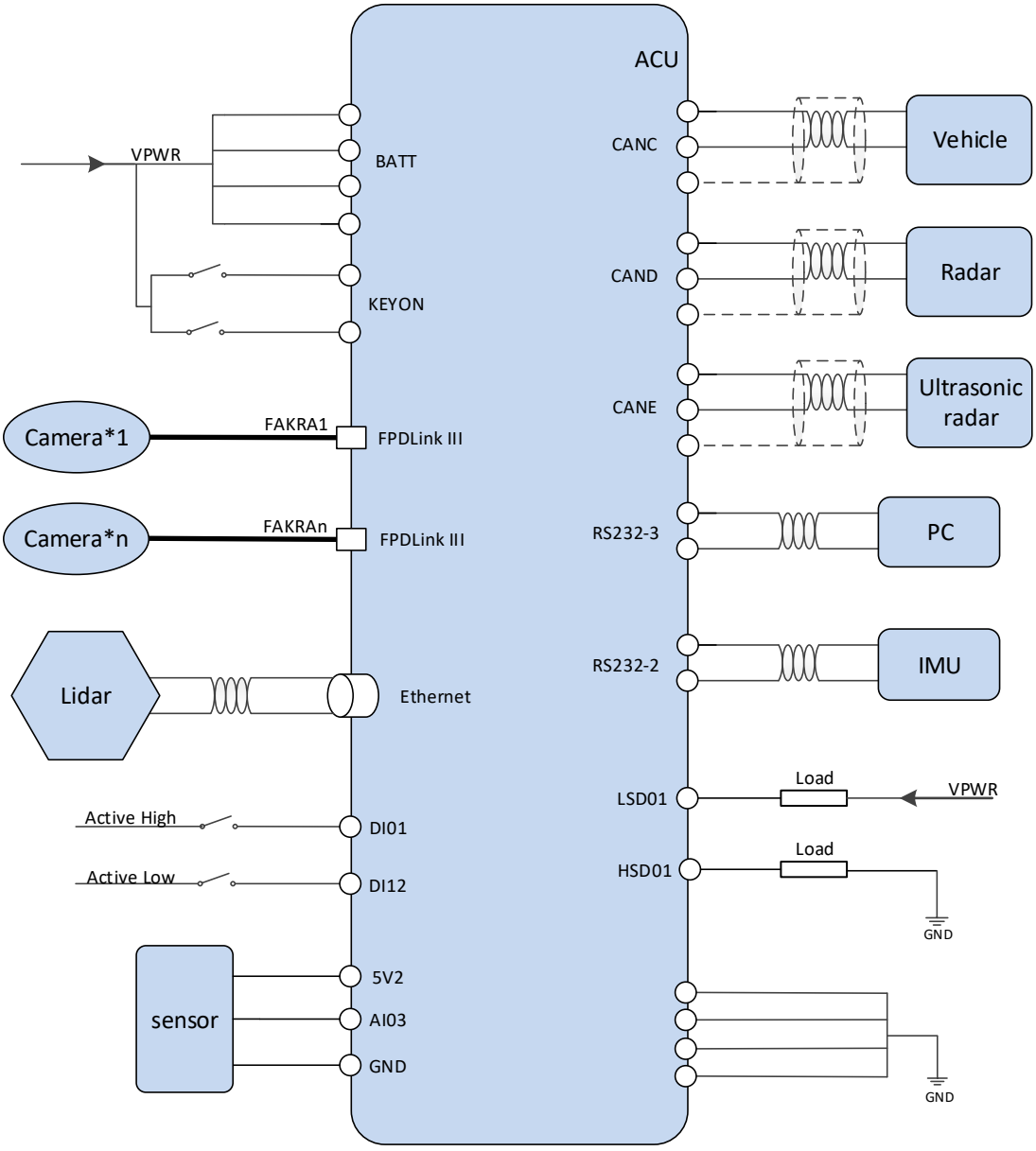
Chapter 7 Demo Application

A demo for robotic hardware platform is shown below, which consists of EAXVA05 and sensors.



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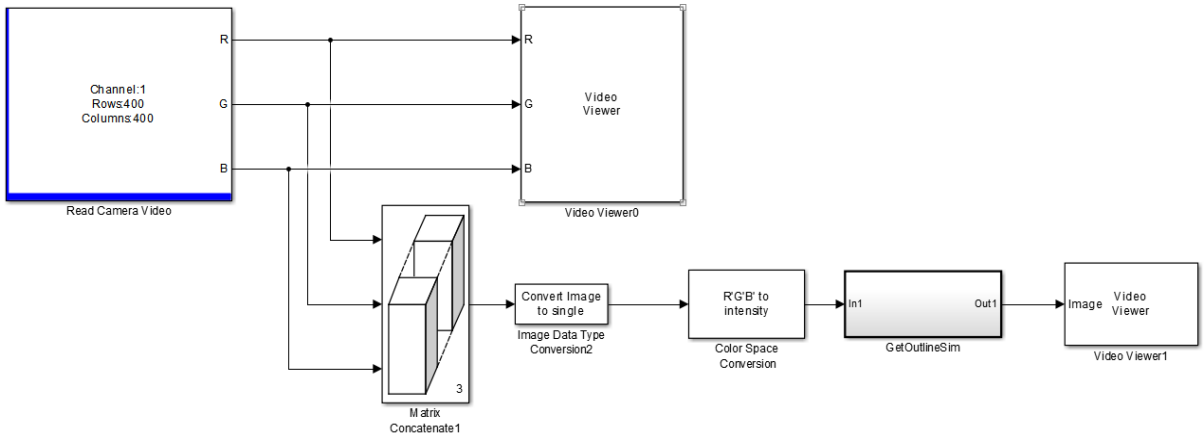
Chapter 8 Development Tool

Devices composed of hardware, operating system stacks, and runtime environments along is not surfficient for modern robotic systems. Continuous software development for packages that can implement specific functions is needed. In addition, deployment to devices is necessary as well. For the intelligent processor Xavier, we provide a development tool EcoCoder-AI. For the microcontroller TC297, we provide three other development tools EcoCoder, EcoCAL, EcoFlash. Users can utilize them to develop customized special applications suitable for specific scenarios.

8.1 EcoCoder-AI

EcoCoder-AI is a powerful automatic code generation library based on Matlab / Simulink that links directly to the target controller. EcoCoder-AI integrates code generation, compilation, and one-click generation of executable files. In addition, the control model based on Simulink can be directly converted into a ROS-based executable program suitable for the target controller and downloaded to the target controller. For details, please refer to EcoCoder-AI Manual.



8.2 EcoCoder

EcoCoder is an application development tool for the control system, which makes it easier for users to develop embedded application software in the Simulink environment. It expands the resources of Simulink and Real-Time Workshop embedded encoders to generate the necessary

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code module and automatically configures and optimizes code generation. By encapsulating the low-level software library to s-functions, EcoCoder allows developers to use low-level software interfaces by model-based-design method and configure basic parameters. It can generate executable files and data description files with one click and provide .a2l file address update tool.

Features:

- Users develop embedded application software in the Simulink environment.
- Application developers can focus on control strategy development without knowing all the information about hardware.
- By encapsulating the low-level software library to s-functions, EcoCoder enables developers to use the low-level software interfaces and configure parameters using the model-based-design method.
- Executable file and data description file can be generated with one click, and a .a2l file address update tool is provided. During the generation, the code generated by the model is integrated with the low-level software automatically in the background, then makefile is used to call the compiler to generate executables.

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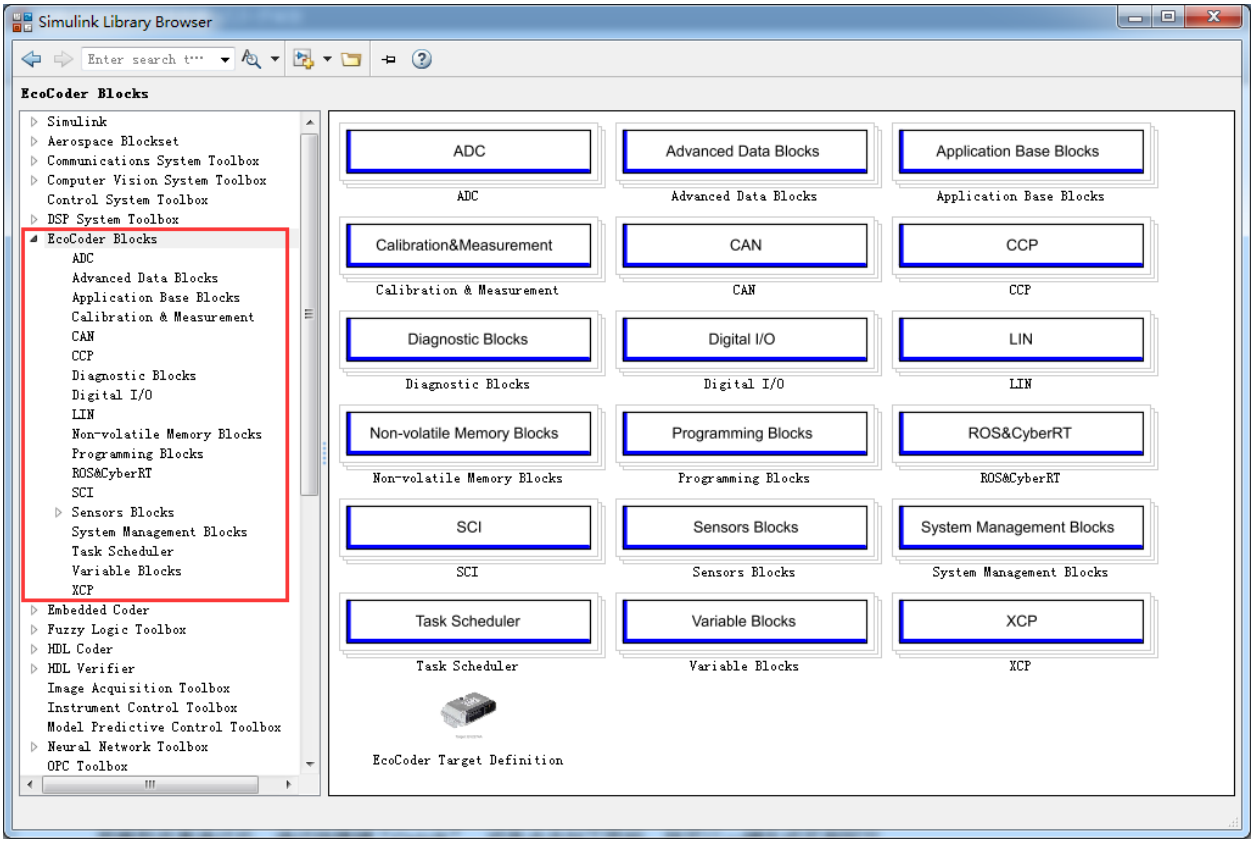
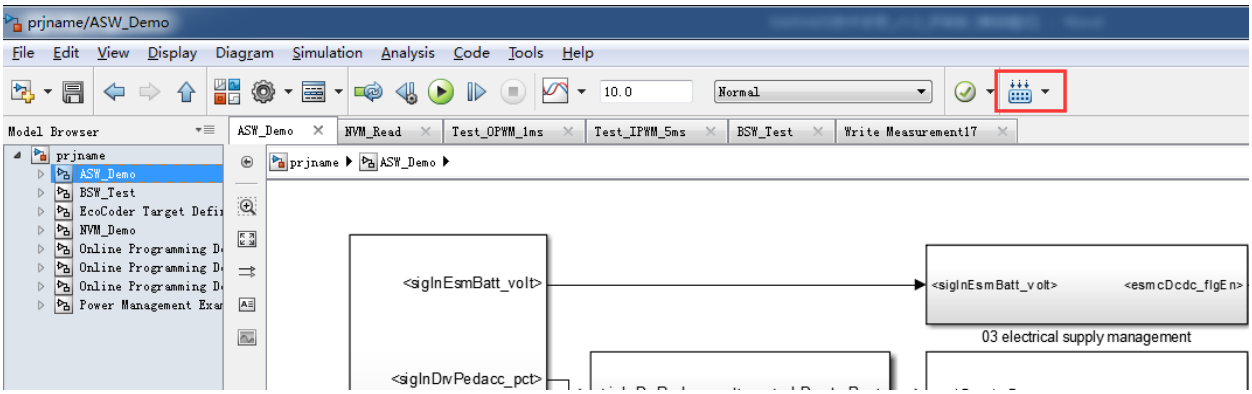


After completing the compilation of the model, use the shortcut “Ctrl + B” or click the button shown below. After that, the files will be ready to be flashed and then generated.



Developers can use EcoCoder to develop application software for MCU in EAXVA05. Please refer to EcoCoder User Manual.

8.3 EcoCAL

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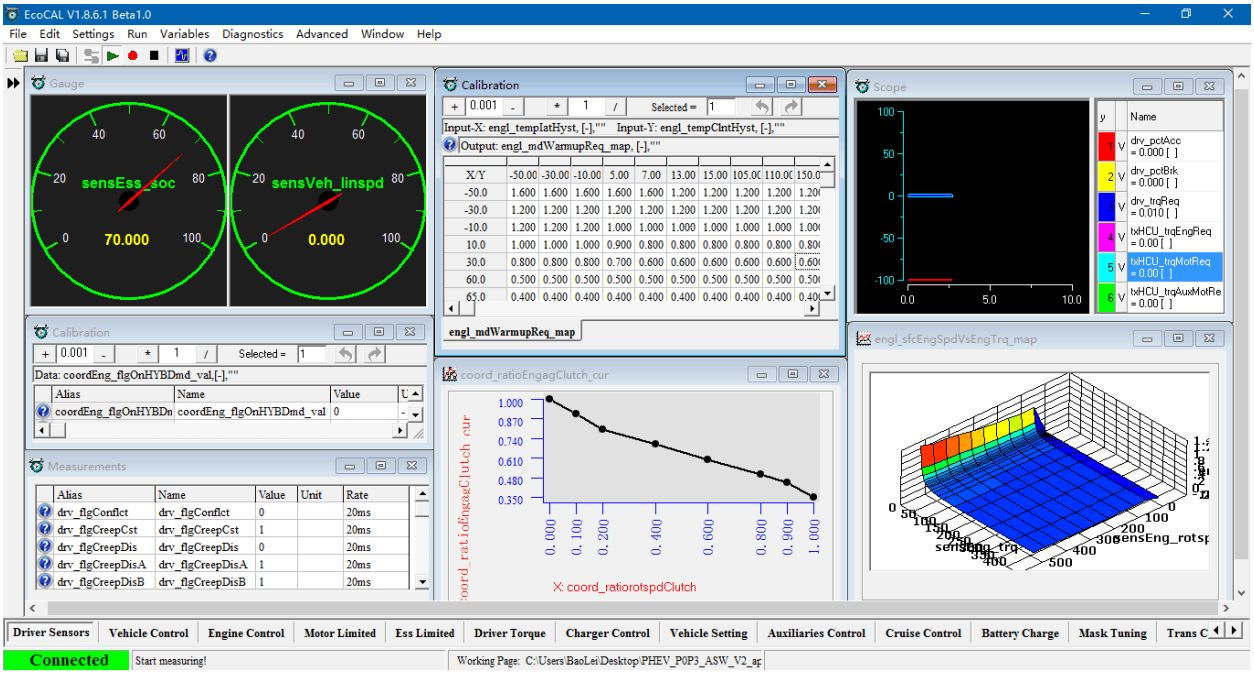
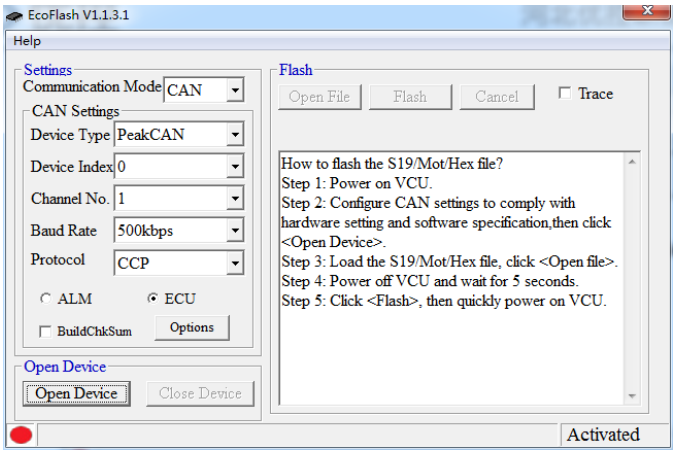
EcoCAL is a PC-side calibration software based on the CCP protocol. By loading .a2l and .hex files, real-time observation of the measurable variables and on-the-fly calibration can be realized. It can assist control strategy development engineers to debug and calibrate application software. Please refer to EcoCAL User Manual for more details.



8.4 EcoFlash

EcoFlash is a PC-side software working with BootLoader to flash target program files. The CAN communication uses CCP/UDS protocol, and supports .s19, .mot and .hex files..



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