ES1274A

- Main Microprocessor
  - MPC5744
  - ISO26262 ASIL-D integrity level
  - 200MHz
  - 2.5M Flash
  - 384K SRAM
  - Float Point Capability
- (SBC) MC33CFS6500 microprocessor
- Inputs
  - 8 Analog Inputs
  - 9 Digital Inputs
  - 2 Frequency Inputs
- Communication
  - 3 CAN 2.0B (CANA, CANB, CANC)
  - CANA supports wake-up function
  - 1 LIN
- Sensor 5V Supply: 2 channels
- SPI Serial EEPROM: 64K
- Hardware Watchdog
- Outputs
  - 4 High-Side Drivers
    (2 of which could be configured as PWM outputs)
  - 10 Low Side Drivers
    (2 of which could be configured as PWM outputs)
- 9-32 V Operating Voltage
- OTP: 12KB, 10KB Optional
- Environmental
  - Operating temperature: -40°C to +110°C
  - ISO26262 Compliant
- Simulink Model Based Design

Date	Version	Note
	V1.0	
Nov. 11, 2019	V1.8	Section 4.7 Bootloader Reset
May 11, 2020	V1.9	Contact info update
June 18, 2020	V2.0	Connector info update
June 24, 2020	V2.1	Frequency input info update
Oct 7, 2020	V2.2	Update the part No. of connector parts
Oct 30, 2020	V2.3	Update the LSO and HSO Diagnostic function
Nov 13, 2020	V2.4	Update Pinout table, DTC functions
Feb 2, 2021	V2.4	Updated connector pin label image
Mar 3, 2021	V2.5	Temperature update
Feb 14,2022	V2.6	Revision

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Contents

Chapter 1 General Information

1.1 SCU Introduction

Supervisory Control Unit, or SCU, is the auxiliary power controller for electrical/hybrid vehicles. The range extender is an additional power storage component installed on vehicle to extend the actual vehicle mileage. The SCU determines the vehicle operating condition by receiving input information from ECU, MCU and VCU (such as engine speed, engine torque, request power, etc.).

According to the MAP efficiency diagram of the engine and generator, SCU can choose the best operating point for them to make the range extender reach the maximum efficiency, and meet the product design requirements.

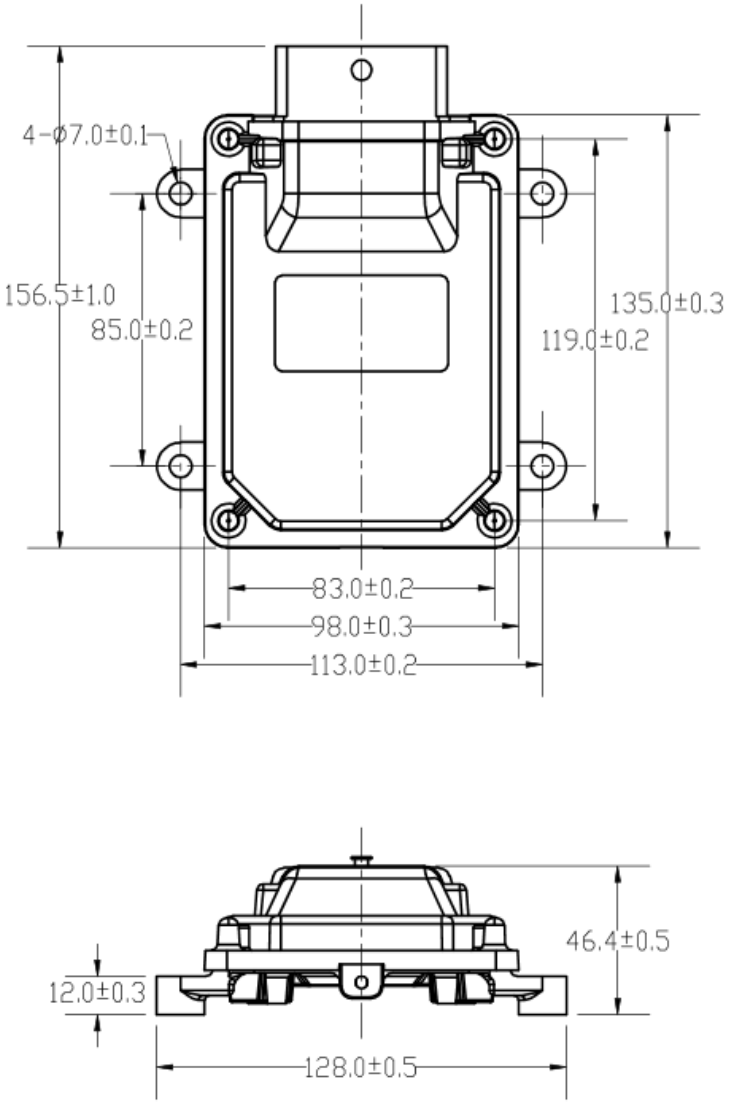
1.1.1 Functions

Functions
1 -Key Signal (KEYON)
4 - supply voltage (BATT)
2 - 5V outputs
3 - CAN communication interface: Supports CANA arbitrary frame wake-up
1 - LIN communication interface: support wake-up
10 - digital signal inputs: 5 Active-high, 5 Active-low
8 - analog signal inputs: 3 - 0~5V voltage type inputs, 2 - channels 0~5V resistive inputs, 3 - channels 0~32V inputs.
2 - frequency signal inputs
4 - high-side drive control outputs: 2 can be configured as PWM outputs
10 - low-side drive control outputs: 2 can be configured as PWM outputs
Hardware watchdog

1.1.2 Mechanical Dimensions

The shell of the SCU is die-cast aluminum and assembled with a silicone seal. There is no special treatment or plating on the outside of the housing, etc., and there are no sharp burrs and sharp edges.

The nominal dimensions of the shell shape of the SCU are as follows (excluding the female end of the SCU connector, in mm):



The appearance of the enclosure as follow:

Please use Plum blossom hexagonal screwdriver to Disassemble and disassemble the enclosure.

The SCU shell is affixed with a product identification label containing a product identification code containing customer information, date, batch number, serial number, etc.

1.1.3 Connectors

Ecotron SCUs, shown as above, use the automotive rated connectors, which meet the automotive safety requirements. Customers can ask Ecotron to buy for them.

The connector diagram is as follows:

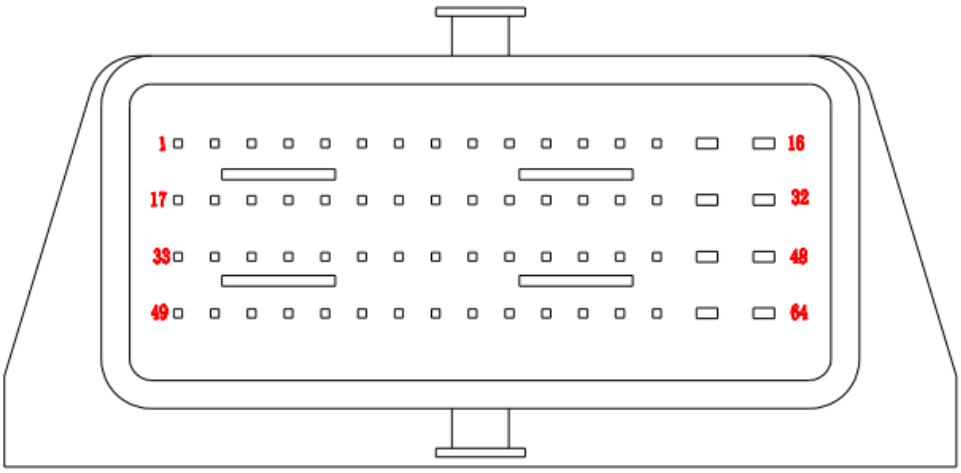


Figure: Pin ID diagram

1.1.4 Chip Resources

Feature	Detail
Micro Control Core	32-bit NXP SPC5744P
Maximum Frequency	200MHz
Flash	2.5M
SRAM	384K
SPI Serial EEPROM	64K
Float Point Capability	Yes
SBC Microprocessor	MC33CFS6500

1.1.5 Power

The ES1274A requires four continuous power supplies (pin10, pin11, and pin26, pin27) to power up the SCU via a key switch (pin18). Chapter 2ES1274A power supply fuse recommends pin10 and pin11 in series a 5A fuse, pin26 and pin27 in series a 5A fuse.

Chapter 2 Interface description

Figure: Pin diagram

2.1 Pin definitions

Signal Name	ID	PIN	Functions	Interface Description	Remark
Power					
BATT	10 11 26 27	1K 1L 2K 2L	Voltage	Power Voltage 12V/24V	9-32V
5V2	5	1E	5V Sensor Voltage2	External Sensor 5V Power Supply	5V±2%， 150mA max
5V3	21	2E	5V Sensor Voltage3	External Sensor 5V Power Supply	5V±2%， 150mA max
PGND	9 25 28 44 47 60 63	1J 2J 2M 3M 3P 4M 4P	Ground	Power Ground	
GND	23 24 49 50 51 52 57	2G 2H 4A 4B 4C 4D 4J	Signal Ground	External Sensor 5V Power Ground	

Analog Input					
AI06	38	3F	Analog Input 06	Analog Input 0~32V	12-bit Accuracy
AI07	36	3D	Analog Input 07	Analog Input 0~32V	12-bit Accuracy
AI01	54	4F	Analog Input 01	Analog Input 0~5V	12-bit Accuracy
AI02	53	4E	Analog Input 02	Analog Input 0~5V	12-bit Accuracy
AI03	37	3E	Analog Input 03	Analog Input 0~5V	12-bit Accuracy
AI04	35	3C	Analog Input 04	Analog Input 0~5V	12-bit Accuracy
AI05	33	3A	Analog Input 05	Analog Input 0~5V	12-bit Accuracy
High Voltage Interlock Signal					
AI08	34	3B	High voltage Input signal Input	Analog Input 0~32V	12-bit Accuracy
HSO02	32	2Q	High voltage interlock signal output	High-side drive output 02	Voltage Logic High
Power-up Signal					
KEYON	18	2B	Key Input	Digital signal 0~BATT	
Digital Input					
DI06	59	4L	Digital Input 06	Digital Signal 0~BATT	Active-High
DI07	1	1A	Digital Input 07	Digital Signal 0~BATT	Active- High
DI08	58	4K	Digital Input 08	Digital Signal 0~BATT	Active- High
DI09	39	3G	Digital Input 09	Digital Signal 0~BATT	Active- High
DI10	56	4H	Digital Input 10	Digital Signal 0~BATT	Active- High
DI01	40	3H	Digital Input 01	Digital Signal 0~BATT	Active-Low
DI02	17	2A	Digital Input 02	Digital Signal 0~BATT	Active- Low
DI03	42	3K	Digital Input 03	Digital Signal 0~BATT	Active- Low
DI04	43	3L	Digital Input 04	Digital Signal 0~BATT	Active- Low
DI21	55	4G	Digital Input 21	Digital Signal 0~BATT	Active- Low
Frequency Inputs					
DI31/SPEED1	2	1B	Frequency inputs 1	Frequency/Digital Inputs 0~BATT	Frequency 20Hz-2KHz/Active Low
DI32/SPEED2	41	3J	Frequency inputs 2	Frequency/Digital Inputs 0~BATT	Frequency 20Hz-2KHz/Active High
Output					
HSO01	16	1Q	High-side Drive output 01	Rated 3A， Peak 5A	
HSO03	48	3Q	High-side Drive Output 03	Rated 0.8A	Configurable PWM Output，Frequency 20Hz-2KHz
HSO04	64	4Q	High-side Drive Output 04	Rated 0.8A	Configurable PWM Output，Frequency 20Hz-2KHz
LSO01	29	2N	Low-side Drive Output 01	Rated 0.25A	Configurable PWM Output，Frequency 20Hz-2KHz
LSO02	62	4O	Low-side Drive Output 02	Rated 0.25A	Configurable PWM Output，Frequency 20Hz-2KHz
LSO03	14	1O	Low-side Drive Output 03	Rated 0.25A	

LSO04	45	3N	Low-side Drive Output 04	Rated 0.25A	
LSO05	46	3O	Low-side Drive Output 05	Rated 0.25A	
LSO06	13	1N	Low-side Drive Output 06	Rated 0.25A	
LSO07	61	4N	Low-side Drive Output 07	Rated 0.25A	
LSO08	30	2O	Low-side Drive Output 08	Rated 0.25A	
LSO09	31	2P	Low-side Drive Output 09	Rated 3A，Peak 5A	
LSO10	15	1P	Low-side Drive Output 10	Rated 3A，Peak 5A	
Serial Communication Interface					
CANA_H	6	1F	CANA_H	120Ohm Termination Resistor	Support Arbitrary Frame Wake-up
CANA_L	7	1G	CANA_L		
CANB_H	20	2D	CANB_H	Without 120Ohm Termination Resistor	
CANB_L	19	2C	CANB_L		
CANC_H	4	1D	CANC_H	120Ohm Termination Resistor	
CANC_L	3	1C	CANC_L		
CAN_SHILD1	8	1H	CAN SHILD		
CAN_SHILD2	22	2F	CAN SHILD		
LIN1	12	1M	LINBUS		Support Wake-up
Internal Signal					
AI26	--	--	Acquires External 5V2 Output Voltage	—	12-bit Accuracy
AI27	--	--	Acquires External 5V3 Output Voltage	—	12-bit Accuracy
AI28	--	--	Acquires Power BATT Voltage	—	12-bit Accuracy

2.2 Pin Description

2.2.1 Analog Input

Function description

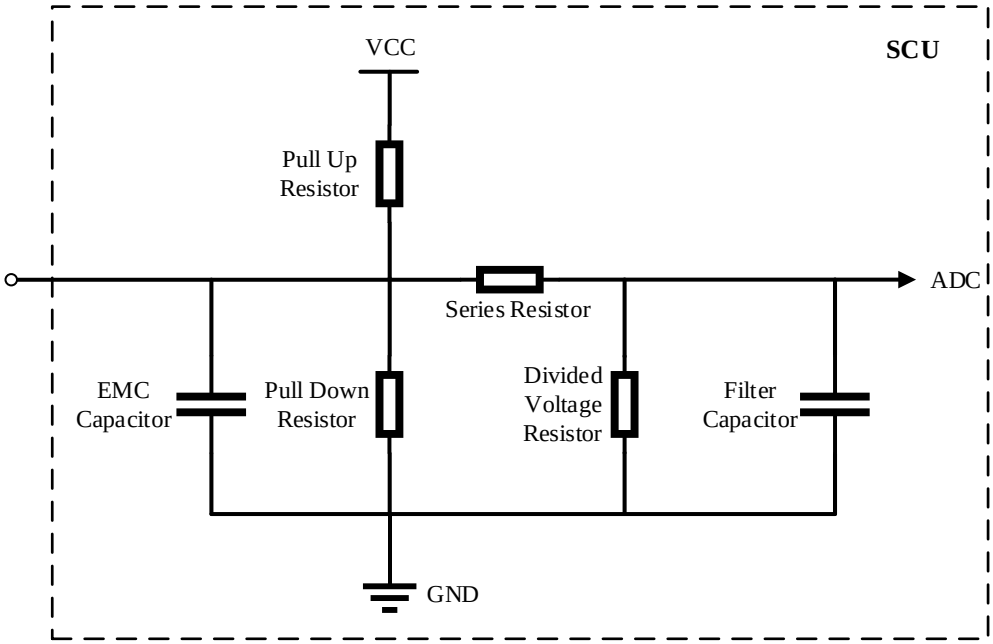
The analog input channel circuit has the same structure, including EMC capacitor, pull-up / pull-down resistor and first-order low-pass filter circuit.

Main differences:

- Resistance value of pull-up/pull-down resistance
- Pull-up Voltage

- Filter time constant

Schematic diagram



Analog Input Channel Parameter Table

Note:
1) "--" means not installed. 2) UB represents the BATT voltage of the power supply. 3) AI26 collects external 5v2 output voltage, AI27 collects external 5v3 output voltage, and AI28 collects batt voltage signal. 4) Whether AI01 and AI02 channels contain "pull up resistor to 5V1" is controlled by the application layer.

Pin #	AI	EMC Cap.	Pull Up Resistor		Pull down Resistor	Serial Resistor	Divided Voltage Resistor	Filter Capacitor	Operation Range		Input Range		Conditions / Remarks
		(F)	to UB (Ohm)	to 5V1 (Ohm)	to GND (Ohm)	(Ohm)	(Ohm)	(F)	Vlow	Vhigh	Min	Max	
54	AI01	100n	--	10k or NC	--	22k	--	10n	0 V	5 V	0 V	5V	
53	AI02	100n	--	10k or NC	--	22k	--	10n	0 V	5 V	0 V	5V	
37	AI03	100n	--	--	220k	22k	--	10n	0 V	5 V	0 V	5V	
35	AI04	100n	--	--	220k	22k	--	10n	0 V	5 V	0V	5V	
33	AI05	100n	--	--	220k	22k	--	10n	0 V	5 V	0 V	5V	
38	AI06	100n	--	--	220k	22k	3.48k	10n	0 V	32 V	0 V	32 V	
36	AI07	100n	--	--	220k	22k	3.48k	10n	0 V	32 V	0 V	32 V	
34	AI08	100n	--	--	220k	22k	3.48k	10n	0 V	32 V	0 V	32V	
--	AI28	100n	--	--	220k	22k	3.48k	10n	0 V	32 V	0 V	32V	
--	AI26	--	--	--	--	1k	1k	10n	0 V	5 V	0 V	5V	
--	AI27	--	--	--	--	1k	1k	10n	0 V	5 V	0 V	5V	

2.2.2 Digital Input

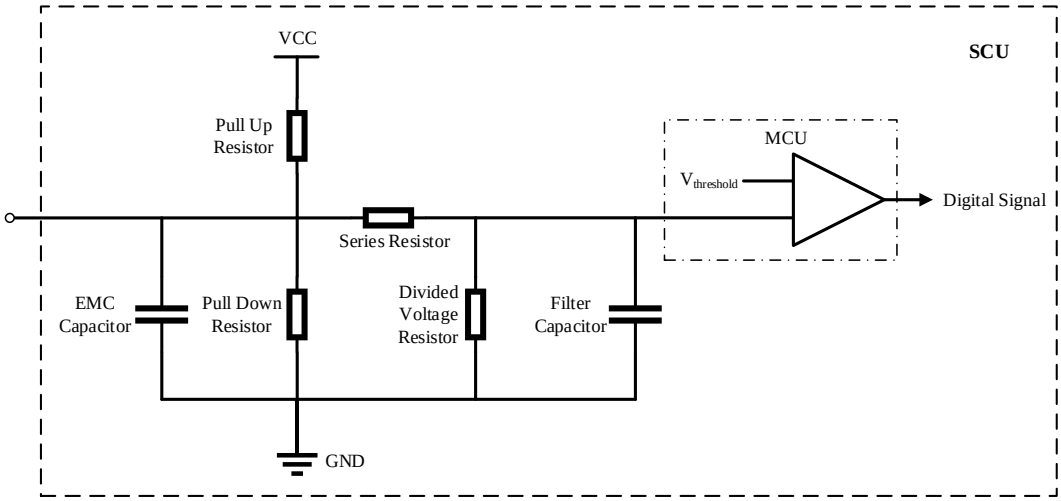
Function description

The digital input channel circuit has the same structure, including EMC capacitor, pull-up / pull-down resistance, voltage-dividing resistance and first order low-pass filter circuit.

Main differences:

- Resistance value of pull-up / pull-down resistance
- Pull up / pull down selection
- Filter time constant

Schematic diagram



Digital input channel parameter table

Note:
1) "--" means not installed. 2) UB represents the batt voltage of the power supply. 3) KEYON is only used as key signal. 4) Digital input DI31 and DI32 can be configured as frequency input SPEED1 and SPEED2.

Pin #	Description	EMC Cap.	Filter Cap.	Pull Up Resistor to UB	Pull Up Resistor to 5V	Pull Down Resistor	Serial Resistor	Divided Voltage Resistor	Operation Threshold for Input Signal		Input Range		Conditions/ Remarks
		(F)	(F)	(Ohm)	(Ohm)	(Ohm)	(Ohm)	(Ohm)	Vlow	Vhigh	min	max	
59	DI06	10n	100p	--	--	10k	100K	33K	5V	8.5V	0 V	UB	
1	DI07	10n	100p	--	--	10k	100K	33K	5V	8.5V	0 V	UB	
58	DI08	10n	100p	--	--	10k	100K	33K	5V	8.5V	0 V	UB	
39	DI09	10n	100p	--	--	10k	100K	33K	5V	8.5V	0 V	UB	
56	DI10	10n	100p	--	--	10k	100K	33K	5V	8.5V	0 V	UB	
40	DI01	10n	100p	10k	--	--	100K	33K	5V	8.5V	0 V	UB	
17	DI02	10n	100p	10k	--	--	100K	33K	5V	8.5V	0 V	UB	
42	DI03	10n	100p	10k	--	--	100K	33K	5V	8.5V	0 V	UB	
43	DI04	10n	100p	10k	--	--	100K	33K	5V	8.5V	0 V	UB	

55	DI21	10n	100p	10k	--	--	100K		5V	8.5V	0 V	UB	
02	DI31	10n	100p	10k	--	--	100K	33K	5V	8.5V	0 V	UB	
41	DI32	10n	100p	--	--	10k	100K	33K	5V	8.5V	0 V	UB	
18	KEYON	10n	100p	--	--	10k	100K	33K	5V	8.5V	0 V	UB	Wakeup Signal

2.2.3 Frequency Input

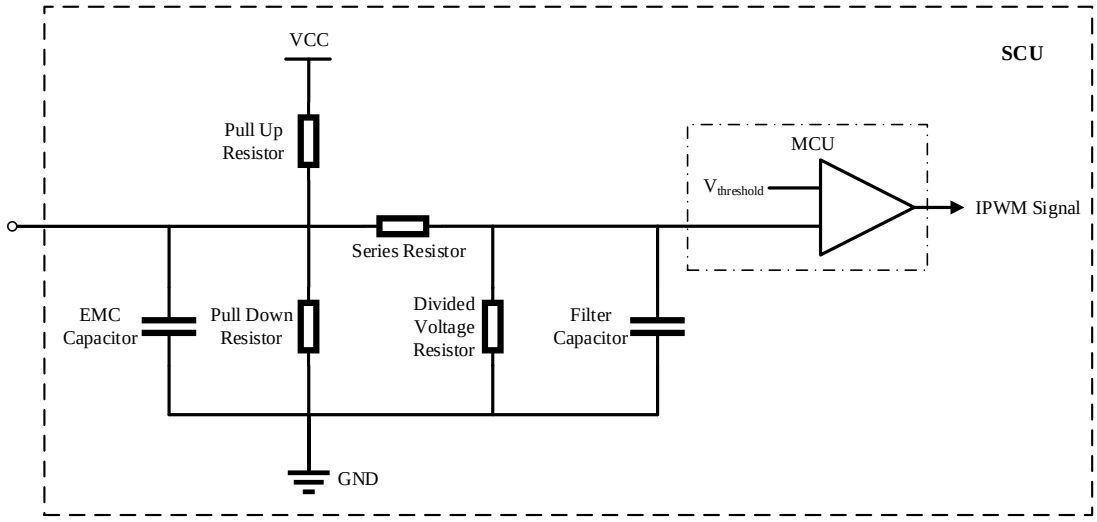
Function description

The frequency Input channel circuit has the similar structure, including EMC capacitor, pull-up / pull-down resistance, voltage-dividing resistance and first order low-pass filter circuit.

Main differences:

- Resistance value of pull-up / pull-down resistance
- Pull up / pull down selection
- Filtering time

Schematic diagram



Frequency signal input channel parameter table

Tips: Frequency input SPEED1, SPEED2 support can be configured as digital input DI31, DI32.

Pin-No.	Description	EMC Cap.	Filter Cap.	Pull Up Resistor to UB	Pull Up Resistor to 5V	Pull Down Resistor	Serial Resistor	Divided Voltage Resistor	Operation Threshold for Input Signal		Input Range	
		(F)	(F)	(Ohm)	(Ohm)	(Ohm)	(Ohm)	(Ohm)	Vlow	Vhigh	min	max
02	SPEED1	10n	100p	10k	--	--	100K	30K	5V	8.5V	0 V	UB
41	SPEED2	10n	100p	--	--	10k	100K	30K	5V	8.5V	0 V	UB

Note: The reference values of frequency and Duty Ratio of the frequency signal input channel are shown in the table below (test conditions: BATT=12V, pulse input amplitude=10V, pulse input Bias=5V):

Frequenc y Inout	Detection frequency	Input Duty Ratio	Detect Duty Ratio	Input Duty Ratio	Detect Duty Ratio	Input Duty Ratio	Detect Duty Ratio
100Hz	100Hz	10.0%	9.92%	50.0%	49.92%	90.0%	89.92%
1000Hz	1000Hz	10.0%	9.67%	50.0%	49.60%	90.0%	90.32%
2000Hz	2000Hz	10.0%	9.12%	50.0%	49.38%	90.0%	90.32 %

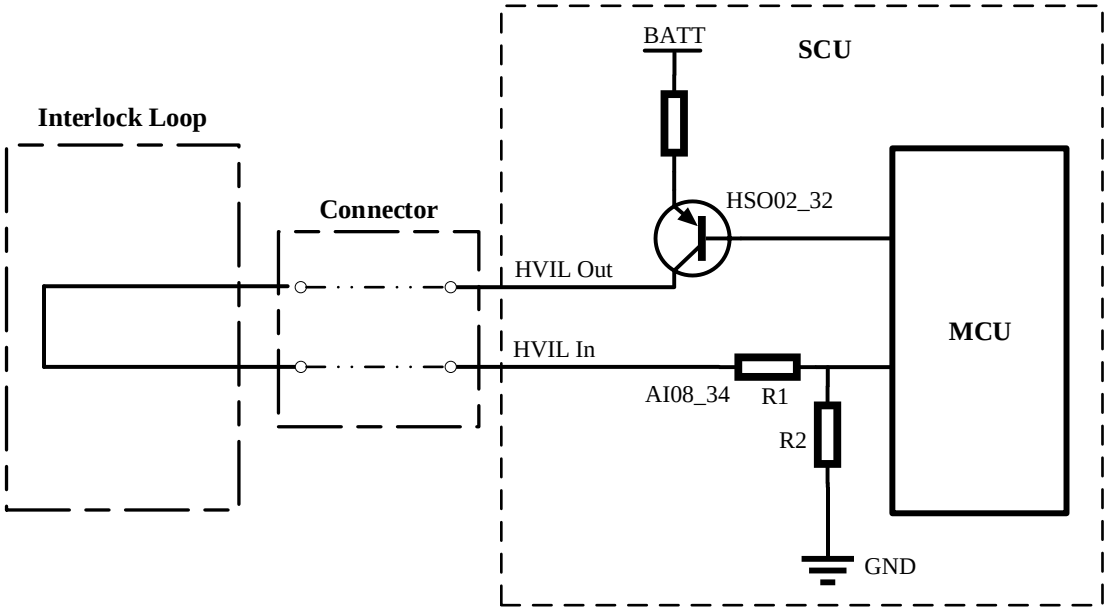
2.2.4 High Voltage Inter-lock Interface

Function description

In the high voltage interlock check circuit of the whole vehicle, the SCU outputs a high-level signal to the circuit through pin 32 high-side channels, and the SCU detects the feedback signal in the circuit through pin 34 analog channels to detect the safety and integrity of the whole vehicle circuit.

Note: pin 32 can be used as normal high-side drive channel and pin 34 can be used as 0-32V analog input channel without using this high voltage inter-lock interface.

Schematic diagram



High Voltage Interlock Parameter Table

Pin #	Description	Resistor (Ohm)	Conditions / Remarks
		R2/(R1+R2)	
32	HVIL_OFT: HVIL signal output	--	HSO02

34	HVIL_IFT: HVIL signal feedback	3.48K/(22K+3.48K)	AI08

2.2.5 Low-Side Drive

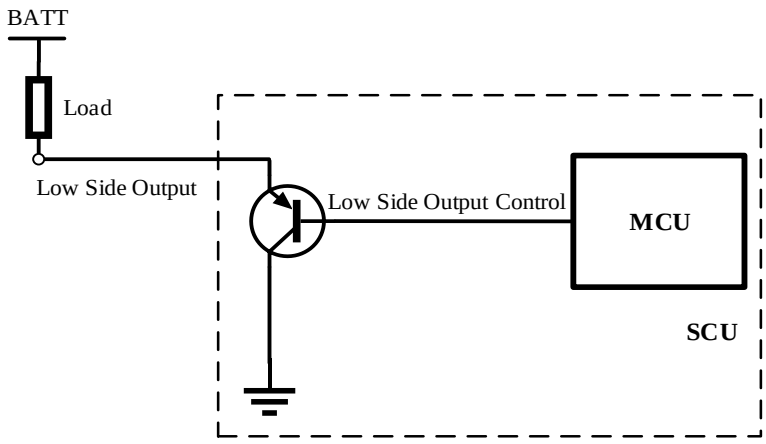
Function description

Low-Side drivers can be used as switches to drive peripherals, and all channels have fault diagnosis Function.

Main differences:

- Different Rated current.
- With or without PWM function.

Schematic diagram



Parameter table of low-side drive channel

Pin #	Description	EMC Cap	Output Current	Free Wheeling Diode	Conditions / Remarks
		(F)	Max		
29	LSO01	100n	0.25A	No	OPWM Configurable
62	LSO02	100n	0.25A	No	OPWM Configurable
14	LSO03	100n	0.25A	No	
45	LSO04	100n	0.25A	No	
46	LSO05	100n	0.25A	No	
13	LSO06	100n	0.25A	No	
61	LSO07	100n	0.25A	No	
30	LSO08	100n	0.25A	No	
31	LSO09	100n	5A	Yes	

15	LSO10	100n	5A	Yes	

Note:
1) "--" means not installed.
2) 5v1 is an internal pull-up power supply to supply power to low-side drive LSO01-LSO10.
3) For the use of all low side drive channel outputs, first
4) The total load of all low-side drive channels shall not exceed 5A.

Error diagnosis of Low side drive

Low side drive channel	Diagnose	
	Disable	Enable
LSO01、LSO02、LSO03、LSO04、LSO06、LSO07、LSO08、LSO09、LSO10	• no load • short to ground	•short to power

Note:
1) Please refer to EcoCoder manual for the use of fault diagnosis function.
2) When lSO01-02 is configured as OPWM, the reference values of frequency and duty cycle accuracy are shown in the table below (test conditions: batt = 12V, load = 24 ohms).

Table - reference values of frequency and duty cycle accuracy when configuring OPWM for Low-side drive channel

Set frequency	Actual output frequency	Set duty cycle	Actual output duty cycle	Set duty cycle	Actual output duty cycle	Set duty cycle	Actual output duty cycle
100Hz	100Hz	10.0%	9.6%	50.0%	49.6%	90.0%	89.6%
1000Hz	1000Hz	10.0%	10.4%	50.0%	50.4%	90.0%	90.4%
2000Hz	2000Hz	10.0%	10.8%	50.0%	50.6%	90.0%	90.8%

2.2.6 High-Side Drive

Functional Description

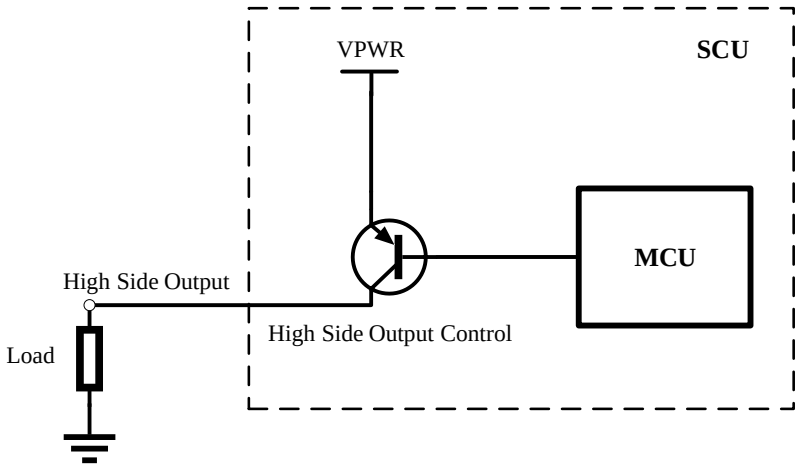
High-edge drivers can be used as switches to drive peripherals, and all channels have fault diagnosis capabilities.

Main differences:

- Rated current
- With or without PWM function

- leakage current
- With or without flyback diode

schematic diagram



Parameter table of high side drive channel

Pin #	Description	EMC Cap.	Output current	Leakage Current	Free Wheeling Diode	Conditions / Remarks
		(F)	Max(A)	Max(uA)		
16	HSO01	100n	5	3	No	
32	HSO02	100n	5	3	No	
48	HSO03	100n	0.8	3	No	OPWM Configurable
64	HSO04	100n	0.8	3	No	OPWM Configurable

Note:
1) 5V1 is an internal pull-up power supply for the high-side drive HSO03-HSO04.
2) All high-side drive channel outputs are controlled by the application layer.
3) The total load of all high-side drive channels does not exceed 5A.

Error diagnosis of high side drive

high side drive channel	Diagnose	
	Disable	Enable
HSO01、HSO02	--	• no load • short to ground • short to power
HSO03、HSO04	• no load • short to power	•Short to ground

Note

1) Refer to the EcoCoder Manual for how to use the fault diagnosis function.
2) When HSO03-04 is configured as OPWM, the precision reference values for frequency and duty cycle are shown in the following table (test conditions: BATT=12V, load=24 ohm).

Reference value of frequency and duty cycle accuracy when configuring OPWM for high side drive channel

Set frequency	Actual output frequency	Set duty cycle	Actual output duty cycle	Set duty cycle	Actual output duty cycle	Set duty cycle	Actual output duty cycle
100Hz	100Hz	10.0%	10.4%	50.0%	50.4%	90.0%	90.4%
1000Hz	1000Hz	10.0%	13.6%	50.0%	53.6%	90.0%	93.2%
2000Hz	2000Hz	10.0%	16.0%	50.0%	56.8%	90.0%	98.4%

2.2.7 CAN Bus

Function description

The can interface circuit is used for the communication between SCU and other on-board electronic controllers, and the communication speed can be up to 1Mbit / s. CANA interface is integrated in the power chip, and CANA supports any frame wake-up function.

Schematic diagram

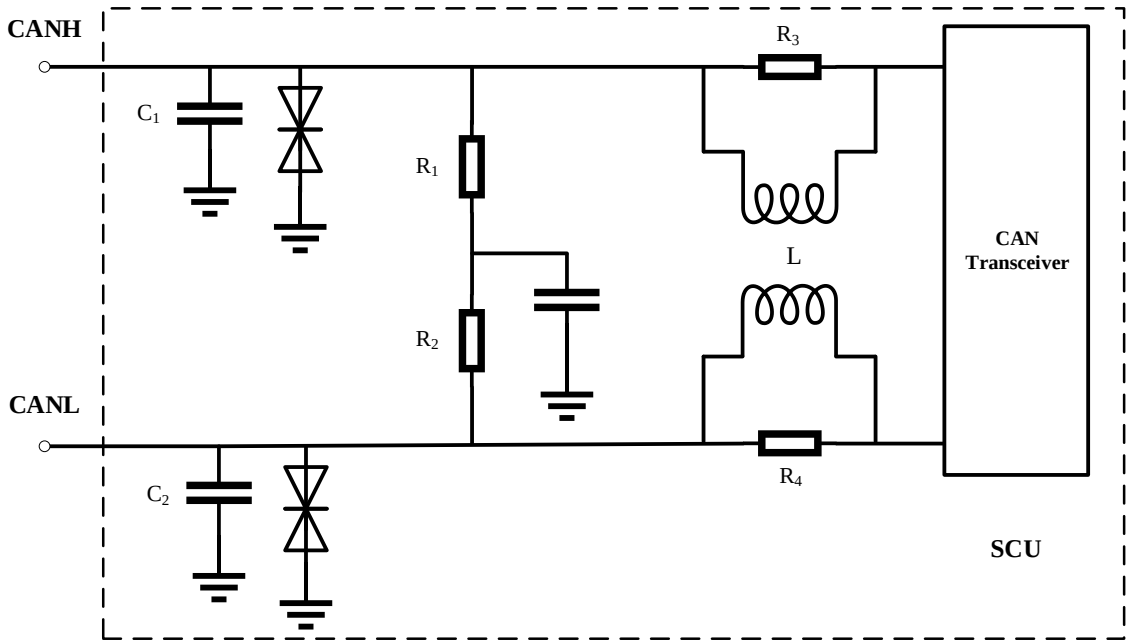


Figure: Schematic diagram of CAN Bus

Can interface parameter table

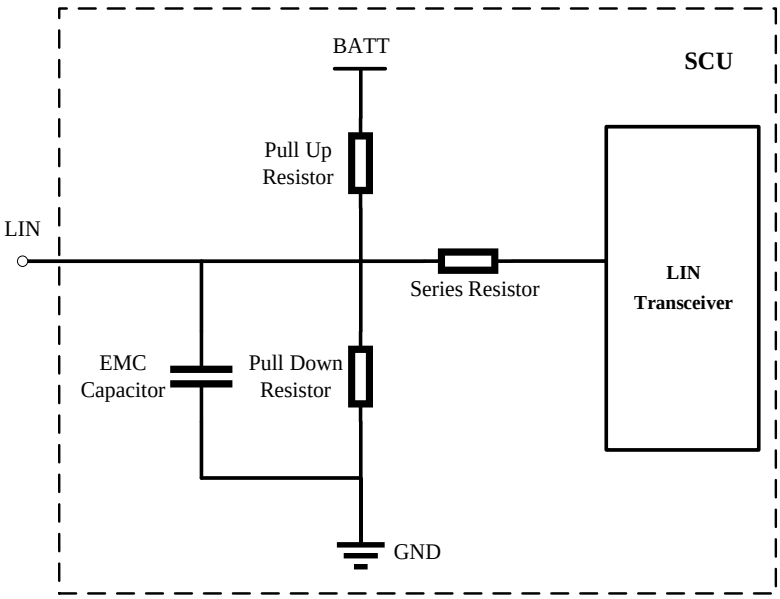
Pin #	Description	EMC Capacitor (F) C1, C2	R1, R2 (Ohm)	Choke L	Conditions / Remarks
6	CANA H	47p	60	Yes	Support ISO11898-5， Support CAN arbitrary frame wake-up
7	CANA L	47p	60		
20	CANB H	47p	--	Yes	Support ISO11898-5
19	CANB L	47p	--		
4	CANC H	47p	60	Yes	Support ISO11898-5
3	CANC L	47p	60		

2.2.8 LIN Bus Interface

Function description

LIN (local interconnect network) bus supports master / slave node communication mode, has short-circuit protection function to power supply, and Lin supports wake-up function.

schematic diagram



Can interface parameter table

Pin #	LIN	EMC Capacitor (F)	Pull Up Resistor to U_B (Ohm)	Pull Down Resistor to GND (Ohm)	Series Resistor (Ohm)	Conditions / Remarks
78	LIN1	10n	6.1k	--	--	

2.2.9 5V Voltage Output

Function description

The 5V sensor power output channel can provide 5V power supply voltage for external sensors and has the following functions:

- Precise 5V output for internal IC power supply
- 5-way sensor 5V power supply output
- Reverse connection protection, short circuit protection and over temperature protection

Channel parameters

Pin #	Description	Imax(mA)	Output Voltage
5	5V supply voltage 2	150	5V±2%
21	5V supply voltage 3	150	5V±2%
--	5V supply voltage 1（5V1）	--	--

Note:

1) 5V1 is an internal pull-up power supply, control analog input AI01, AI02 pull-up, supply power to Low-side driver LSO01-LSO10 and High-side driver HSO03-HSO04.

2) AI26 collects external 5V2 output voltage, AI27 collects external 5V3 output voltage. See chapter 2.2.1 for details.

3) All 5V sensor power output channels are controlled by the application layer.

2.2.10 OTP

Function description

OTP (one time programmable) is a memory type of single chip microcomputer, that is, one-time programmable: after the program is burned into the single chip microcomputer, it cannot be

changed and cleared again. The OTP area of ES1274A is 12KB, and the factory brushing product identification code takes 2KB. Users have 10KB of OTP area space to access.

Chapter 3 Technical Performance

3.1 Electrical characteristic parameters

Supply Voltage	DC 12/24V(9~32V)
Working Temperature	-40~110 °C
Humidity	0~95%, no condensation
Storage Temperature	-45~125 °C
Protection Level	IP67
Mechanical Shock	50g
Quiescent Current	<1 mA
Electric Performance	ISO16750, ISO7637 compliance
EMC	CISPR25 compliance
Dimensions	156×128×46mm
Weight	≤350g
Housing	Die-casting aluminum
Rated Power Consumption	3W

3.2 Other Standard Tests

NO	Test	Description	Test Standard
1	Environmental Tests	Waterproof experiment	IEC/EN 60529 IP67
2		Anti-dust experiment	ISO 20653
3		Salt-fog leakage test	ISO 16750-4
4		Corrosion test	ISO 16750-3
5		Mechanical shock test	ISO 16750-3
6		Drop test	ISO 16750-3
7		Electrical operation at ambient temperature	ISO 16750-4
8		High and low temperature operation test	ISO 16750-4
9		high and low temperature test	ISO 16750-4
10		Thermal cycling with humidity test	IEC 60068-2-30

11		Constant temperature and humidity test	ISO 16750-4
12		Vibration test	ISO 16750-3
13		Thermal shock test	ISO 16750-4
14		ESD	GMW3097
15	EMC Tests	DC supply voltage	ISO 16750-2
16		Overvoltage	ISO 16750-2
17		Superimposed alternating voltage	ISO 16750-2
18		Slow decrease and increase of supply voltage	ISO 16750-2
19		Discontinuities in supply voltage (Reset behaviors at voltage drop)	ISO 16750-2
20		Discontinuities in supply voltage (Starting profile)	ISO 16750-2
21		Reverse Polarity	ISO 16750-2
22		Open circuit tests (Single line interruption)	ISO 16750-2
23		Open circuit tests (Multiple lines interruption)	ISO 16750-2
24		Short interrupts	ISO 16750-2
25		Withstand voltage	ISO 16750-2
26		Leakage Resistance	ISO 16750-2
27	EMC Tests	Voltage Transient Emissions Test	ISO 7637-2
28		Conducted emission test-voltage method	CISPR25
29		Conducted emission test-current probe method	CISPR25
30		Radiated emission test-ALSE method	CISPR25
31		Signal line transient conducted immunity test	ISO 7637-3
32		Bulk Current Injection	ISO 11452-4
33		Absorber-lined shielded enclosure	ISO 11452-2
34		Disturbance resistance-magnetic fields	ISO 11452-8

Chapter 4 Installation requirements

Ecotron recommends that the SCU be installed in the vehicle cockpit. If the vehicle manufacturer wants to assemble the SCU in other positions, the corresponding installation positions shall be jointly evaluated by the engineers of Ecotron and the engineers of the vehicle manufacturer.

Precautions for SCU installation are as follows:

1) The installation of SCU and harness shall be firm and reliable without looseness, and please avoid supporting the harness through SCU. At the same time, the layout of SCU harness shall prevent and protect all wires in the harness from damage due to wear and overheating.

2) Try to avoid installing in the place where dust is easy to gather. A large amount of dust accumulation will affect the reliability of SCU work.

3) It shall be kept away from the position where the temperature of its shell may exceed 85 ° C as far as possible, and the heat released by surrounding parts shall be prevented from radiating to SCU.

4) Avoid installing SCU in places where oil, moisture and water droplets are easy to splash.

5) Avoid the possibility of additional mechanical vibration and external force impact due to the installation position and fixing method of SCU and avoid installing SCU at the resonance point of vehicle body.

6) Avoid installing the SCU near the parts that may contact the battery or other acid-base solutions that are easy to seep out, and the places where the SCU is easy to be corroded.

7) Avoid installing the SCU near the positive terminal of the battery and the terminal of the ignition power supply.

8) The SCU shall be installed at a certain angle to avoid the inflow of water from the connector. In the horizontal direction, the recommended installation angle is - 170 ° to - 10 °. In the vertical direction, the recommended installation angle is - 170 ° ~ - 10 °. As shown in the figure below.