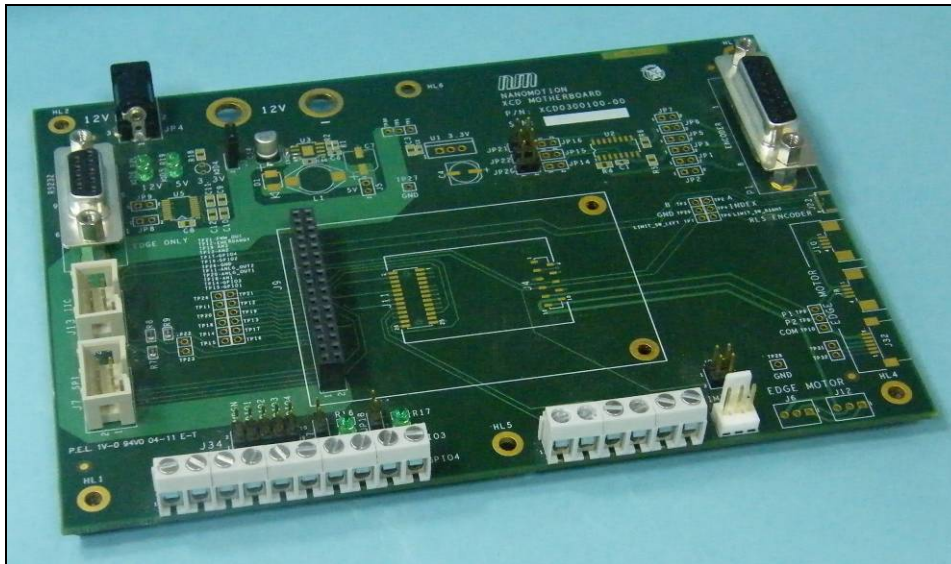


XCD HR

Motherboard

User Guide



DN XCDH458001-00, Revision C

August 29, 2012

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Patent Information

One or more of the patents listed in the following table may apply to Nanomotion products.

5,453,653; 5,616,980; 5,714,833; 111597; 5,640,063; 6,247,338; 6,244,076;
,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)

Contact Information

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Revision History

ECO	Revision	Release date	Details
CO-0433	00/B	May 2012	Deleted reference to specific XCD Software version number. Added patent and trademark information
CO-0465	00/C	Aug. 2012	Added reference to XCD HR1, and list of Nanomotion patents

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About this Guide

Scope

This user guide provides the required information for interfacing with the XCD HR 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 HR1/2/4 Controller Driver User Guide, D/N: XCDH458000.
- XCD Software User Guide for installed firmware version

Glossary

D/N	Document Number
GPIO	General Purpose Input / Output
I ² C (IIC)	Inter-Integrated Circuit Serial Communication Interface
I/O	Input / Output
MB	Motherboard
NM	Nanomotion
PWM	Pulse-Width Modulation
P/N	Part Number
SPI	Serial Peripheral Interface
SW	Software
TP	Test Point

1 Safety

**WARNING!**

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

**CAUTION:**

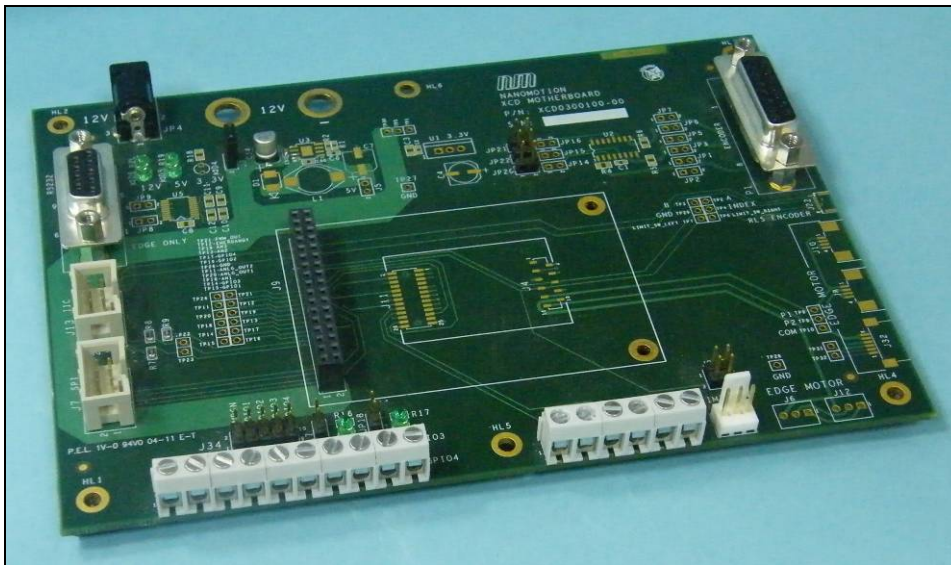
Use the XCD HR Motherboard only for the purposes and tasks described in this manual, or in related documentation.
Always perform tasks according to the instructions provided in the documentation.

2 Overview

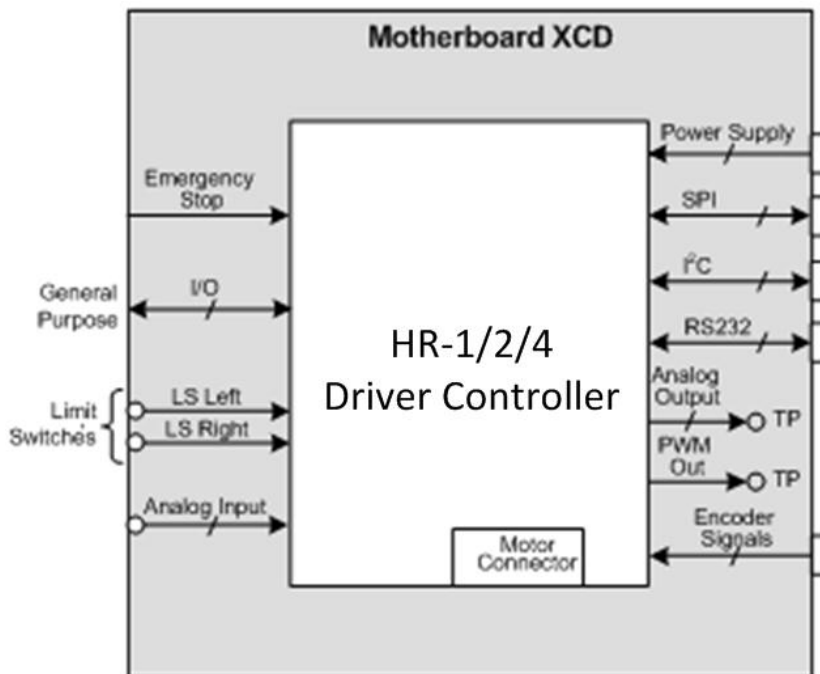
The XCD HR Motherboard is an interface connection board for the XCD HR1/2/4 Controller Driver. With the XCD HR Motherboard the user can easily access all signals on the XCD HR1/2/4 Controller Driver.

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

XCD HR Motherboard



The XCD HR Motherboard Connections Diagram

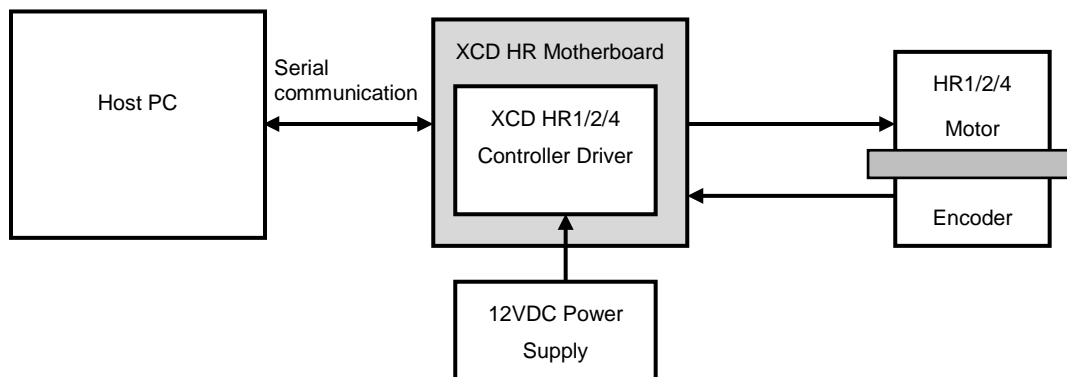


3 XCD HR Motherboard Interface

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

3.1 Functional Interface

Controlling an HR Motor Through the XCD HR Motherboard



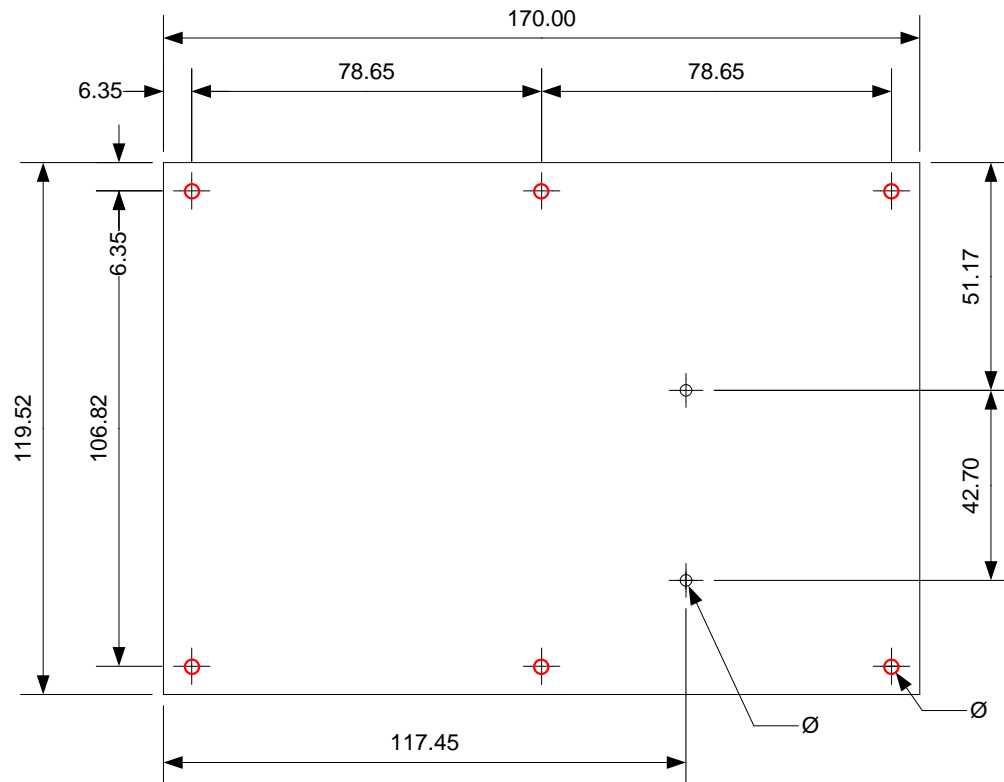
Operating the HR1/2/4 motor requires a setup consisting of the following components:

1. A Host PC, running the XCD Commander application version that is the same as the FW version installed on the Controller Drive. This application is developed especially for evaluation and development purposes.
2. An XCD HR Motherboard: either the XCD HR Motherboard, P/N: XCDH150100 or a user-customized motherboard that meets the interface requirements, as specified in section 3.
3. The XCD Controller Driver:
 - XCD HR1 – P/N XCD-HR1-BD-XX
 - XCD HR2 - P/N: XCD-HR2-BD-XX
 - XCD HR4 - P/N: XCD-HR4-BD-XX.
4. A single axis NM stage (or user-customized power stage) with mounted HR1, HR2, or HR4 motor.
5. A 12VDC power supply.

3.2 Mechanical Interface

XCD HR Motherboard - Top View

(all dimensions are in mm)

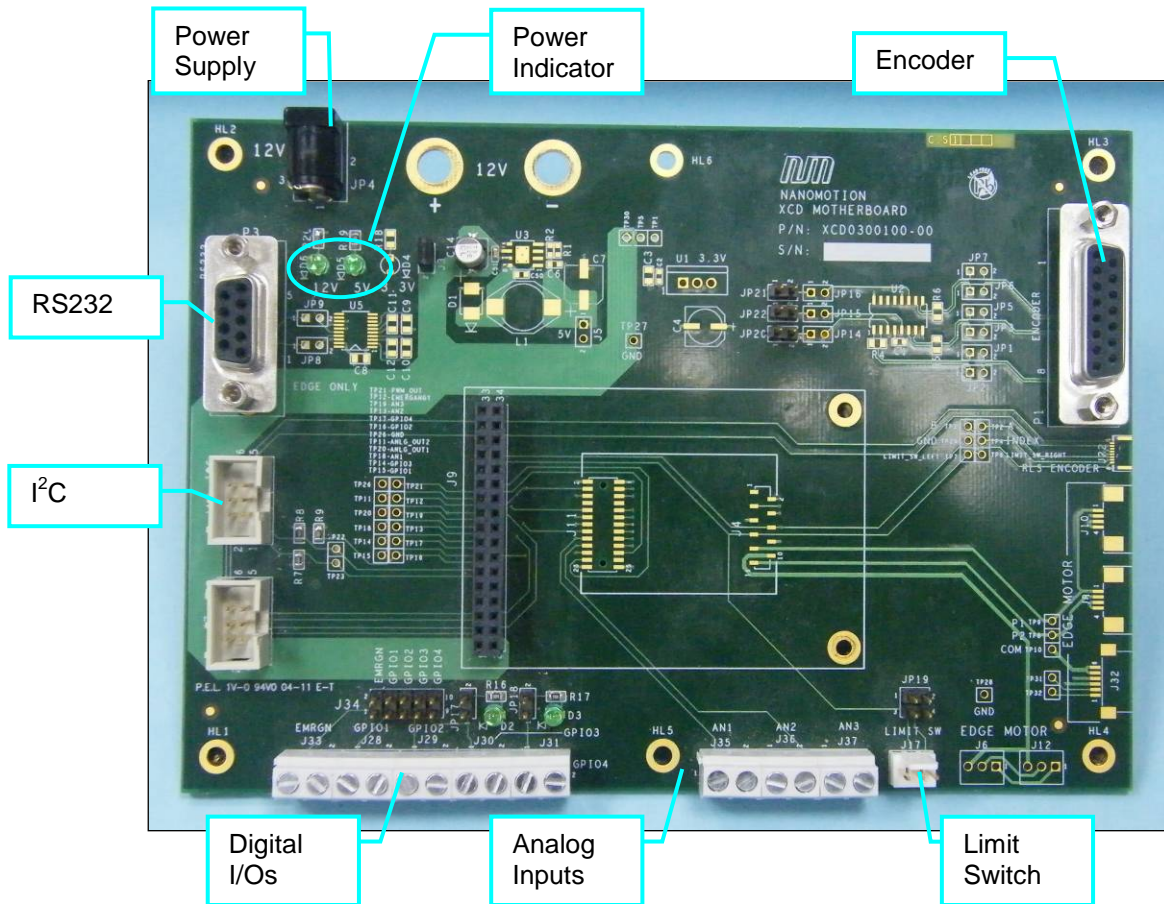


Note:

Install the XCD HR Motherboard, using six 3x10 spacers, and six M3 mounting screws to be inserted in the card mounting holes, marked red (see 6 holes lengthwise the edge of the motherboard card).

3.3 Electrical Interface

XCD HR Motherboard Connectors



Power Supply Connector

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

Power Indicators

LED D5 indicates 5V power is on.

LED D6 indicates 12V power is on.

Encoder Connector

DB, 15 pins, female connector (P1).

For mating connector use: DB, 15 pins, male connector.

Table 1: Encoder Connector Pinout

Pin #	Pin Name	In/Out	Function
1	N.C.	N/A	Not connected
2	0V	Power	DC power out
3	N.C.	N/A	Not connected
4	Z-/Q+	Input	Reference mark
5	B-	Input	Incremental signal
6	A-	Input	Incremental signal
7	5V	Power	DC power out
8	5V	Power	DC power out
9	0V	Power	DC power out
10	N.C.	N/A	Not connected
11	N.C.	N/A	Not connected
12	Z+/Q-	Input	Reference mark
13	B+	Input	Incremental signal
14	A+	Input	Incremental signal
15	Shield	N/A	Shorted to the shield

Limit Switch Connector

Header, 3 friction lock (J17).

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

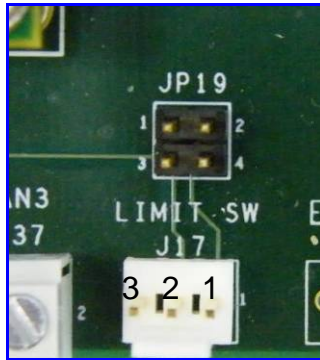


Table 2: Limit Switch Connector Pinout

Pin #	Pin Name	In/Out	Function
1	LS Right	Input	Limit Switch signals can be used if an axis is equipped with limit switch sensors indicating if the axis is too close to hard stop. 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

Use this connector for connecting analog signals (range 0 – 3.3 V) to be processed in XMS script.

Three terminal blocks (J35, J36, J37).

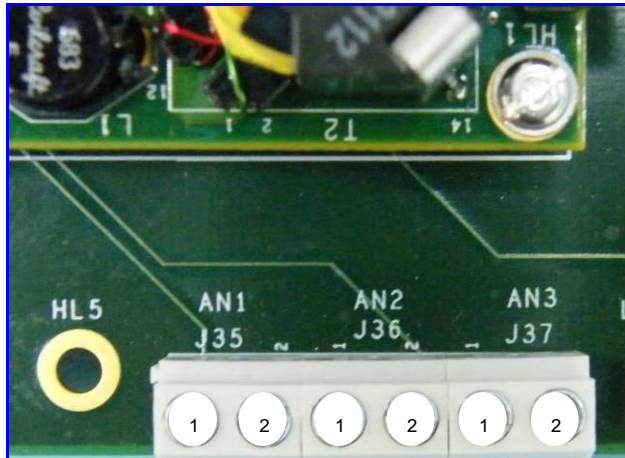


Table 3: Analog Inputs Connector Pinout

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

Use this connector to connect digital signals (CMOS 3.3 V levels) to be processed in XML script.

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

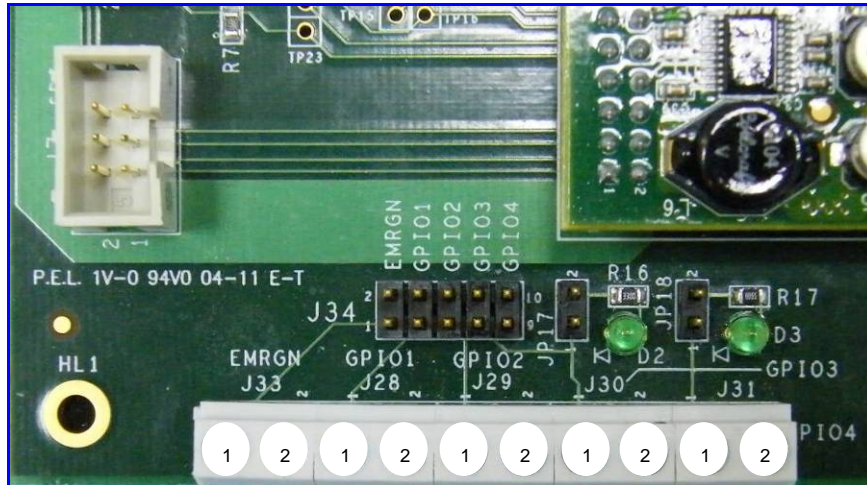


Table 4: I/O Connector Pinout

Connector & Pin #	Pin Name	In/Out	Description
J33 - 1	Emergency Stop	Input	Emergency input signal, CMOS 3.3V. By default, when the signal is active low; i.e. zero level, causes fault: stops motion, XMS program.
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	General Purpose Digital Input 2, CMOS 3.3V. 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

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.

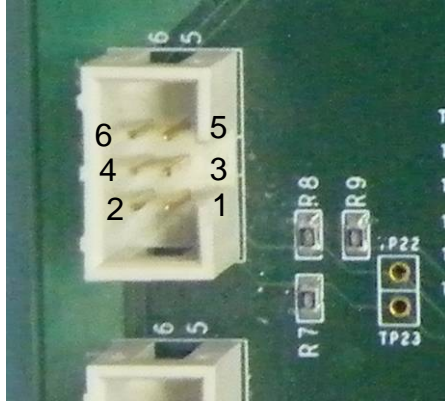


Table 5: Limit Switches Connector Pinout

Pin #	Pin Name	In/Out	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).

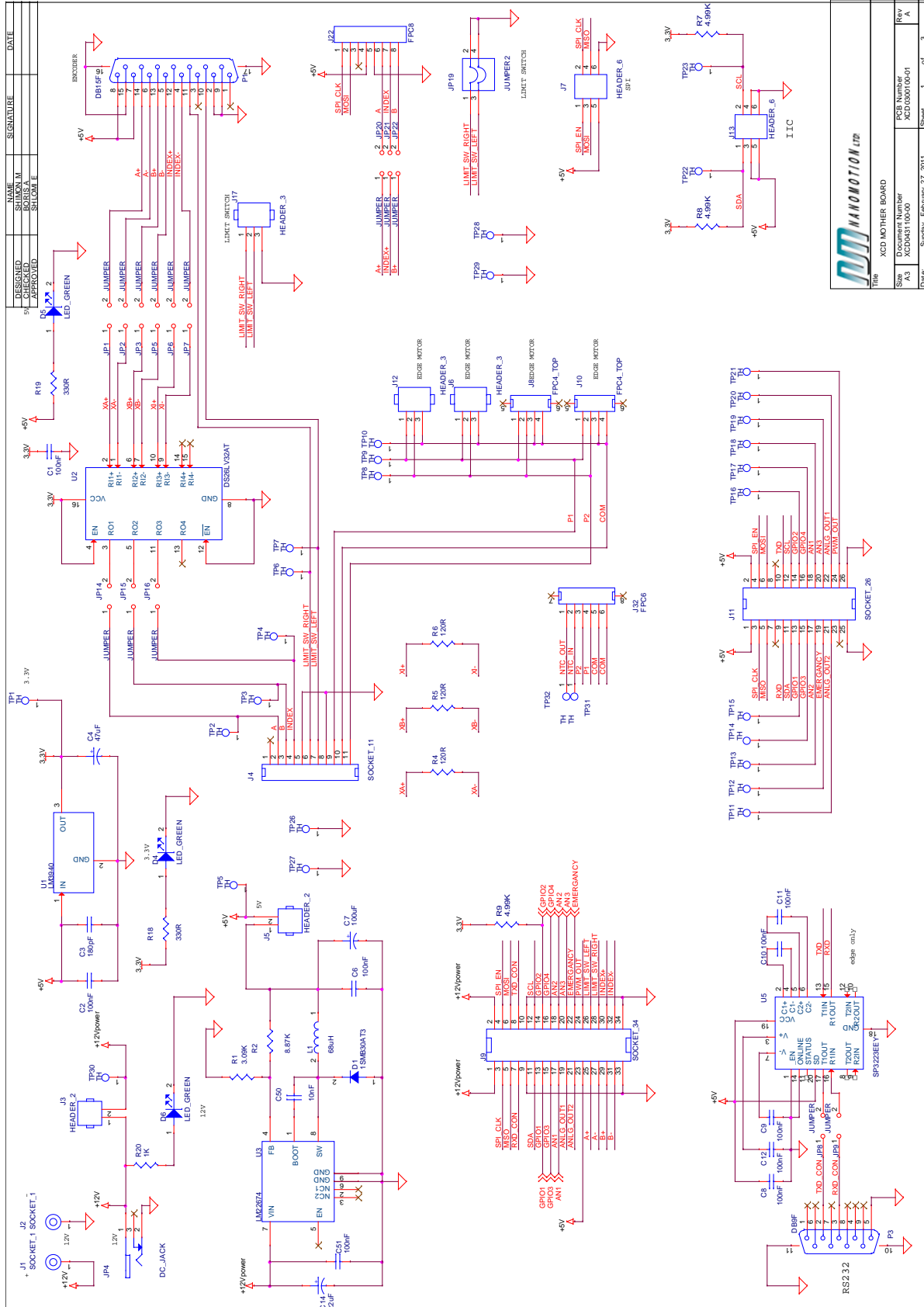
For mating connector use: DB Type, 9 pins, male connector.

Table 6: Encoder Connector Pinout

Pin #	Signal Name	In/Out	Function
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

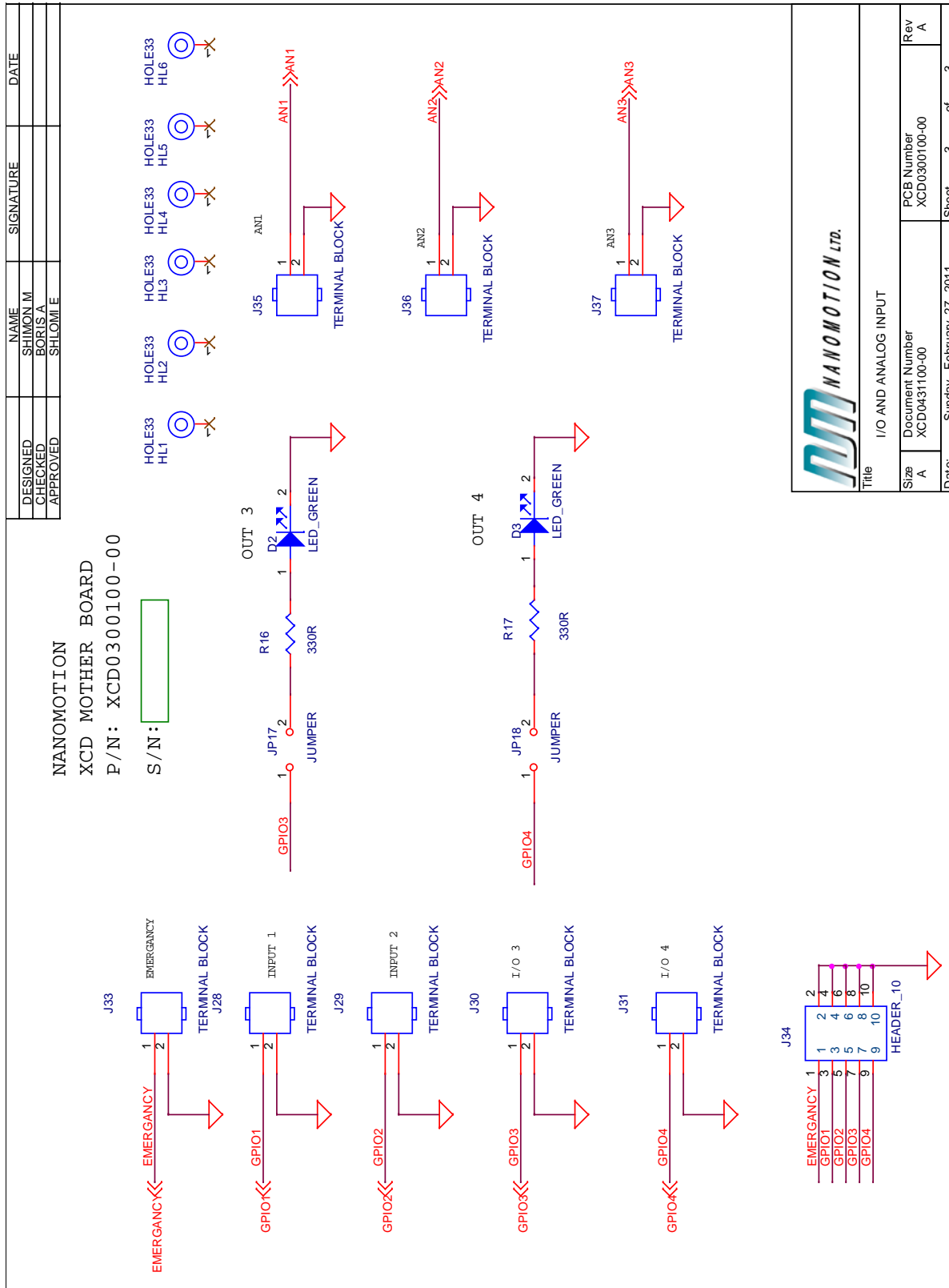
4 Electrical Schemes

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



MANOMOTION LTD	
Title: XCD MOTHER BOARD	
Rev: A3	Document Number: XCD030100-00
Date: Sunday, February 27, 2011	Sheet: 1 of 3

I/O and Analog Inputs Electrical Scheme



5 Technical Data

Dimensions:

120mmx170mmx16mm.

Electrical:

Input power supply voltage: 12V DC $\pm 5\%$.

6 Ordering Information

Part Description	Part Number
XCD HR Motherboard	XCDH150100-XX