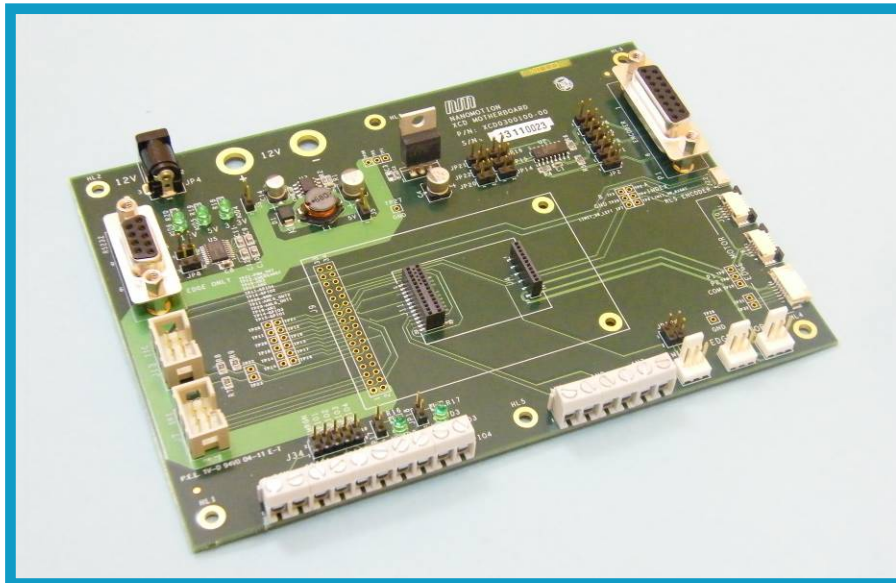


XCD EDGE™

Motherboard

User Guide



D/N: XCDE458100-00, Revision B

May 23, 2012

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5,453,653; 5,616,980; 5,714,833; 111597; 5,640,063; 6,247,338; 6,244,076;
6,747,391; 6,661,153; 69838991.3; 6,384,515; 7,119,477; 7,075,211;
69932359.5; 1186063; 7,211,929; 69941195.5; 1577961; 4813708; 6,879,085;
6,979,936; 7,439,652; 7061158 ;1800356; 1800356; 1800356; 2007-533057
(pending); 2011-093431 (pending); 7,876,509; 10-2007-7009928 (pending);
200780019448.6 ; 7713361.9 (pending); 12/294,926 (pending); GB2008000004178
(pending); GB2009000003796 (pending); 12/398,216 (pending); GB2446428;
12/517,261 (pending); 08702695.1 (pending); 10-2009-7017629 (pending);
12/524,164 (pending); 12/581,194 (pending)

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About this Guide

Scope

This user guide provides the required information for interfacing with the XCD EDGE Motherboard.

Intended Users

This user guide is intended for engineers or technicians directly involved in installation, operation and maintenance of positioning systems and control systems.

Reference Documentation

- XCD EDGE Controller Driver User Guide, D/N: XCDH458000-00.

Glossary

D/N	Document Number
FW	Firmware
GPIO	General Purpose Input / Output
I ² C (IIC)	Inter-Integrated Circuit Serial Communication Interface
I/O	Input / Output
MB	Motherboard
NM	Nanomotion
P/N	Part Number
SW	Software Version
XMS™	XCD Motion Script

Contact Information

Website: www.nanomotion.com

Customer Service

Contact your local distributor or email Nanomotion Ltd. Technical Support Department at techsupport@nanomotion.com, with detailed problem description, additions, corrections or suggestions.

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1 Safety



WARNING!

- Keep your hands off the XCD EDGE Motherboard while the it is turned on.
Approaching your fingers to the XCD EDGE Motherboard, may result in an electrical shock.
 - Before operating the stage, ensure that the motor is grounded.
-



CAUTION:

Use the XCD EDGE Motherboard only for the purposes and tasks described in this manual, or in related documentation.

Always perform tasks according to the instructions provided in the documentation.

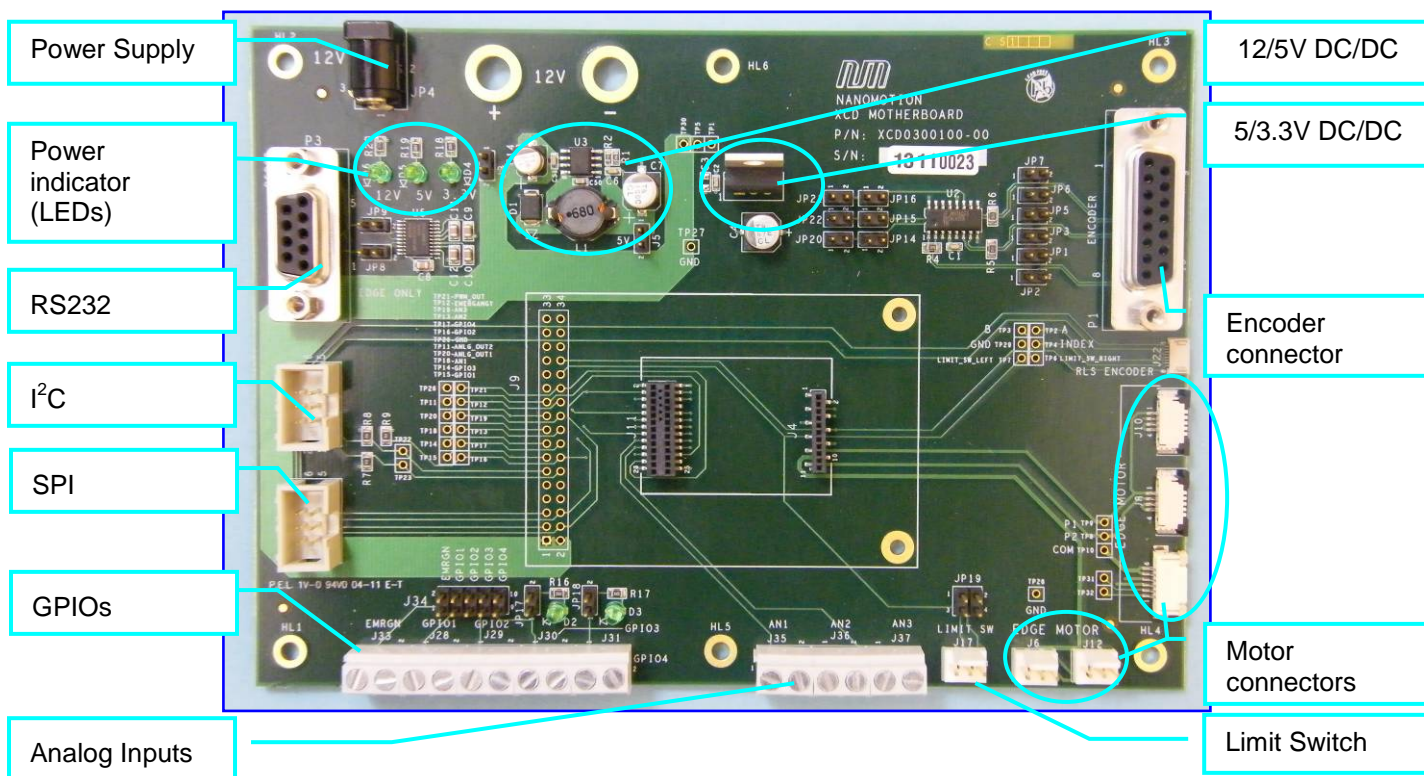
2 Overview

The XCD EDGE™ Motherboard is an interface connection board for the XCD EDGE Controller Driver. With the XCD EDGE Motherboard the user can easily access all signals on the XCD EDGE Controller Driver.

The user can use the XCD EDGE Motherboard as a reference evaluation board for designing a user-customized motherboard.

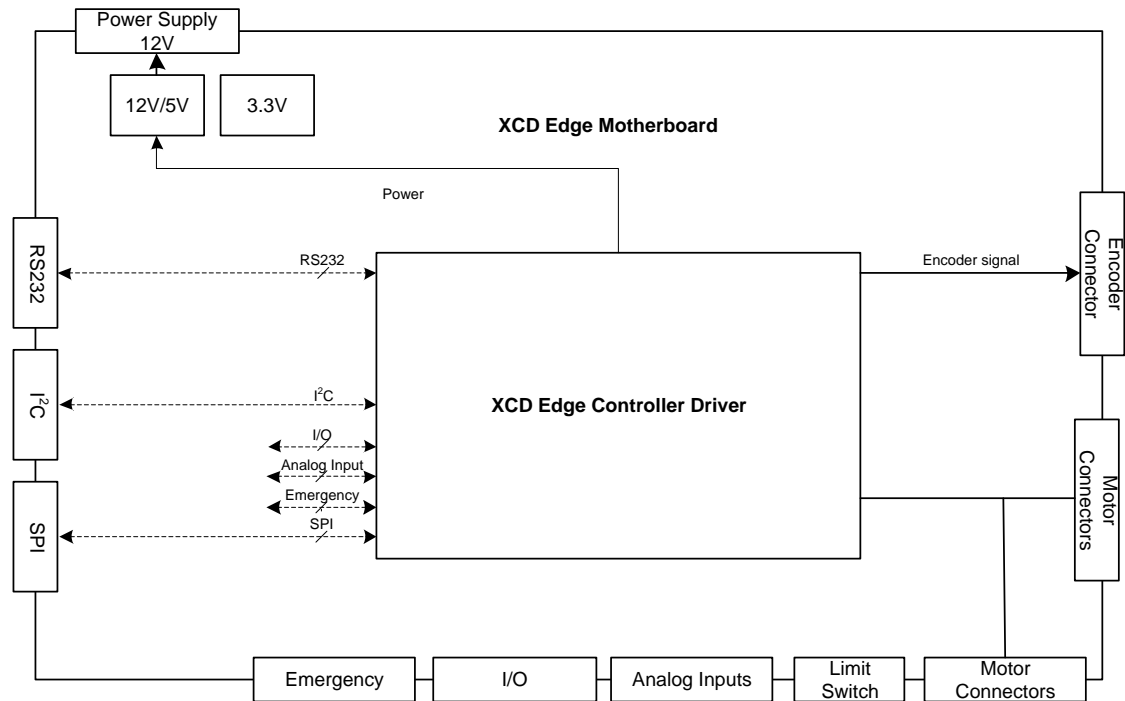
2.1 Features

- Power supply 12/5V DC/DC
- Power supply 5/3.3V DC/DC
- Power indicators LEDs
- Supports I²C, UART, and SPI communication protocols
- Supports user-programming, using XMS
- 2 Limit Switches
- 4 GPIOs
- 3 Analog inputs
- Emergency Stop input signal



The XCD EDGE Motherboard Connections Diagram

The diagram describes the XCD EDGE Controller Driver connected to the XCD Motheboard. The XCD Motherboard is designed for XCD EDGE Controller Driver evaluation and development purposes.

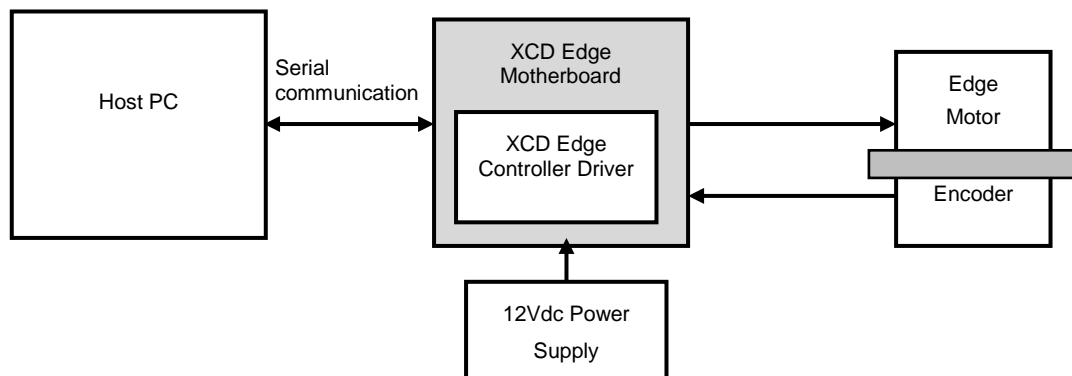


3 XCD EDGE Motherboard Interfaces

This section provides the required information for interfacing with the XCD EDGE Motherboard.

3.1 Functional Interface

Controlling an EDGE Motor through the XCD EDGE Motherboard



Operating Nanomotion motor requires a setup consisting of the following components:

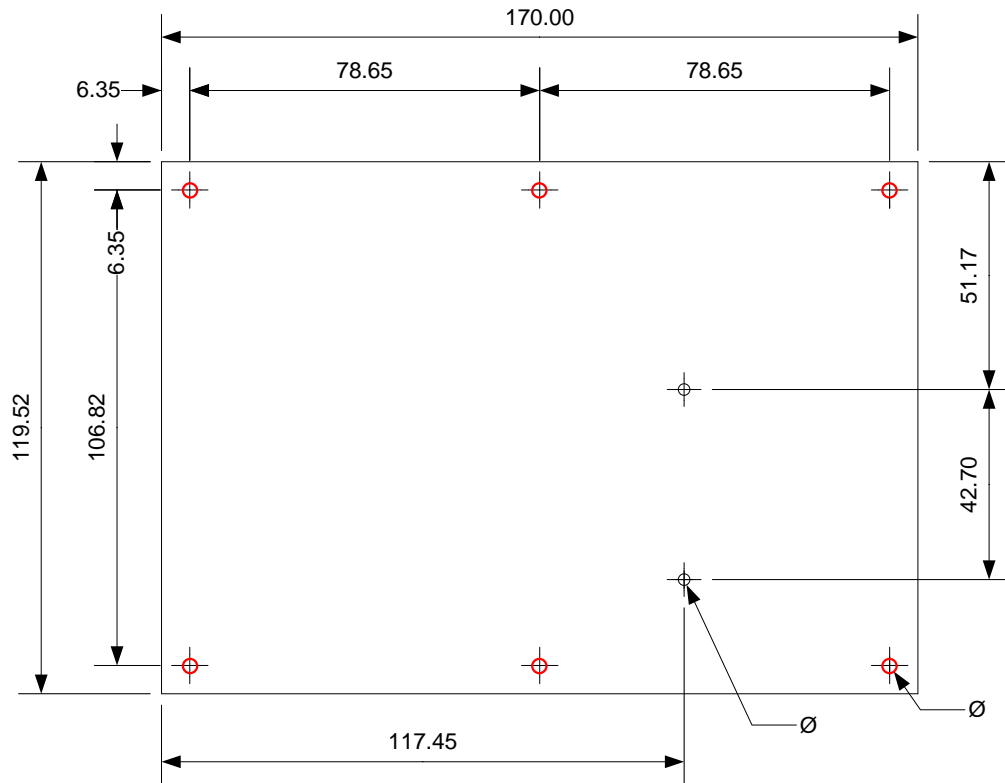
A Host PC, running the XCD Commander application, SW version 1.0. This SW is developed especially for evaluation and development purposes.

1. An XCD EDGE Motherboard: either the XCD EDGE Motherboard, P/N: XCDE150100-XX or a user-customized motherboard, that meets the interface requirements, as specified in section 3.
2. The XCD EDGE Controller Driver.
3. A single axis NM stage (or user-customized power stage) with mounted EDGE motor.
4. A 12Vdc power supply.

3.2 Mechanical Interface

XCD EDGE Motherboard - Top View

(all dimensions are in mm)



3.3 Electrical Interface

Power Supply Connector

Singatron Enerprize 2DC-0005D100 DC Power Jack (JP4).

Power Indicators

LED D4 indicates 3.3V power is on.

LED D5 indicates 5V power is on.

LED D6 indicates 12V power is on.

Main Connector

Connector type on board: Samtec header, P/N: TMS-113-01-L-D-RA .

Mating connector: Samtec micro socket, P/N: SMS-113-01-X-D or
P/N: RSM-113-02-L-D-X.

Pin #	Pin Name	In/Out	Function	Comments
1	+5V	Power	5Vdc Power Input	Max power consumption 2W
2	+5V	Power	5Vdc Power Input	Max power consumption 2W
3	SPI_CLK	Input	SPI Clock	Future option
4	SPI_EN	Input	SPI Enable	
5	MISO	Input	Master In Slave Out	
6	MOSI	Output	Master Out Slave In	
7	N.C.	N.C.	Not connected	N/A
8	N.C.	N.C.	Not connected	N/A
9	RXD	Input	RS232 Receive	The controller receives commands from the host and sends back the replies
10	TXD	Output	RS232 Transmit	
11	SDA	Bidirectional	I ² C Serial data	The controller receives commands from the host and sends back the replies
12	SCL	Bidirectional	I ² C Serial clock	
13	GPIO1	Output	PPW	Voltage level CMOS 3.3V. The customer defines I/O processing in XMS
14	GPIO2	N.C.	Not connected	
15	GPIO3	Output	General Purpose Digital Output 3	
16	GPIO4	Ouput	General Purpose Digital Output 4	
17	AN2	Input	Analog Input 1	V range: 0V÷3.3V. The customer defines input processing in XMS
18	AN1	Input	Analog Input 2	
19	EMERGENCY	Input	Emergency stop	CMOS 3.3V V range: 0V÷3.3V

Table 1: Main Connector Pinout

Pin #	Pin Name	Inout/Output	Function	Comments
20	AN3	Input	Analog Input 3	V range: 0V÷3.3V The customer defines input processing in XMS script
21	ANLG_OUT2	Output	Analog Ouput 2	
22	ANLG_OUT1	Output	Analog Ouput 1	
23	N.C.	N.C.	Not connected	N/A
24	PWM_OUT	Output	Keep alive	For testing puposes
25	GND	Ground	System Ground	N/A
26	GND	Ground	System Ground	N/A

Table 2: Main Connector Pinout (Cont.)

Motor / Encoder Connector

Connector type on board: Samtec header, P/N: TMS-111-01-L-S-RA.

Mating connector: Samtec micro socket, P/N: RSM-111-02-L-S-X or
P/N: SMS-111-01-X-S

Table 3: Motor / Encoder Connector Pinout

Pin #	Pin Name	Input / Output	Description
1	ENCDR_PWR	Power	Encoder power out
2	A_5V	Input	Incremental signal
3	B_5V	Input	Incremental signal
4	INDEX_5V	Input	Reference mark
5	GND	Ground	System ground
6	LIMIT_SW_RIGHT	Input	Limit switch Right
7	LIMIT_SW_LEFT	Input	Limit switch Left
8	GND	Ground	System ground
9	P1	Output	Motor phase 1
10	COM	Output	Motor common
11	P2	Output	Motor phase 2

Limit Switches Connector

Header, 3 friction lock (J17).

For mating connector use: Molex Crimp terminal housing (PN 22-29-2031), with Molex Crimp terminal pins (PN 0008500113).

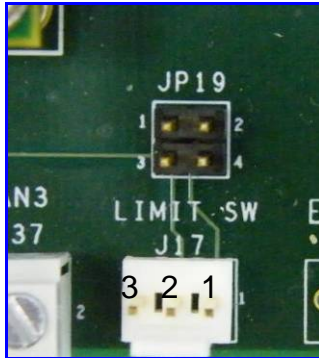


Table 4: Limit Switches Connector Pinout

Pin #	Pin Name	Input / Output	Description
1	LS Right	Input	Limit Switch Right
2	LS Left	Input	Limit Switch Left
3	GND	Power	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 terminal blocks (J35, J36, J37).

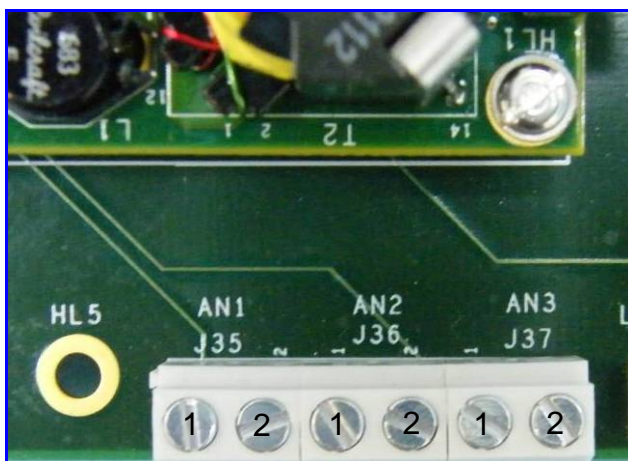


Table 5: Analog Inputs Connector Pinout

Connector & Pin #	Pin Name	Input / Output	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

GPIOs Connector

Five terminal blocks (J33, J28, J29, J30, J31).

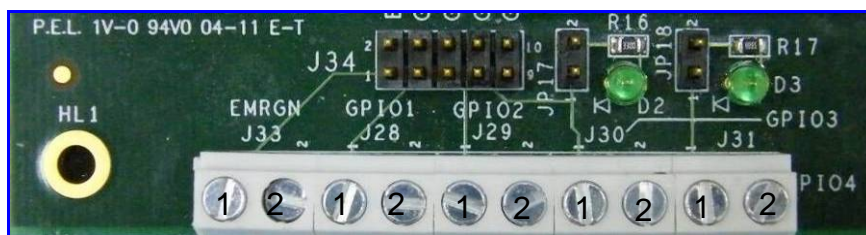


Table 6: I/O Connector Pinout

Connector & Pin #	Pin Name	Input / Output	Description
J33 - 1	Emergency Stop	Input	Emergency input signal, CMOS 3.3V
J33 - 2	GND	Ground	System ground
J28 - 1	I/O 1	Input	General Purpose Digital Input 1, CMOS 3.3V
J28 - 2	GND	Ground	System ground
J29 - 1	I/O 2	N.C.	Not connected
J29 - 2	GND	Ground	System ground
J30 - 1	I/O 3	Output	General Purpose Digital Input 3, CMOS 3.3V
J30 - 2	GND	Ground	System ground
J31 - 1	I/O 4	Output	General Purpose Digital Input 4, CMOS 3.3V
J31 - 2	GND	Ground	System ground

I²C Serial Communication Connector

Header, 6 shrouded (J13).

For mating connector use: IDC socket 6 pins CVILUX CA21-06-S-A-1-0, with Starin Releaf CA21-06-S-R-1-0.

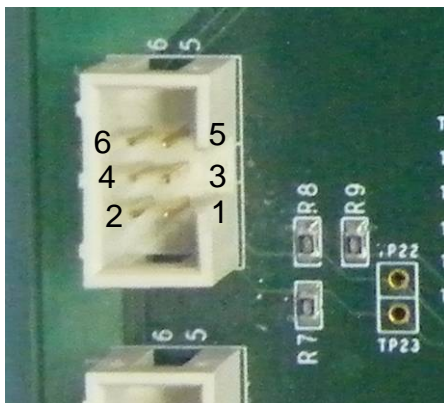


Table 7: Limit Switches Connector Pinout

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

SPI Connector

Header, 6 shrouded (J7).

For mating connector use: IDC socket 6 pins CVILUX CA21-06-S-A-1-0, with Starin Releaf CA21-06-S-R-1-0.

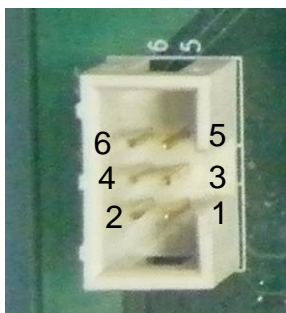


Table 8: Limit Switches Connector Pinout

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

RS232 Serial Communication Connector

DB Type, 9 pins, female connector (P3).

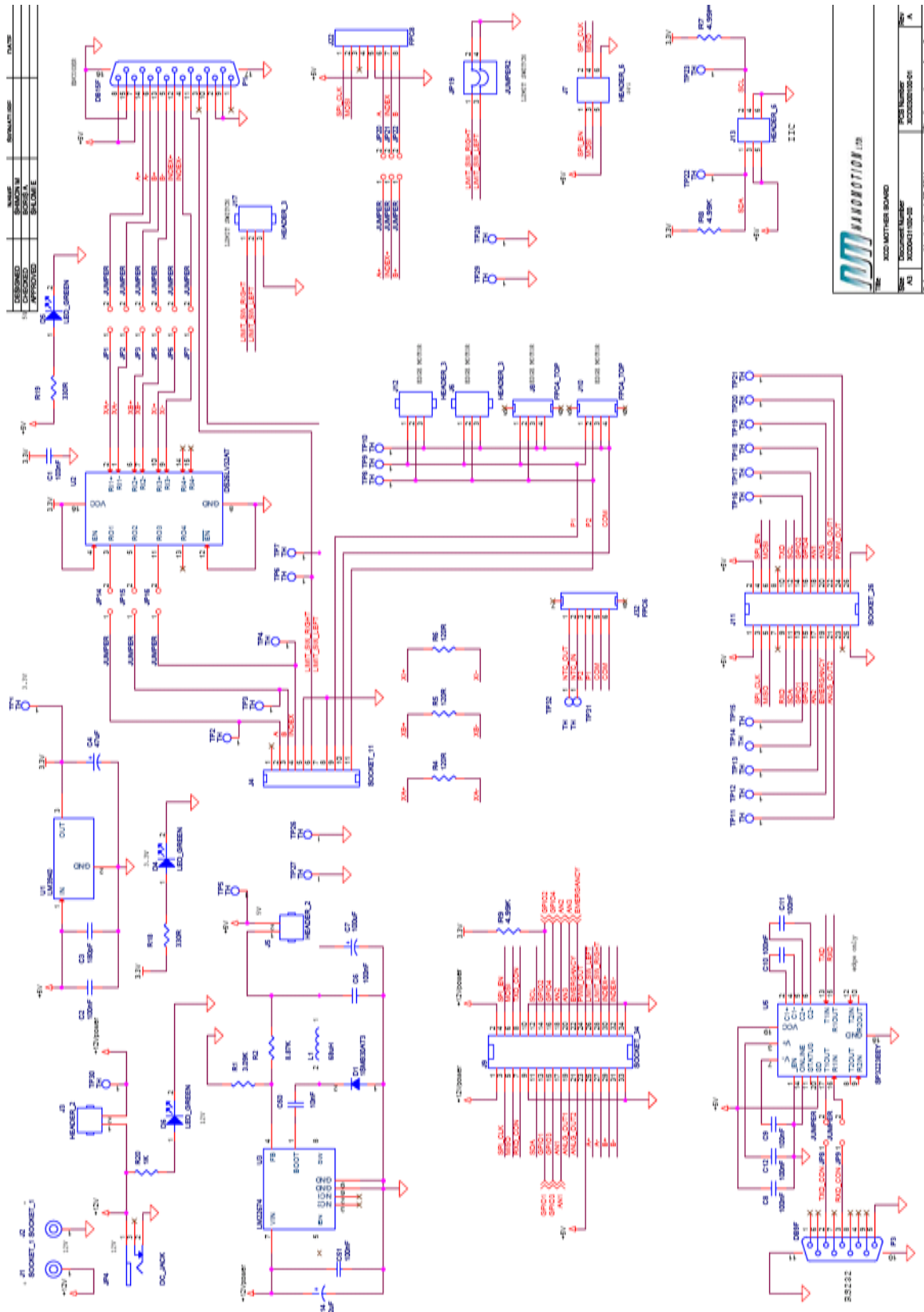
For mating connector use: DB Type, 9 pins, male connector.

Table 9: Encoder Connector Pinout

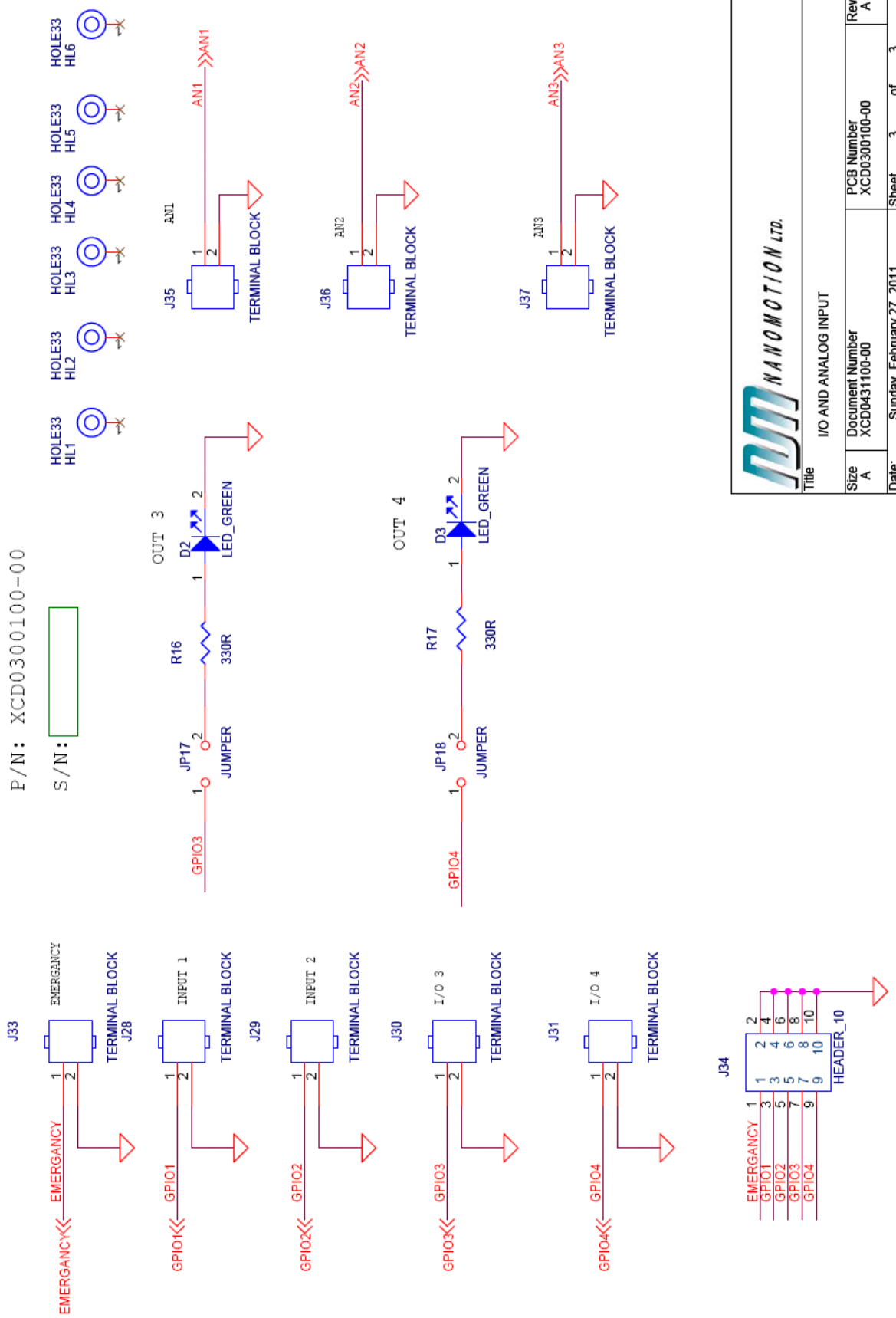
Pin #	Pin Name	Input / Output	Description
1	N.C.	N.C.	Not connected.
2	TXD	Output	RS232 Transmit.
3	RXD	Input	RS232 Receive.
4	N.C.	N.C.	Not connected.
5	GND	Ground	System ground.
6	N.C.	N.C.	Not connected.
7	N.C.	N.C.	Not connected.
8	N.C.	N.C.	Not connected.
9	N.C.	N.C.	Not connected.

4 Electrical Schemes

XCD ~~HR~~ EDGE Motherboard (all circuits, except for I/O and Analog inputs)



I/Os and Analog inputs



NANOMOTION LTD.

Title: I/O AND ANALOG INPUT

Size	Document Number	PCB Number	Rev
A	XCD0431100-00	XCD0300100-00	A
Date:	Sunday February 27 2011	Sheet	3 of 3

5 Technical Data

Dimensions:

120mm x 170mm x 16mm.

Electrical:

Input power supply voltage: 12Vdc \pm 5%.

6 Ordering Information

Part Description	Part Number
XCD EDGE Motherboard	XCDH150100-XX