ECAT-4XMO Series

ECAT-4XMO/ECAT-TRG4
EtherCAT Distributed 4-axis
Motion Control and Trigger Module

User's Manual



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LEADING EDGE AI COMPUTING

Revision History

Revision	Release Date	Description of Change(s)
1.0	2021-01-08	Initial release
1.1	2021-03-04	Update Servo I/O CM1-CM4 connector diagram
1.2	2026-06-16	Specifications updated

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Preface

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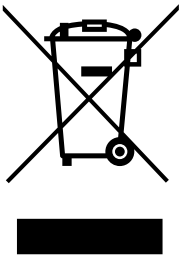
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Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE: Additional information, aids, and tips that help users perform tasks.

CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.
ATTENTION: Informations destinées à prévenir les blessures corporelles mineures, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche.

WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.
AVERTISSEMENT: Informations destinées à prévenir les blessures corporelles graves, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche spécifique.

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1 Introduction

1.1 Overview

The ECAT-4XMO/TRG4 is a 4-axis motion controller module for EtherCAT distributed motion systems. It can generate fast frequency pulses to drive stepper or servomotors for machine automation and provides comprehensive motion functions which include 2D/3D circular interpolation, up to 32 sets Gantry function, 2-4 axis linear interpolation, or continuous interpolation for continual velocity. Changing position/speed on the fly is available with a single axis operation.

Multiple ECAT-4XMO/TRG4 modules (up to 16 sets max.) can be used in one EtherCAT system. Incremental encoder interfaces on all four axes provide the ability to correct positioning errors generated by inaccurate mechanical transmissions. By integrating EtherCAT technology, whole motion functions can be performed with time-deterministic cycle times. In addition, a mechanical sensor interface, servo motor interface, and general-purposed I/O signals are provided for easy system integration.

The ECAT-4XMO/TRG4 applies FPGA technology to perform 4-axis motion control and supports one ECAT satellite to communicate with a host PC and EtherCAT protocol. The motion control functions include linear and S-curve acceleration/deceleration, circular interpolation between two axes, linear interpolation between 2-4 axes and 9 home return modes.

In addition to the motion functions, ADLINK offers the ECAT-4XMO/TRG4 and ECAT-TRG4 that come equipped with real-time position comparison and trigger pulse output function for easy integration into automated optical inspection application systems supporting up to 10 MHz within 255 points at 250 µs cycle time trigger output frequency. The ECAT-4XMO/TRG4 and ECAT-TRG4 also support encoder sharing that can trigger equipment by using the same encoder data. The advanced path move function features continuous moving with constant velocity. The Advance Point Table guarantees time-deterministic, continuous and smooth motion progression.

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1.2 Features

- Up to 64 axes by EtherCAT network
- EtherCAT cycle time up to 250 μs
- Maximum wiring distance up to 100 meters between 2 stations
- 4-axis pulse train output channels; frequency up to 12 MHz
- Encoder input frequency up to 20 MHz under 4x AB feed-back mode
- Supports 9 homing modes
- Pulse output support OUT/DIR, CW/CCW types
- 4 table triggers, maximum frequency 10 Mhz with FIFO 255 points
- 4 linear triggers, maximum 10Mhz
- 4-channel maximum latch response frequency 3 Mhz with 255 points
- Hardware emergency stop interface
- Supports gantry function up to 32 sets with master
- Power-off memory for axis parameter
- Supports encoder re-driver function
- Supports advanced point table

1.3 Specifications

EtherCAT Communication	
Communication Cycle Time	250 / 500 / 1000 / 2000 microsecond
Number of Controllable Axes	4
Supported Motion Modes	Single Axis Move, Multi-axes Move Trigger and Stop, Jog Move, Advanced Single Move and Interpolation, Advanced Point Table, Gear/ Gantry Function. (Refer to ADLINK APS function library)

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I/O	
Motion I/O	▶ PEL, MEL, ORG (ECAT-4XMO only) ▶ LTC, CMP
Servo I/O	SVON, RDY, RST, ALM, INP, ERC (ECAT-4XMO only)
Pulse Output	OUT/DIR, frequency up to 12 MHz (ECAT-4XMO only) CW/CCW, frequency up to 12 MHz (ECAT-4XMO only)
Encoder Input	CW/CCW, frequency up to 8 MHz OUT/DIR, frequency up to 8 MHz 1/2/4xAB, frequency up to 20 MHz
Encoder Re-driver	Encoder input OUT/DIR signal sharing to output pin, frequency up to 10 MHz
Trigger Output	4 Linear triggers max. 10 Mhz 4 Table triggers max. freq. 10 Mhz (w/ FIFO 255 points) Table size = 8192 points/axis
Latch Input	Source type, DI/PWM 4-channel max. latch response frequency, 3 Mhz with 255 points (Multiple & Single Point Size = 5256 points)
GPIO	4 DI, 4 DO (4 DO and RST share a common pin, selected by DIP switch)
EMG	Per Module
DIP Switch	▶ 6-bit for ID setting ▶ 4-bit for EA1+/-, EB1+/- open/short selection between CN6 and CM1 ▶ 4-bit for DO connect to alarm reset pin of D-SUB 26P (ECAT-4XMO only)
General	
Power Consumption	5W max. (power supply input 24V DC ±10%)
Protection	Over current, short, reverse, 1A
Operating Temperature	0°C to 50°C
Storage Temperature	-40°C to 70°C
Relative Humidity	10% to 90%, non-condensing
Dimensions	165.3 x 74.9 x 52.7mm (W x D x H)
Certificate	
EMC	FCC Part 15b, and EN55032 (CISPR 32) for Class B
Safety	IEC62368; IEC61010

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1.4 Supported Software

1.4.1 APS Function Library

The Automation Product Software (APS) library provides users a uniform interface to access all ADLINK products that support it, and covers many automation fields including machine automation. The APS library supports motion control with components such as system platform management, field bus communications, general digital/analog input/output, and various counter/timer support built-in, making the APS library an all-in-one solution for ADLINK products in the automation field.

There are several benefits to using the APS library.

Hardware Independent

Because the APS library acts as middleware between different hardware, time and effort is saved that would normally be spent having to reprogram custom software interfaces each time new hardware is added or replaced. Thus, custom device programming based on hardware dependecies is eliminated.

Operating System Independent

The standard APS package supports a variety of operating systems including Microsoft Windows XP/2000/Vista and newer verions as well as 32-bit or 64-bit single core and multi-core (SMP) patforms. Planned support for non Windows operating systems include Linux and DOS, as well as real-time operating systems like RTX and VxWorks.

Programming Consistency

Applications like motion control, I/O control and communication benefit from the programming consistency offered by the APS library. It makes no difference whether a motor is stepper or servo, or the sytem has a distributed or centralized topology because the APS library utilizes the same programming method and parameter definitions as well as providing various programming language interfaces and programming examples like ANSI C/C++, Microsoft Visual C/C++, Visual Basic, C#, Visual Basic.NET, Borland Delphi, and C/C++ builder.

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1.4.2 MotionCreatorPro 2 Utility

This Windows-based utility is used to setup cards, motors, and systems. It can also aid in debugging hardware and software problems. It allows users to set I/O logic parameters to be loaded in their own program. The MotionCreatorPro 2 Utility is bundled with the card.

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2 Getting Started

This chapter describes the proper installation environment, installation procedures, package contents and basic information users should be aware of regarding the ECAT-4XMO/ECAT-TRG4.

We suggest the following order of actions:

1. Unpack the ECAT-4XMO/ECAT-TRG4
2. Ensure the package contents are complete
3. Check the ECAT-4XMO/ECAT-TRG4 module for visible damage
4. Install the module
5. Install the driver

2.1 Installation Environment

When unpacking and preparing to install, refer to Important Safety Instructions.

Only install equipment in well-lit areas on flat, sturdy surfaces with access to basic tools such as flat- and cross-head screwdrivers, preferably with magnetic heads as screws and standoffs are small and easily misplaced.

Recommended Installation Tools

- Phillips (cross-head) screwdriver
- Flat-head screwdriver
- Anti-static wrist strap
- Antistatic mat



The equipment must be protected from static discharge and physical shock. Never remove any of the socketed parts except at a static-free workstation. Use the anti-static bag shipped with the product to handle the equipment and wear a grounded wrist strap when servicing.

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2.2 Package Contents

Inspect the carton and packaging for damage. Shipping and handling can cause damage to the equipment inside. Make sure that the equipment and its associated components have no damage before installation. In addition to this User's Manual, the package also includes either the

ECAT-4XMO EtherCAT 4-axis Motion Control Module

or the

ECAT-TRG4 EtherCAT High Speed 4Ch Trigger Module

Ensure the correct model is present and check the package condition.

If any of these items are missing or damaged, contact the dealer from whom you purchased the product.

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3 ECAT-4XMO/TRG4 Layout

3.1 Mechanical Dimensions

NOTE: All dimensions shown are in mm.

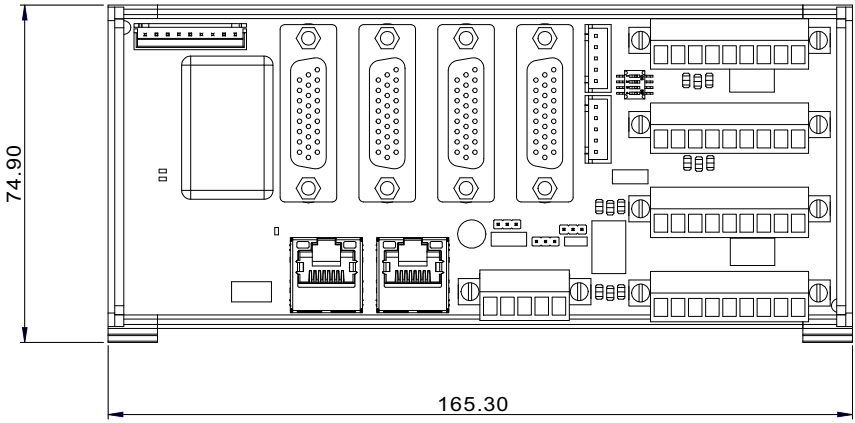


Figure 3-1: ECAT-4MXO Top View

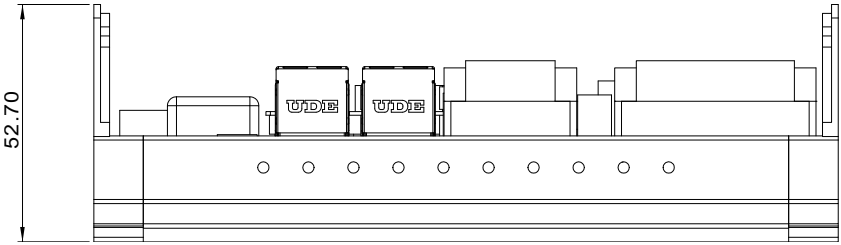


Figure 3-2: ECAT-4MXO Side View

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3.2 ECAT-4XMO/TRG4 Interfaces

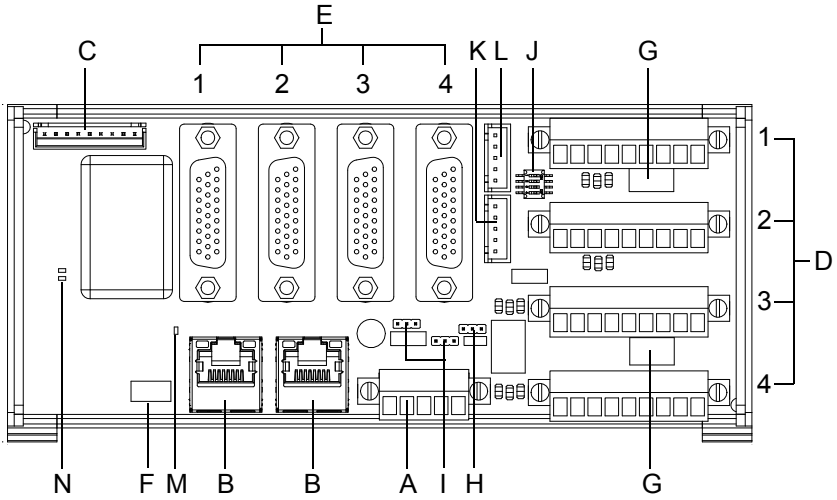


Figure 3-3: ECAT-4XMO/TRG4 Interfaces

	Item	Function
A	J1	Power supply, input common and emergency stop input connector
B	RJ1, RJ2	EtherCAT communication signal connector
C	CN1	Compare trigger output signals
D	IOIF1-IOIF4	Motion I/O connector
E	CM1-CM4	Servo I/O connector
F	S1	Board ID switch
G	S3, S5	Enable/Disable DO to alarm reset switch (4XMO only)
H	JP3	Enable/Disable EMG signal (4XMO only)
I	JP5, JP6	Common or differential power selection
J	SW1	Encoder re-driver Enable/Disable selection
K	CN6	Encoder re-driver input connector
L	CN7	Encoder re-driver output connector
M	D6	Power LED
N	D7, LED2	EtherCAT status LED

Table 3-1: Board Features Legend

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3.3 Servo I/O Connectors (CM1-CM4)

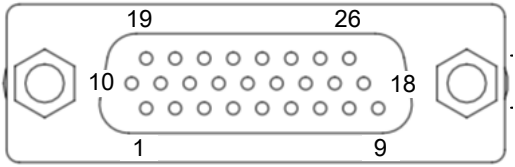


Figure 3-4: Servo I/O Connectors (CM1-CM4) Pin Definition

Pin	Signal	Function	Pin	Signal	Function
1	SVON	Servo on output signal	2	INP	In-position input signal
3	ERC	Deviation counter clear	4	RDY	Ready input signal
5	OUT-	Pulse signal (-)	6	OUT+	Pulse signal (+)
7	EA-	Encoder A-phase (-)	8	EA+	Encoder A-phase (+)
9	N/C	Empty	10	RST	Alarm reset output signal
11	ALM	Alarm input signal	12	I24V	Internal power supply, +24V
13	IGND	Internal power ground	14	N/C	Empty
15	DGND	Pulse and encoder digital ground	16	EB-	Encoder B-phase (-)
17	EB+	Encoder B-phase (+)	18	DGND	Pulse and encoder digital ground
19	EMG	Emergency Stop	20	IGND	Internal power ground
21	IGND	Internal power ground	22	IGND	Internal power ground
23	DIR-	Direction Signal (-)	24	DIR+	Direction Signal (+)
25	EZ-	Encoder Z-phase (-)	26	EZ+	Encoder Z-phase (+)

Table 3-2: Servo I/O Connectors (CM1-CM4) Pin Definition

NOTE:

ECAT-4XMO servo I/O includes: OUT+/-, DIR+/-, EA+/-, EB+/-, EZ+/-, EMG, ALM, INP, RDY, SVON, ERC, RST

ECAT-TRG4 servo I/O includes: EA+/-, EB+/-, EZ+/-

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3.4 Motion I/O Connectors (IOIF1-4)

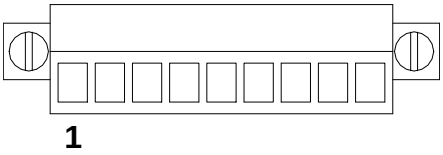


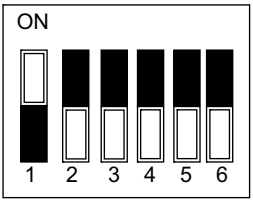
Figure 3-5: Motion I/O Connectors (IOIF1-4) Pin Definition

Pin	Signal	Description
1	I24	I/O power supply, +24V
2	MEL	End Limit input signal (-) (4XMO only)
3	ORG	Origin input signal (4XMO only)
4	PEL	End Limit input signal (+) (4XMO only)
5	LTC	Latch signal edge trigger
6	DI	General purpose input
7	DO	General purpose output
8	N/A	Empty
9	IGND	External power ground

Table 3-3: Motion I/O Connectors (IOIF1-4) Pin Definition

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3.5 Board ID Switch (S1)



ON = 1

000000	Address 0 (default)
100000	Address 1
010000	Address 2
	~
011111	Address 62
111111	Address 63

OFF = 0

Figure 3-6: Board ID Switch (S1) Pin Definition

3.6 LED Indicators (4XMO only)

PEL/MEL/ORG LED for each axis.

LED indicator 'active' color:

	PEL & MEL	ORG
DICOM= I24V	Red	Green
DICOM= IGND	Green	Red

Table 3-4: LED Indicator Colors

3.7 DO to Alarm Reset Switch (S3, S5) (4XMO only)

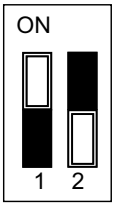


Figure 3-7: DO to Alarm Reset Switch (S3, S5) Pin Definition

ON: DO = servo driver alarm reset

OFF: DO (default)

	Pin 1	Pin 2
S3	Servo driver 1 reset	Servo driver 2 reset
S5	Servo driver 3 reset	Servo driver 4 reset

Table 3-5: DO to Alarm Reset Switch (S3, S5) Pin Definition

3.8 EMG Jumper (JP3)



Figure 3-8: EMG Jumper (JP3) Pin Definition

	Pin 1-2 Short (Default)	Pin 2-3 Short
EMG	Enable	Disable

Table 3-6: EMG Jumper (JP3) Pin Definition

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3.9 Power Connector (J1)

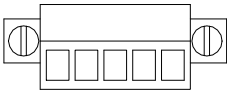


Figure 3-9: Power Connector (J1) Pin Definition

Pin	Signal	Description
1	E24V	External power supply (DC/DC converter FKC08-24S05 input +24V)
2	EGND	External power ground (DC/DC converter FKC08-24S05 input GND)
3	FGND	Frame ground
4	DICOM	Mechanical input and general input common
5	EMG	Emergency stop input

Table 3-7: Power Connector (J1) Pin Definition

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3.10 Trigger Out Connector (CN1)

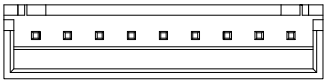


Figure 3-10: Trigger Out Connector (CN1) Pin Definition

Pin	Signal	Description
1	CMP1+	Trigger Out 1 (+)
2	CMP1-	Trigger Out 1 (-)
3	CMP2+	Trigger Out 2 (+)
4	CMP2-	Trigger Out 2 (-)
5	CMP3+	Trigger Out 3 (+)
6	CMP3-	Trigger Out 3 (-)
7	CMP4+	Trigger Out 4 (+)
8	CMP4-	Trigger Out 4 (-)
9	DGND	Digital ground

Table 3-8: Trigger Out Connector (CN1) Pin Definition

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3.11 I/O Power Source Selection (JP5, JP6)



Figure 3-11: I/O Power Selection (JP5, JP6) Pin Definition

	JP5, JP6 Pin 1-2 Short	JP5, JP6 Pin 2-3 Short (Default)
E24V, I24V	different power	common power (default)
EGND, IGND	different GND	common GND (default)

Table 3-9: I/O Power Selection (JP5, JP6) Pin Definition

3.12 Power/Run/Error LED Indicator

LED	Part	Indicator	Function	Status
Power	D6	Green	System power status	Power on
		OFF		Power off or VIN < +18 V
Run	D7	Green	EtherCAT Communication Status	Normal operation
		Blinking		Warning
		OFF		•Under configuration •Watchdog counter expired (1 sec.)
Error	LED2	Red	System error handling	Error
		OFF		No warning and error

Table 3-10: Power/Run/Error LED Indicator

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3.13 RJ45 LED Indicator

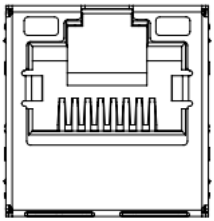


Figure 3-12: RJ45 LED Indicator

Label	Indicator	Status
Right LED 10/100	Off	10 Mbps
	Green	100 Mbps
Left LED ACT/LINK	Yellow	Link
	Blinking	Activity

Table 3-11: RJ45 LED Indicator

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3.14 EA1+/-, EB1+/- Connect Selection (SW1)

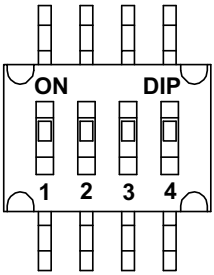


Figure 3-13: EA1+/-, EB1+/- Connect Selection (SW1)

Pin	Signal	Connect Multiple ECAT-4XMO EA1+/-, EB1+/- pins	Disconnect Multiple ECAT-4XMO EA1+/-, EB1+/- pins
1	EA1+	ON	OFF
2	EA1-	ON	OFF
3	EB1+	ON	OFF
4	EB1-	ON	OFF

Table 3-12: EA1+/-, EB1+/- Connect Selection (SW1)

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3.15 Encoder Re-driver Input Connector (CN6)

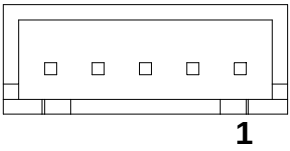


Figure 3-14: Encoder Re-driver Input Connector (CN6)

Pin	Signal	Description
1	EA1+_IN	Encoder re-driver input (EA+)
2	EA1-_IN	Encoder re-driver input (EA-)
3	EB1+_IN	Encoder re-driver input (EB+)
4	EB1-_IN	Encoder re-driver input (EB-)
5	DGND	Digital ground

Table 3-13: Encoder Re-driver Input Connector (CN6)

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3.16 Encoder Re-driver Output Connector (CN7)

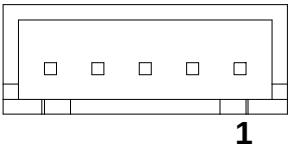


Figure 3-15: Encoder Re-driver Output Connector (CN7)

Pin	Signal	Description
1	EA1+_OUT	Encoder re-driver output (EA+)
2	EA1-_OUT	Encoder re-driver output (EA-)
3	EB1+_OUT	Encoder re-driver output (EB+)
4	EB1-_OUT	Encoder re-driver output (EB-)
5	DGND	Digital ground

Table 3-14: Encoder Re-driver Output Connector (CN7)

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4 Signal Connections

Signal connections of all I/O's are described in this chapter. Refer to the contents of this chapter before wiring any cable between the ECAT-4XMO/TRG4/TRG4 and any motor driver.

4.1 Emergency Stop Signal (EMG)

There is an emergency stop input pin for this module. When EMG is active, all motion pulse output commands will be rejected until the EMG is deactivated. The emergency stop switch should have a contact capacity of +24V @ 6mA minimum. 'B-type' (normal closed) contact switches can be used. The type of switch can be configured by software.

CM1 Pin No.	Signal Name	Axis #	CM2 Pin No.	Signal Name	Axis #
19	EMG	1	19	EMG	2

CM3 Pin No.	Signal Name	Axis #	CM4 Pin No.	Signal Name	Axis #
19	EMG	3	19	EMG	4

J1 Pin No.	Signal Name	Axis #
5	EMG	All

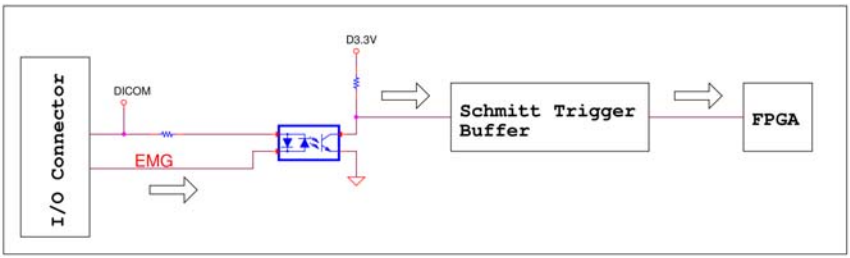


Figure 4-1: Emergency Stop Wiring Diagram

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4.2 Trigger Output Signals (CMP+/CMP-)

The ECAT-4XMO/TRG4 provides 4 comparison output channels. The comparison output channel generates a pulse signal when the encoder counter reaches a pre-set value set by the user.

CN1 Pin No.	Signal Name	Description	Axis #
1	**CMP1+**	Trigger signal (+)	1
2	**CMP1-**	Trigger signal (-)	1
3	**CMP2+**	Trigger signal (+)	2
4	**CMP2-**	Trigger signal (-)	2
5	**CMP3+**	Trigger signal (+)	3
6	**CMP3-**	Trigger signal (-)	3
7	**CMP4+**	Trigger signal (+)	4
8	**CMP4-**	Trigger signal (-)	4

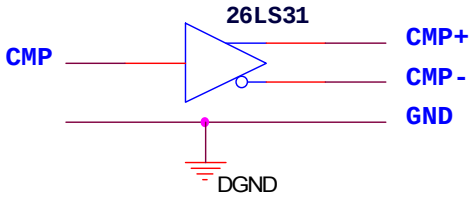


Figure 4-2: Trigger Output Signals Wiring Diagram

NOTE:

The CMP trigger type can be set as normal low (rising edge) or normal high (falling edge). The default setting is normal low.

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4.3 Pulse Output Signals (OUT/DIR)

There are 4 axes pulse output signals on the ECAT-4XMO. For each axis, two pairs of OUT and DIR differential signals are used to transmit the pulse train and indicate the direction. The OUT and DIR signals can also be programmed as CW and CCW signal pairs. In this section, the electrical characteristics of the OUT and DIR signals are detailed. Each signal consists of a pair of differential signals. For example, OUT1 consists of OUT1+ and OUT1- signals. The following tables show all pulse output signals on CM1-CM4.

CM1 Pin No.	Signal Name	Description	Axis #
6	**OUT1+**	Pulse signal (+)	1
5	**OUT1-**	Pulse signal (-)	1
24	**DIR1+**	Direction signal (+)	1
23	**DIR1-**	Direction signal (-)	1

CM2 Pin No.	Signal Name	Description	Axis #
6	**OUT2+**	Pulse signal (+)	2
5	**OUT2-**	Pulse signal (-)	2
24	**DIR2+**	Direction signal (+)	2
23	**DIR2-**	Direction signal (-)	2

CM3 Pin No.	Signal Name	Description	Axis #
6	**OUT3+**	Pulse signal (+)	3
5	**OUT3-**	Pulse signal (-)	3
24	**DIR3+**	Direction signal (+)	3
23	**DIR3-**	Direction signal (-)	3

CM4 Pin No.	Signal Name	Description	Axis #
6	**OUT4+**	Pulse signal (+)	4
5	**OUT4-**	Pulse signal (-)	4
24	**DIR4+**	Direction signal (+)	4
23	**DIR4-**	Direction signal (-)	4

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The default setting of OUT and DIR is set to differential line driver mode.

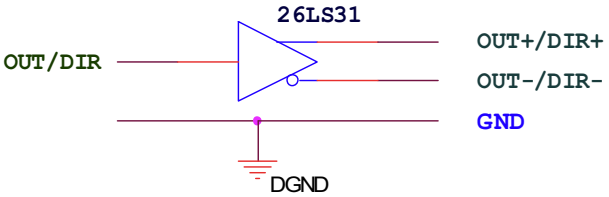


Figure 4-3: OUT/DIR Signal Axis Wiring Diagram

NOTE:

Suggested Usage: See the following figure. Choose OUT-/ DIR- to connect to the driver's OUT/DIR.

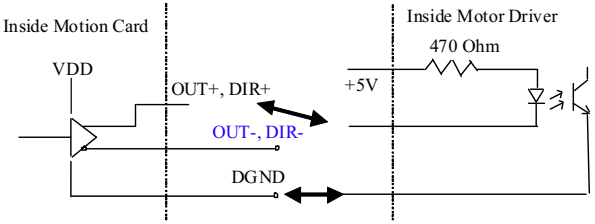


Figure 4-4: OUT/DIR Pulse Output Signal Circuit

WARNING:

The sink current must not exceed 20mA or the 26LS31 will be damaged!

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4.4 Encoder Feedback Signals (EA/EB/EZ)

The encoder feedback signals include EA, EB, and EZ. Every axis has six pins for three differential pairs of phase-A (EA), phase-B (EB), and index (EZ) inputs. EA and EB are used for position counting, and EZ is used for zero position indexing.

CM1-CM2

CM1 Pin No.	Signal Name	Axis #	CM2 Pin No.	Signal Name	Axis #
8	EA1+	1	8	EA2+	2
17	EB1+	1	17	EB2+	2
26	EZ1+	1	26	EZ2+	2
7	EA1-	1	7	EA2-	2
16	EB1-	1	16	EB2-	2
25	EZ1-	1	25	EZ2-	2

CM3-CM4

CM3 Pin No.	Signal Name	Axis #	CM4 Pin No.	Signal Name	Axis #
8	EA3+	3	8	EA4+	4
17	EB3+	3	17	EB4+	4
26	EZ3+	3	26	EZ4+	4
7	EA3-	3	7	EA4-	4
16	EB3-	3	16	EB4-	4
25	EZ3-	3	25	EZ4-	4

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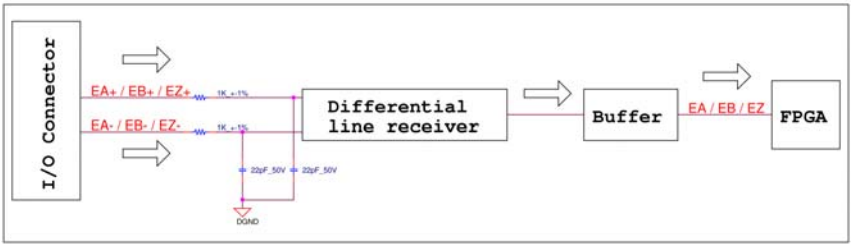


Figure 4-5: Encoder Feedback Signals (EA/EB/EZ) Circuit

The voltage across each differential pair of encoder input signals (EA+, EA-), (EB+, EB-), and (EZ+, EZ-) have a ±7V common mode range. Therefore, the output current must be confirmed when connecting to the encoder feedback or motor driver feedback as not to over drive the source. The differential signal pairs are converted to digital signals EA, EB, and EZ, and then fed to the FPGA side.

Connection to Line Driver Output

Below is an example of connecting the input signals with an external circuit. The input circuit can be connected to an encoder or motor driver if it is equipped with a differential line driver.

To drive the ECAT-4XMO/TRG4 encoder input, the driver output must provide at least 0.2V across the differential pairs. The case grounds of both sides must be tied together. The maximum frequency is 5 Mhz or more depending on wiring distance and signal condition.

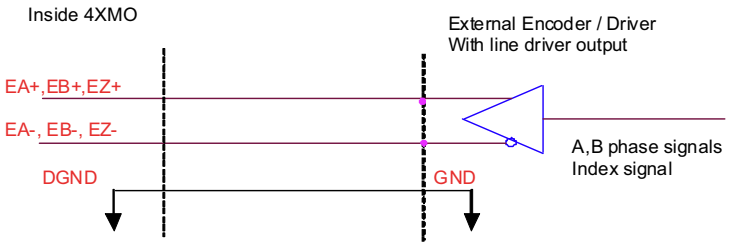


Figure 4-6: Connection to Line Driver Output Circuit

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4.5 Origin Signals (ORG)

The origin signals (ORG1-ORG4) are used as input signals for the origin of the mechanism.

IOIF1 Pin No.	Signal Name	Axis #	IOIF2 Pin No.	Signal Name	Axis #
3	ORG1	1	3	ORG2	2

IOIF3 Pin No.	Signal Name	Axis #	IOIF4 Pin No.	Signal Name	Axis #
3	ORG3	3	3	ORG4	4

The input circuit of the ORG signals is shown below. Usually, a limit switch is used to indicate the origin on one axis. The specifications of the limit switch should have a contact capacity of +24V at 6mA minimum. An internal filter circuit is used to filter out any high frequency spikes, which may cause errors in the operation.

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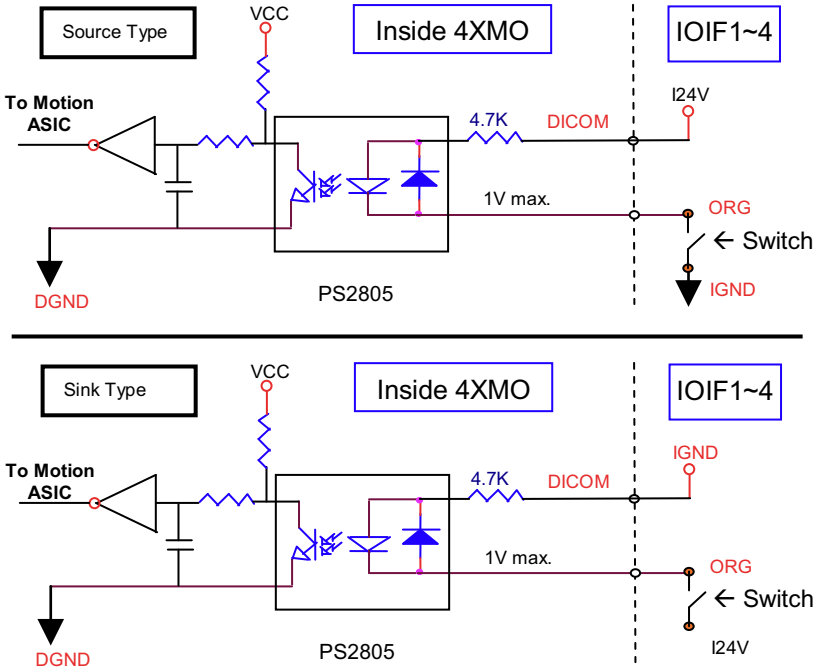


Figure 4-7: Origin Signals (ORG) Input Circuit

When the motion controller is operated in the home return mode, the ORG signal is used to inhibit the control output signals (OUT and DIR).

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4.6 End-Limit Signals (PEL/MEL)

There are two end-limit signals, PEL and MEL, for each axis. PEL indicates the end limit signal is in the plus direction and MEL indicates the end limit signal is in the minus direction.

IOIF1 Pin No.	Signal Name	Axis #	IOIF2 Pin No.	Signal Name	Axis #
4	PEL1	1	4	PEL2	2
2	MEL1	1	2	MEL2	2

IOIF3 Pin No.	Signal Name	Axis #	IOIF4 Pin No.	Signal Name	Axis #
4	PEL3	3	4	PEL4	4
2	MEL3	3	2	MEL4	4

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In the circuit diagram diagram below, the external limit switch should have a contact capacity of +24V at 6mA minimum. Either 'A-type' (normal open) contact or 'B-type' (normal closed) contact switches can be used. The type of switch can be configured by software.

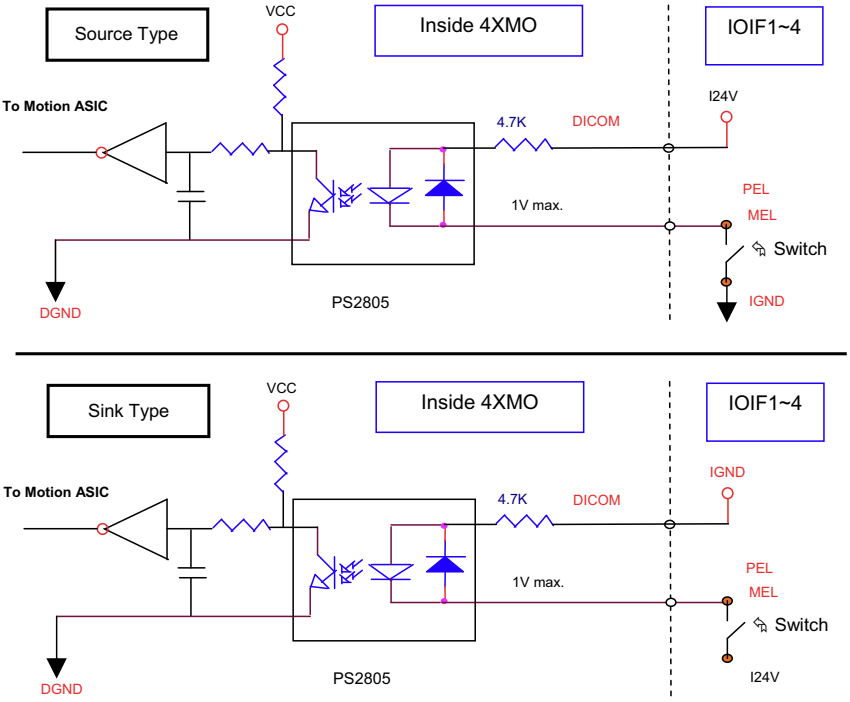


Figure 4-8: End-Limit Signals (PEL/MEL) Circuits

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4.7 In-position Signal (INP)

The in-position signal (INP) from a servo motor driver indicates its deviation error. If there is no deviation error then the servo's position indicates zero.

CM1 Pin No.	Signal Name	Axis #	CM2 Pin No.	Signal Name	Axis #
2	INP1	1	2	INP2	2

CM3 Pin No.	Signal Name	Axis #	CM4 Pin No.	Signal Name	Axis #
2	INP3	3	2	INP4	4

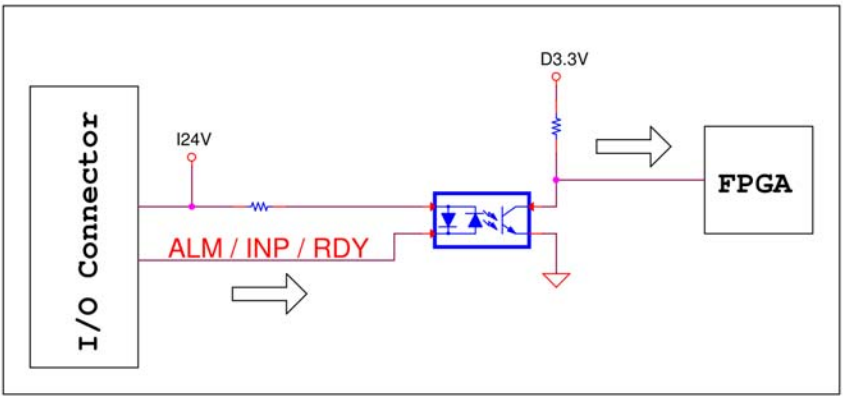


Figure 4-9: In-position Signal (INP) Circuit

The in-position signal is usually generated by the servomotor driver and is ordinarily an open collector output signal. An external circuit must provide at least 6mA current sink capability to drive the INP signal.

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4.8 Alarm Signal (ALM)

The alarm signal (ALM) is used to indicate the alarm status from the servo driver.

CM1 Pin No.	Signal Name	Axis #	CM2 Pin No.	Signal Name	Axis #
11	ALM1	1	11	ALM2	2

CM3 Pin No.	Signal Name	Axis #	CM4 Pin No.	Signal Name	Axis #
11	ALM3	3	11	ALM4	4

The ALM signal usually is generated by the servomotor driver and is ordinarily an open collector output signal. An external circuit must provide at least 6mA current sink capabilities to drive the ALM signal.

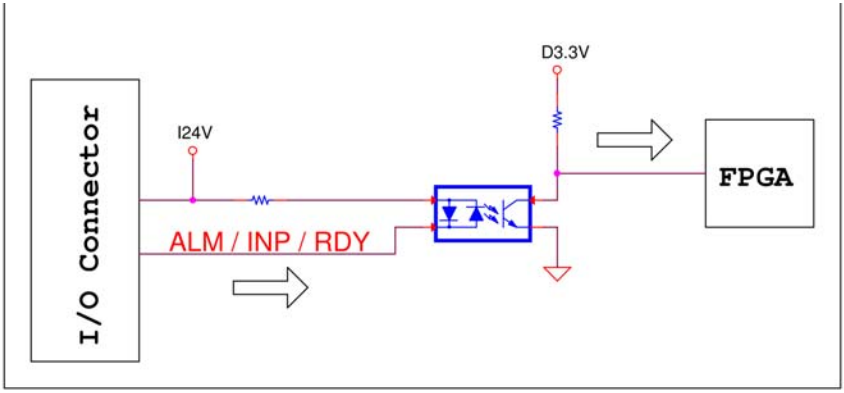


Figure 4-10: Alarm Signal (ALM) Circuit

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4.9 General Purpose Signal (SVON)

The SVON signal can be used as a servomotor-on control or general purpose output signal.

CM1 Pin No.	Signal Name	Axis #	CM2 Pin No.	Signal Name	Axis #
1	SVON1	1	1	SVON 2	2

CM3 Pin No.	Signal Name	Axis #	CM4 Pin No.	Signal Name	Axis #
1	SVON 3	3	1	SVON 4	4

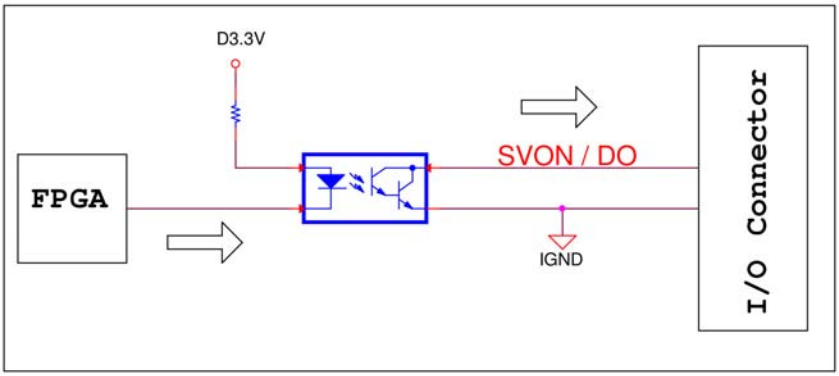


Figure 4-11: General Purpose Signal (SVON) Circuit

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4.10 Deviation Counter Clear Signal (ERC)

The deviation counter clear signal (ERC) is active in the following situations:

1. Home return is complete
2. End-limit switch is active
3. An alarm signal stops OUT and DIR signals
4. An emergency stop command is issued by software (operator)

The ERC signal is used to clear the deviation counter of the servo-motor driver. The ERC output circuit is an open collector with a maximum of 35V at 6mA driving capacity.

CM1 Pin No.	Signal Name	Axis #	CM2 Pin No.	Signal Name	Axis #
3	ERC1	1	3	ERC2	2

CM3 Pin No.	Signal Name	Axis #	CM4 Pin No.	Signal Name	Axis #
3	ERC3	3	3	ERC4	4

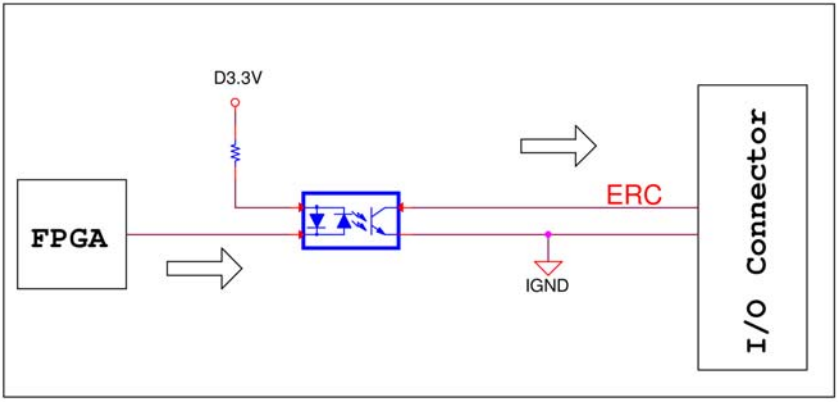


Figure 4-12: Deviation Counter Clear Signal (ERC) Circuit

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4.11 General-purpose Signal (RDY)

The RDY signals can be used as motor driver ready input or general purpose input signals.

CM1 Pin No.	Signal Name	Axis #	CM2 Pin No.	Signal Name	Axis #
4	RDY1	1	4	RDY 2	2

CM3 Pin No.	Signal Name	Axis #	CM4 Pin No.	Signal Name	Axis #
4	RDY 3	3	4	RDY 4	4

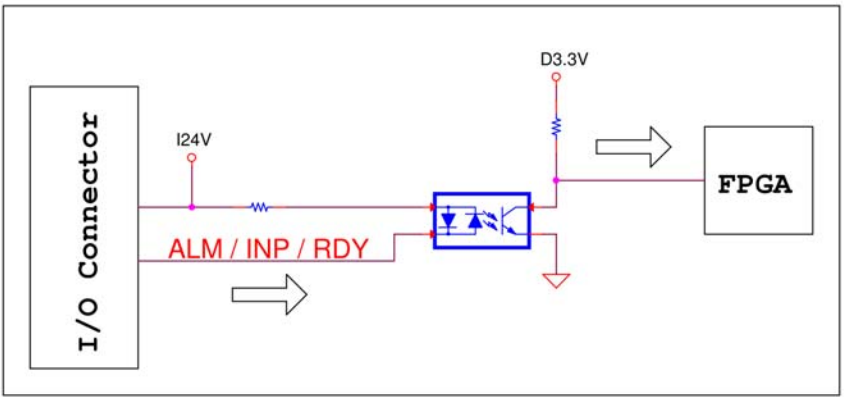


Figure 4-13: General-purpose Signal (RDY) Circuit

4.12 General Purpose Digital Output Signals (DO)

The ECAT-4XMO/TRG4 provides 4 general purpose output channels (DO1 to DO4). The general purpose output channels are located on IOIF1 to IOIF4.

IOIF1 Pin No.	Signal Name	Axis #	IOIF2 Pin No.	Signal Name	Axis #
7	DO1	1	7	DO2	2

IOIF3 Pin No.	Signal Name	Axis #	IOIF4 Pin No.	Signal Name	Axis #
7	DO3	3	7	DO4	4

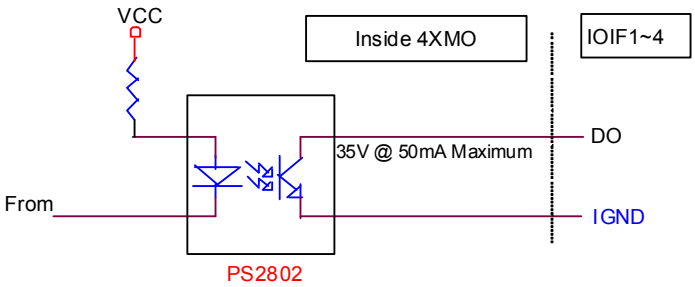


Figure 4-14: DO Signal Circuit

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4.13 General Purpose Digital Input Signals (DI)

The ECAT-4XMO/TRG4 provides 4 general purpose input channels (DI1 to DI4). The general purpose input channels are located on IOIF1 to IOIF4.

IOIF1 Pin No.	Signal Name	Axis #	IOIF2 Pin No.	Signal Name	Axis #
6	DI1	1	6	DI2	2

IOIF3 Pin No.	Signal Name	Axis #	IOIF4 Pin No.	Signal Name	Axis #
6	DI3	3	6	DI4	4

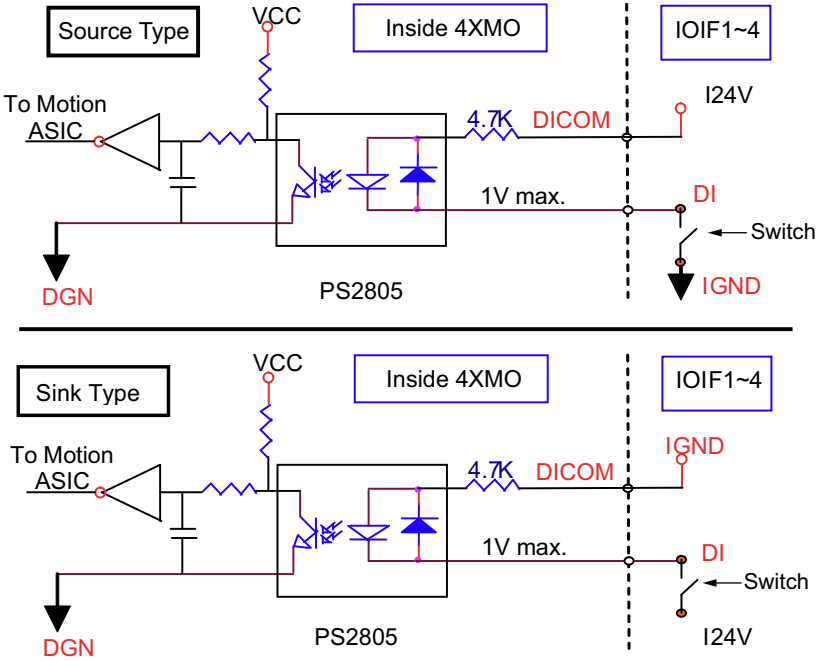


Figure 4-15: DI Signal Circuit

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Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

- Read these safety instructions carefully.
- Keep the User's Manual for future reference.
- Read the Specifications section of this manual for detailed information on the recommended operating environment.
- The device can be operated at an ambient temperature of 45ºC with DC input, and 35ºC with adapter input.
- It is recommended that the device be installed in Information Technology Rooms that are in accordance with Article 645 of the National Electrical Code and NFPA 75.
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources.
  - Keep device away from high heat or humidity.
  - Keep device properly ventilated (do not block or cover ventilation openings).
  - Always use recommended voltage and power source settings.
  - Always install and operate device near an easily accessible electrical outlet.
  - Secure the power cord (do not place any object on/over the power cord).
  - Only install/attach and operate device on stable surfaces and/or recommended mountings.
  - The power cord must be connected to a socket or outlet with a ground connection.
- If the device will not be used for long periods of time, turn off and unplug from its power source.
- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools.

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- A Lithium-type battery may be provided for uninterrupted backup or emergency power.

CAUTION:

Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.

- This equipment is not suitable for use in locations where children are likely to be present.
- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged
  - Liquid has entered the device interior
  - The device has been exposed to high humidity and/or moisture
  - The device is not functioning or does not function according to the User's Manual
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location



BURN HAZARD

Hot surface! Do not touch! Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.

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Consignes de Sécurité Importante

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil, pour éviter des blessures ou des dommages.

- *Lisez attentivement ces consignes de sécurité.*
- *Conservez le manuel de l'utilisateur pour pouvoir le consulter ultérieurement.*
- *Lisez la section Spécifications de ce manuel pour des informations détaillées sur l'environnement d'exploitation recommandé.*
- *L'appareil peut fonctionner à une température ambiante de 45°C avec une entrée CC et de 35°C avec une entrée d'adaptateur.*
- *Il est recommandé d'installer l'appareil dans des salles de technologie de l'information conformes à l'article 645 du National Electrical Code et à la NFPA 75.*
- *Pour éviter les chocs électriques et/ou d'endommager l'appareil:*
  - *Tenez l'appareil à l'écart de toute source d'eau ou de liquide.*
  - *Tenez l'appareil à l'écart d'une forte chaleur ou d'une humidité élevée.*
  - *Maintenez l'appareil correctement ventilé (n'obstruer ou ne couvrez pas les ouvertures de ventilation).*
  - *Utilisez toujours les réglages de tension et de source d'alimentation recommandés.*
  - *Installez et utilisez toujours l'appareil près d'une prise de courant facilement accessible.*
  - *Fixez le cordon d'alimentation (ne placez aucun objet sur le cordon d'alimentation).*
  - *Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou sur les fixations recommandées.*
  - *Le cordon d'alimentation doit être connecté à une prise ou à une prise de courant avec mise à la terre.*

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- Si l'appareil ne doit pas être utilisé pendant de longues périodes, éteignez-le et débranchez-le de sa source d'alimentation
- *N'essayez jamais de réparer l'appareil, qui ne doit être réparé que par un personnel technique qualifié à l'aide d'outils appropriés*
- *Une batterie de type Lithium peut être fournie pour une alimentation de secours ininterrompue ou d'urgence.*



ATTENTION: Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- *Cet équipement ne convient pas à une utilisation dans des lieux pouvant accueillir des enfants.*
- *L'appareil doit être entretenu par des techniciens agrees lorsque:*
- *Le cordon d'alimentation ou la prise est endommagé(e)*
- *Un liquide a pénétré à l'intérieur de l'appareil.*
- *L'appareil a été exposé à une forte humidité et/ou de la buée.*
- *L'appareil ne fonctionne pas ou ne fonctionne pas selon le manuel de l'utilisateur.*
- *L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de dommage.*
- *Débranchez le cordon d'alimentation avant de desserrer les vis à oreilles et serrez toujours les vis à oreilles avec un tournevis avant de mettre le système en marche.*
- *Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique où l'accès est:*
  - *Réservé au personnel de service qualifié ou aux utilisateurs familiarisés avec les restrictions appliquées à l'emplacement, aux raisons de ces restrictions et toutes les précautions requises*
  - *Uniquement autorisé par l'utilisation d'un outil, d'une serrure et d'une clé, ou d'un autre moyen de sécurité, et contrôlé par l'autorité responsable de l'emplacement.*

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	***RISQUE DE BRÛLURES*** ***Partie chaude!*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures. Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

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ADLINK Technology, Inc.
No. 66 Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan
Tel: +886-3-216-5088
Fax: +886-3-328-5706
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.
5215 Hellyer Avenue, #110
San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.
300 Fang Chun Rd., Zhangjiang Hi-Tech Park
Pudong New Area, Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5132-3588
Email: market@adlinktech.com

ADLINK Technology GmbH
Hans-Thoma-Straße 8-10
68163, Mannheim, Germany
Tel: +49-621-43214-0
Fax: +49-621 43214-30
Email: emea@adlinktech.com

Please visit the Contact page at www.adlinktech.com for informa-tion on how to contact the ADLINK regional office nearest you:

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