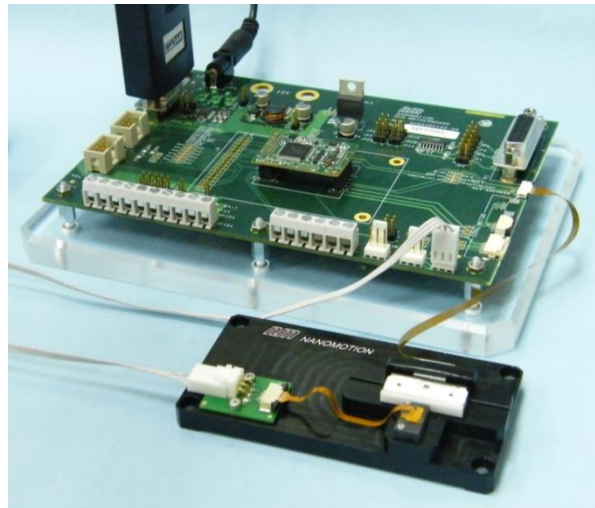


XCD EDGE™ Evaluation Kit

User Guide



XCDE458E01-00 revision A

August 30, 2012

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Introduction

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Revision History

The revision history shows the last four revisions to this document. The last revision is shown first.

ECO	Revision	Release date	Details
387	00/A	August 2012	First release of this user guide.

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Introduction

This application guide provides instructions for connecting and operating the XCD EDGE™ Evaluation Kit. The document describes the XCD EDGE Evaluation Kit components, functionalities, operation modes, hardware, and electrical specifications.

Related Products

Product	Part Number
EDGE Motor User Manual	EDGE458001-XX
XCD EDGE Controller Driver User Guide	XCDE458000-XX

Related Documentation

Document	Document Number
XCD Software version 1.4.0.7	XCD0458001-XX
EDGE Motor User Manual	EDGE458001-XX
XCD EDGE Controller Driver User Guide	XCDE458000-XX
USER MANUAL, XCD EDGE MOTHERBOARD	XCDE458100-XX

Overview of the XCD EDGETM Evaluation Kit

The XCD EDGE Evaluation Kit is a closed loop positioning system. The kit's purpose is to allow the user to evaluate the XCD EDGE controller driver and the Nanomotion EDGE motor. The controller driver drives the EDGE motor in linear mode. The controller driver provides positioning control for one axis, with configurable motion profile and servo parameters.

The controller driver supports user programming, using a Nanomotion proprietary XCD Motion Script (XMS). With the XMS, the user can define a complex sequence of motions along with sophisticated calculations and execution control. The user can store a preprogrammed XMS program in the controller's flash memory, and execute it at power up..

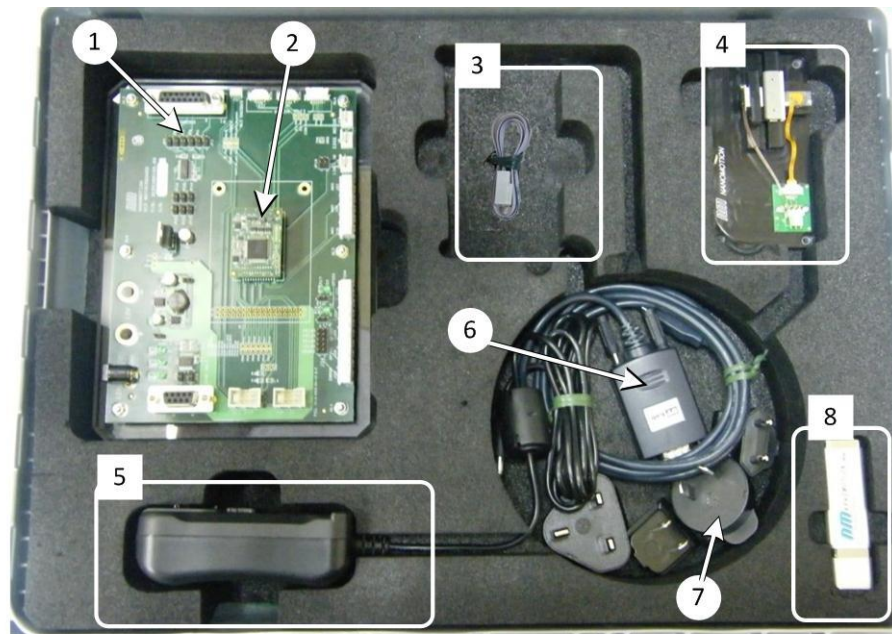
XCD EDGETM Evaluation Kit Contents

The XCD EDGETM Evaluation Kit is supplied in a hard plastic case containing all physical equipment and software required to operate the system.

ER-15 Evaluation Kit contents

1	XCD Motherboard
2a	XCD EDGE Controller Driverr
3	Motor cable
4	EDGE Stage
5	Power supply
6	USB-RS232 cable
7	Power supply connectors
8	USB Flash Drive with XCD Commander

Overview of the XCD EDGETM Evaluation Kit



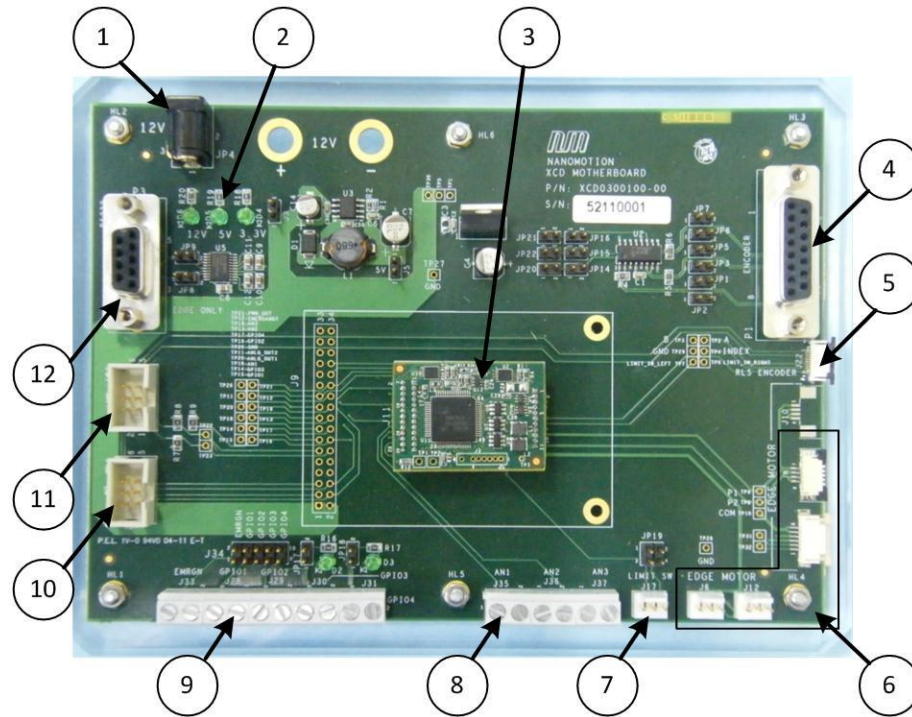
XCD EDGE Evaluation Kit Contents

XCD EDGETM Evaluation Kit Motherboard Components

XCD EDGETM Evaluation Kit Motion Module

1	Power connector
2	Power LEDs
3	XCD EDGE Controller Driver
4	
5	Encoder connector
6	Four EDGE motor connections
7	Limit switch connector
8	Analog inputs
9	Digital I/O
10	SPI connector
11	IIC connector
12	USB-RS232 connector

Overview of the XCD EDGETM Evaluation Kit



XCD EDGE Motherboard Components

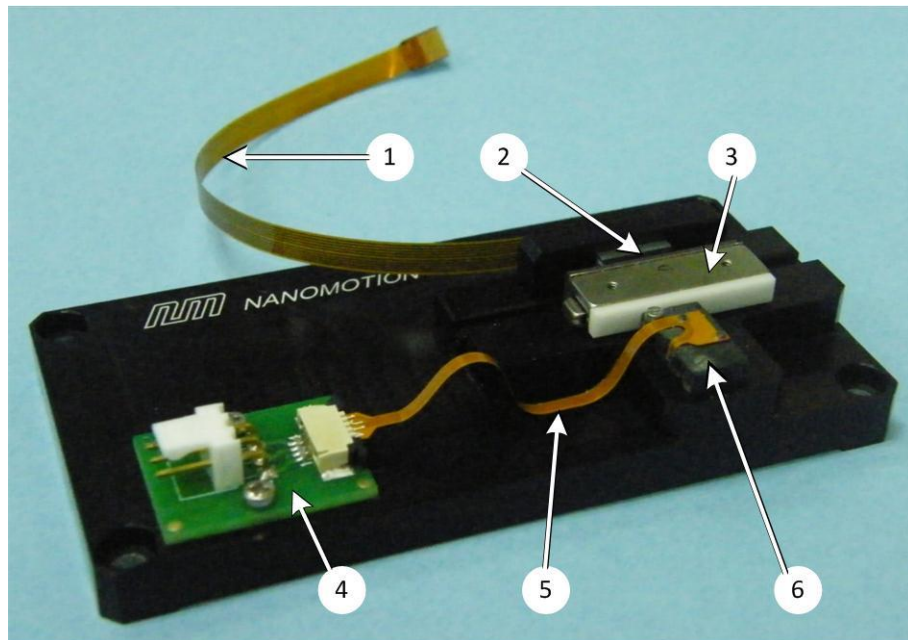
XCD EDGETM Evaluation Kit Motion Module

The Motion Module is a complete motion control system assembled on a rigid jig. The following figure shows the Evaluation Kit Motion Module and its components.

XCD EDGETM Evaluation Kit Motion Module

1	Encoder FPC
2	Encoder
3	Travel plate
4	EDGE motor
5	Motor cable
6	Motor connector adapter

Overview of the XCD EDGETM Evaluation Kit

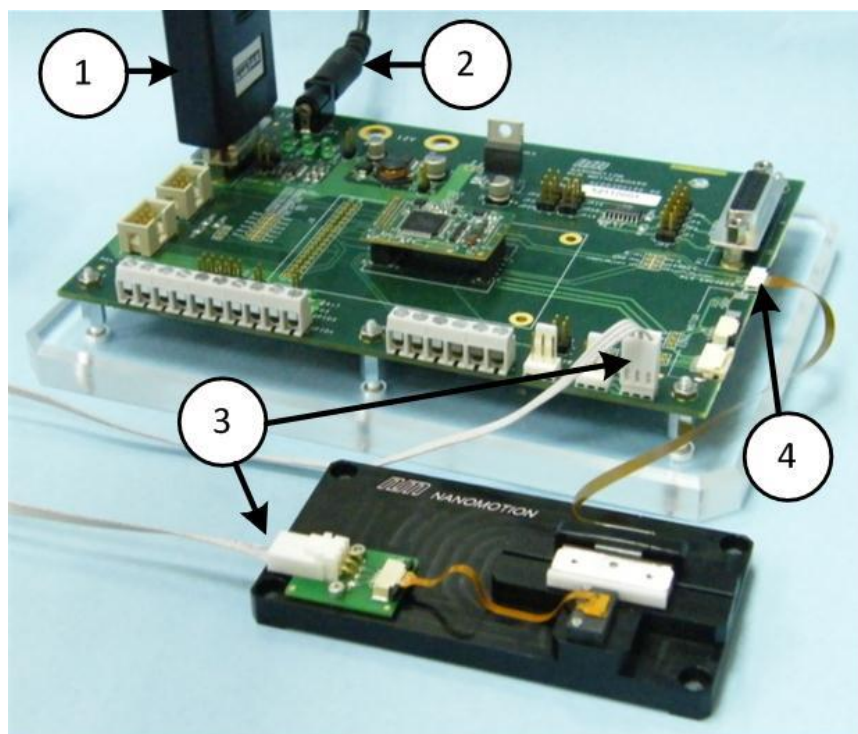


XCD EDGETM Evaluation Kit Motion Module

Connecting the XCD EDGETM Evaluation Kit Components

The XCD EDGE motherboard must be connected to power and a remote computer. It must also be connected to the motion module.

Overview of the XCD EDGETM Evaluation Kit



XCD EDGE Evaluation Kit Connections

Electrical Interface

For XCD EDGE motherboard electrical scheme, see section 7.1.

For I/Os and Analog inputs electrical scheme, see section 7.2.

For motor cable electrical scheme, see section 7.3.

Power Supply Connector

Singatron Enterprise 2DC-0005D100 DC Power jack (JP4), located on the motherboard.

Two (2) power indicators are located on the motherboard:

- LED D5 indicates 5V power is on.
- LED D6 indicates 12V power is on.

EDGE Motor Header Connector

The EDGE Motor Header J12 (3 friction lock). For mating connector use: Molex Crimp terminal housing (P/N: 22-29-2031), with Molex Crimp terminal pins (P/N: 0008500113).

Pin #	Pin Name	In/Out	Description
1	P_1	Output	Motor phase 1
2	P_2	Output	Motor phase 2
3	COM	Output	Motor common

EDGE Motor Connector

The user can choose an alternative motor connector for connecting the motor FPC directly to the motherboard, using J8 or HL4.

Encoder Connector

The encoder DB, 15 pins, female connector (P1) is located on the motherboard.

Pin #	Pin Name	In/Out	Description
1	N.C.	N/A	Not connected
2	N.C.	N/A	Not connected
3	N.C.	N/A	Not connected
4	N.C.	N/A	Not connected

Electrical Interface

5	5V	Output	Vcc power out
6	GND	Ground	System ground
7	A	Input	Incremental signal
8	Index	Input	Reference mark / Limit Switch
9	B	Input	Incremental signal
10	N.C.	N/A	Not connected

Limit Switch Connector

A Limit Switch Header, 3 friction lock (J17), located on the motherboard. For mating connector use: Molex Crimp terminal housing (P/N: 22-29-2031), with Molex Crimp terminal pins (P/N: 0008500113).

Pin #	Pin Name	In/Out	Description
1	LS Right	Input	By default, when the signals are active low; i.e. zero level, causes fault: stops motion, XMS program.
2	LS Left	Input	
3	GND	Ground	System ground

Note:

- Jumper JP19-1, 2 shorts to ground Limit Switch Right.
- Jumper JP19-3, 4 shorts to ground Limit Switch Left.

Analog Inputs Connector

Three (3) terminal blocks (J35, J36, J37), located on the motherboard. The purpose of the Analog connector is for processing analog signals (range 0-3.3V) by the XMS script.

Connector & Pin #	Pin Name	In/Out	Description
J35 - 1	AN1	Input	Analog Input 1 (voltage range of 0-3.3V)
J35 - 2	GND	Ground	System ground
J36 - 1	AN2	Input	Analog Input 2 (voltage range of 0-3.3V)
J36 - 2	GND	Ground	System ground
J37 - 1	AN3	Input	Analog Input 3 (voltage range of 0-3.3V)
J37 - 2	GND	Ground	System ground

I/O Connector

Five (5) terminal blocks (J33, J28, J29, J30, J31), located on the motherboard. The purpose of the I/Os connector is for processing digital signals (CMOS 3.3 V levels) by the XML script.

Connector & Pin #	Pin Name	In/Out	Description
J33 - 1	Emergency Stop	Input	Emergency input signal, CMOS By default, when the signal is active low; i.e. zero level, causes fault: stops motion, XMS program.3.3V.
J33 - 2	GND	Ground	System ground
J28 - 1	IO_0	Input	General Purpose Digital Input 0, CMOS 3.3V. The customer defines IO processing in XMS script.
J28 - 2	GND	Ground	System ground
J29 - 1	IO_1	N.C.	Not connected
J29 - 2	GND	Ground	System ground
J30 - 1	IO_2	Output	The customer defines IO processing in XMS script.
J30- 2	GND	Ground	System ground
J31 - 1	IO_3	Output	General Purpose Digital Input 3, CMOS 3.3V. The customer defines IO processing in XMS script.
J31 - 2	GND	Ground	System ground

SPI Communication Connector

The SPI Communication Header, 6 shrouded (J7) located on the XCD EDGE motherboard. For mating connector use: IDC socket 6 pins CVILUX CA21-06-S-A-1-0, with Strain Relief CA21-06-S-R-1-0.

Pin #	Pin Name	In/Out	Description
1	SDA	Bi-directional	Serial data.
2	SCL	Bi-directional	Serial clock.
3	5V	Output	5Vdc power out.
4	GND	Ground	System ground.
5	5V	Output	5Vdc power out.
6	GND	Ground	System ground.

IIC Serial Communication Connector

The I2C Header, 6 shrouded (J13), located on the motherboard. For mating connector use: IDC socket 6 pins CVILUX CA21-06-S-A-1-0, with Strain Relief CA21-06-S-R-1-0.

Pin #	Pin Name	In/Out	Description
1	SDA	Bi-directional	Serial data
2	SCL	Bi-directional	Serial clock
3	5V	Output	5Vdc power out
4	GND	Ground	System ground
5	5V	Output	5VdC power out
6	GND	Ground	System ground

RS232 Serial Communication Connector

RS232 serial communication connector DB Type, 9 pins, female connector (P3), located on the motherboard. For mating connector use: DB Type, 9 pins, male connector.

Pin #	Pin Name	In/Out	Description
1	N.C.	N/A	Not connected
2	RS232-TxD	Output	The controller receives commands from the host and sends back the replies.
3	RS232-RxD	Input	
4	N.C.	N/A	Not connected
5	GND	Ground	System ground
6-9	N.C.	N/A	Not connected

Evaluating XCD EDGE Operations

The XCD Commander version 1.4.0.7 provides a means of running sample motion control scripts on the motion module. New scripts (*.xms) can be written to test application specific operations.

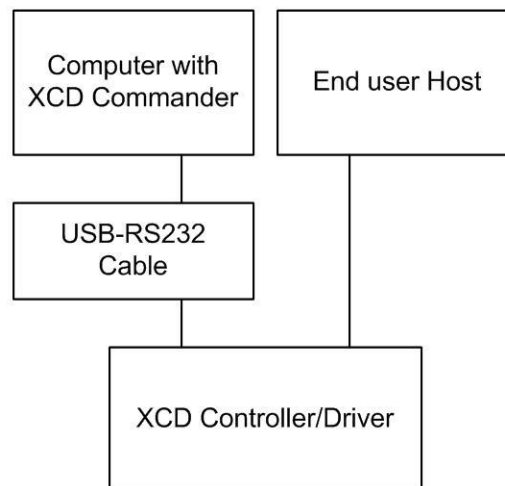
1. Insert the Evaluation Kit Disc-on-key into a USB connection on the computer.
2. Locate the XCD Software (...\\XCD_1.4\\Nano 1.4.0.7\\InstallationDisk\\) and copy the folder to the computer.
3. In the folder InstallationDisk double click on setup.exe to install the XCD Commander.

When the installer finishes it will launch XCD Commander. Because there is no Driver connected at this time a No Communication Warning is displayed. Click OK and the Commander window opens..

4. Close the Nano Commander window.

XCD Commander must be installed before connecting the Motion Module.

5. Place the Motion Module on a flat stable surface.
6. Connect the Communication card to a computer with the USB cable.



XCD Controller to Host Communication Connections

- Connecting to a computer with the XCD Commander software, use a communications adapter card.
 - Connecting directly to the end user's Host, direct connection is possible.
7. Connect the Communication card to the external power supply.

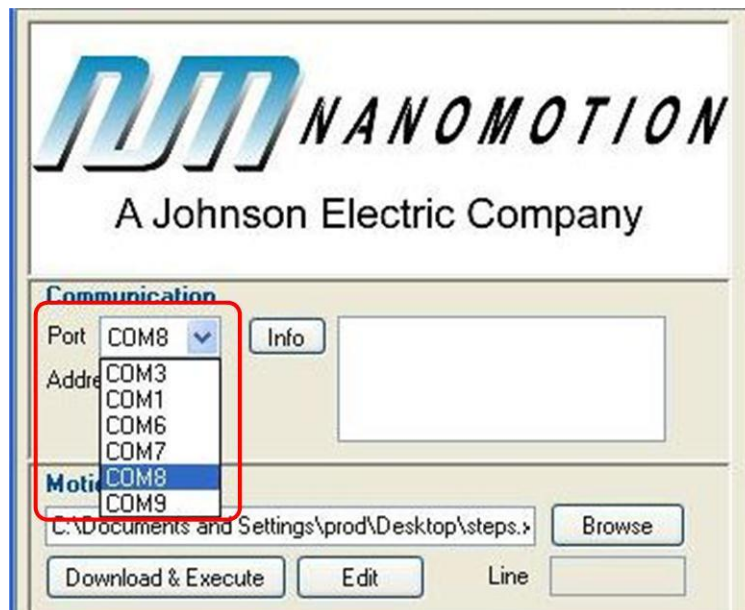
Evaluating XCD EDGE Operations



The external power supply has a set of 110/220 VAC international adapters for connection to mains.

8. Launch Nano Commander.
9. In the Communication pane open the Port drop-down menu.
10. Locate a sequence of four consecutive numbers and select the fourth number in the sequence.

The dropdown menu displays many numbers, but only four will be consecutive. In the following figure the four number sequence is COM6, COM7, COM8, and COM9. Select COM9.



Four Number Sequence in Port Dropdown Menu

11. In the **Address** field select **A4**.
12. To confirm successful communication click **Info**.

The **Info** field displays the Controller and application information:

- Controller version and build
- Controller serial number
- Code
- Controller/Driver type and mode



Ensure that the Controller version is the same as the XCD Commander version shown in the window header.

For example, Controller version 1.4.0.7 and XCD Commander 1.4

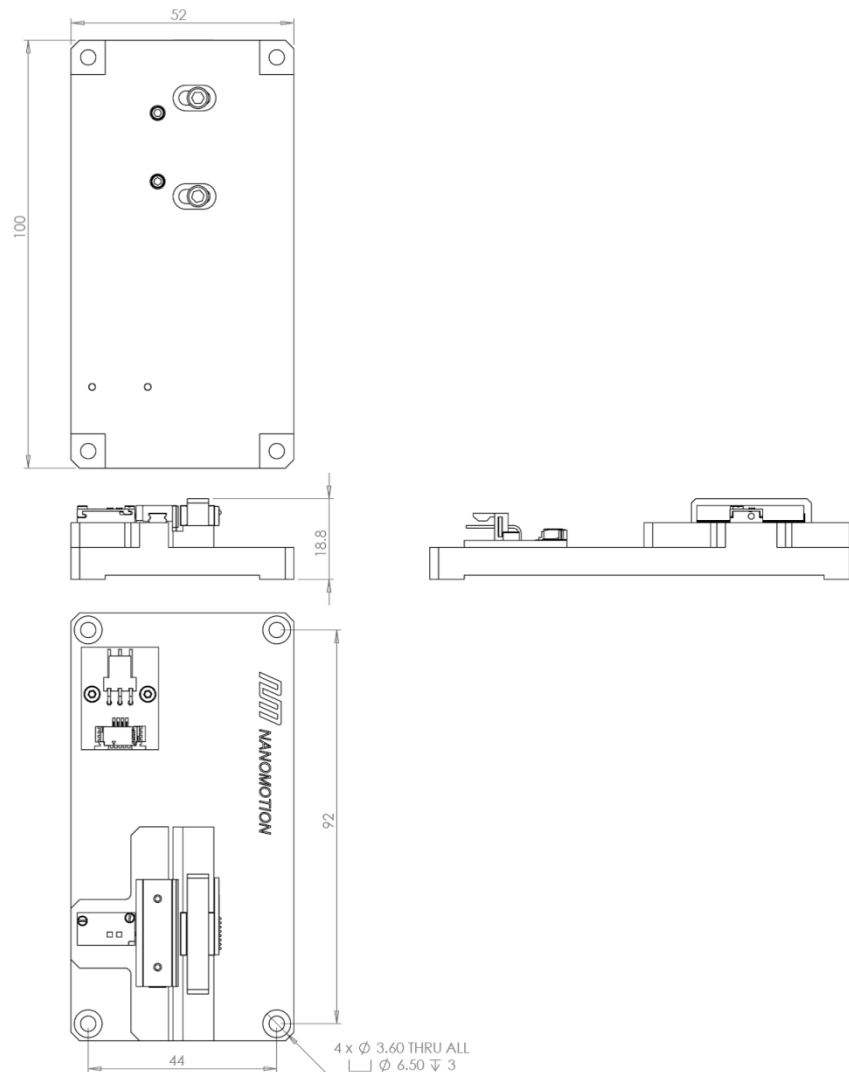
13. The XCD Commander application is ready for use.

Evaluating XCD EDGE Operations

Refer to the **XCD Software 1.4.0.7 User Manual** for additional setup and detailed operating instructions. The manual contains:

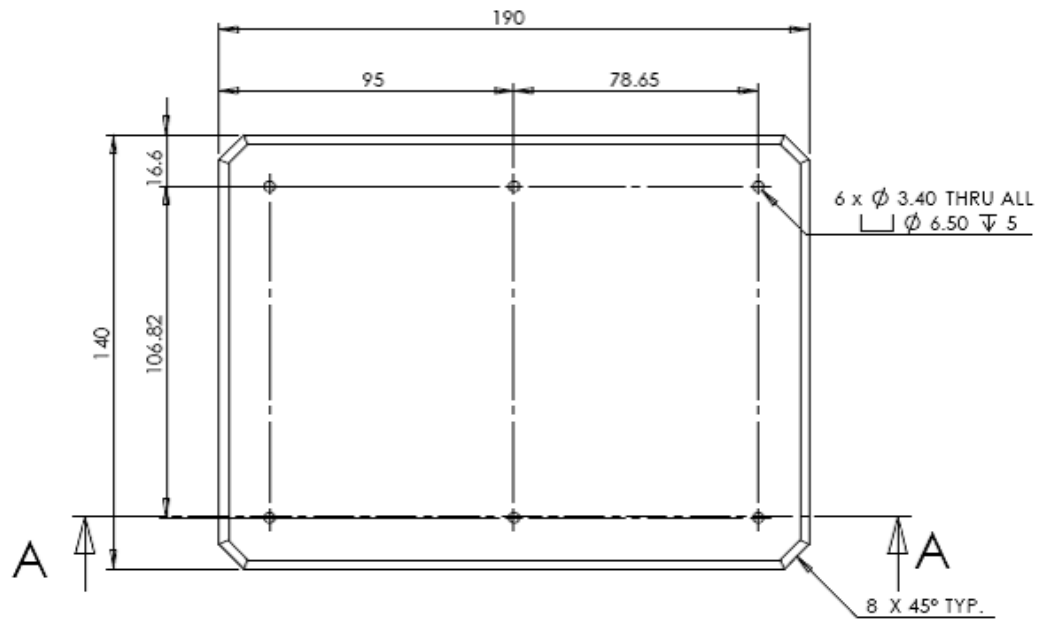
- Overview of Nanomotion motor control
- XCD Commander installation, setup, and operating instructions
- XCD Motion Software syntax, commands, parameters, and values
- Communication Protocol description with syntax and command tables

Mechanical and Electrical Drawings

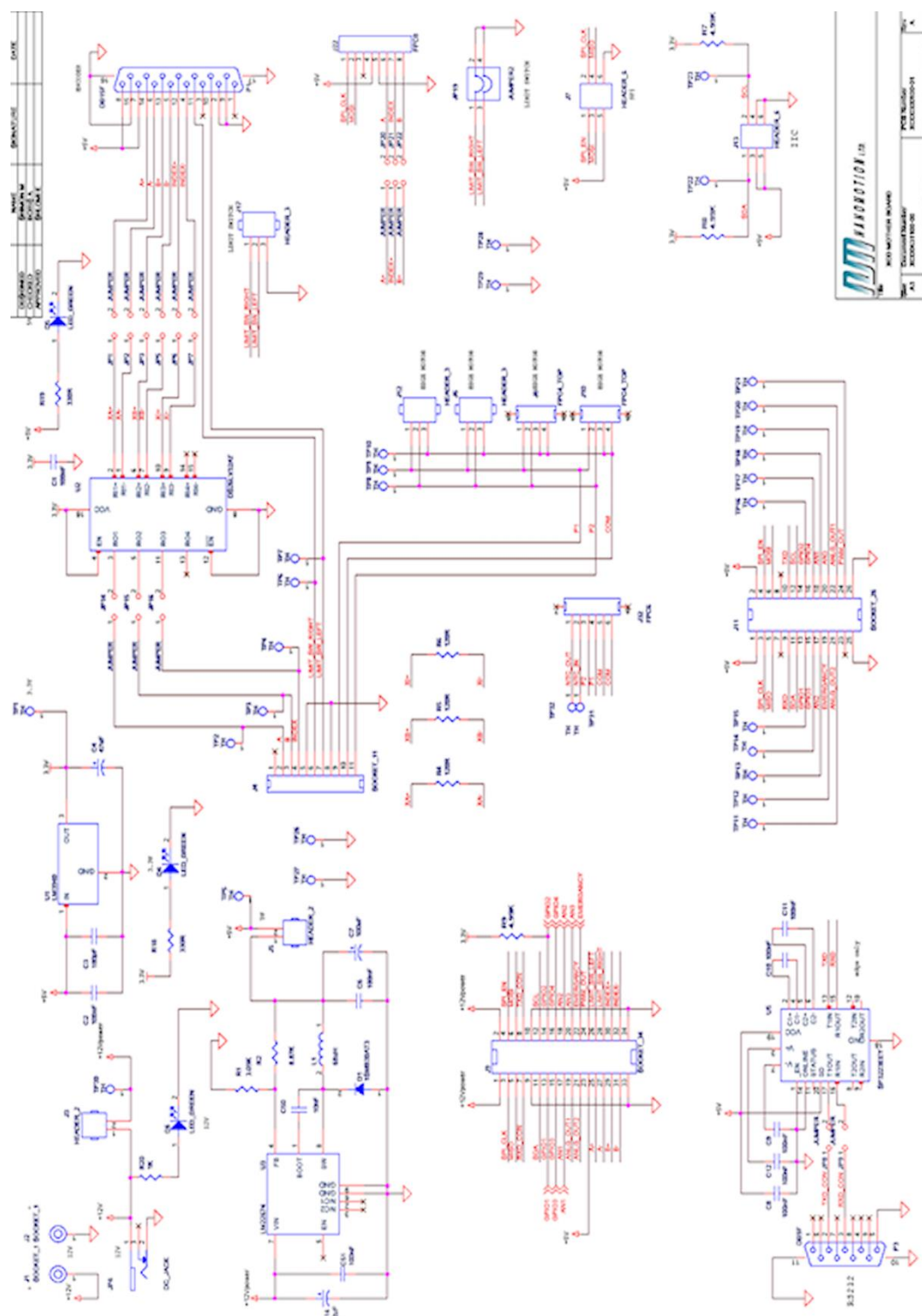


Motion Module Mechanical Drawing (dimensions in mm)

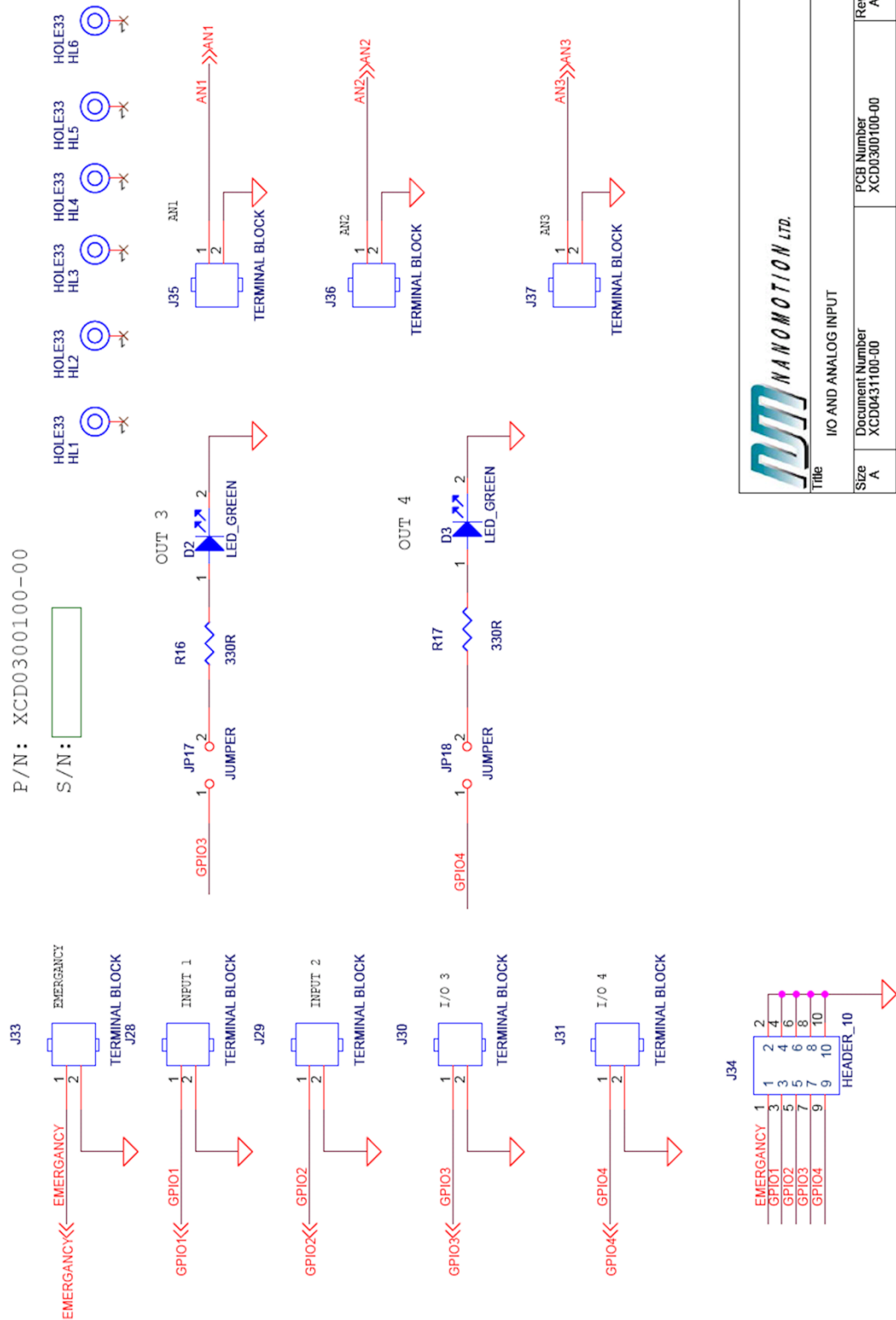
Mechanical and Electrical Drawings



Motherboard Base Mechanical Drawing (dimension in mm)



XCD Motherboard Schematic



I/O and Analog Inputs

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Title I/O AND ANALOG INPUT			
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