innodisk

Total Solution For
Embedded Peripherals

EGPC-B4S1

M.2 to four isolated

CAN bus 2.0B

Customer: _____

Customer Part Number: _____

Innodisk Part Number: _____

Innodisk Model Name: _____

Date: _____

Innodisk Approver	Customer Approver

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REVISION HISTORY

Revision	Description	Date
1.0	First Released	Jun, 2020
1.1	1. Correct M.2 GF pinout 2. Add MTBF	Aug, 2020

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1. Product Introduction

1.1. Overview

Innodisk EGPC-B4S1 is designed with standard M.2 2280 form factor with an external daughter board; EGPC-B4S1 supports PCIe to four independent CAN bus 2.0B, optimized for higher performance and lower power, which brings you a flexible expansion solution for embedded systems.

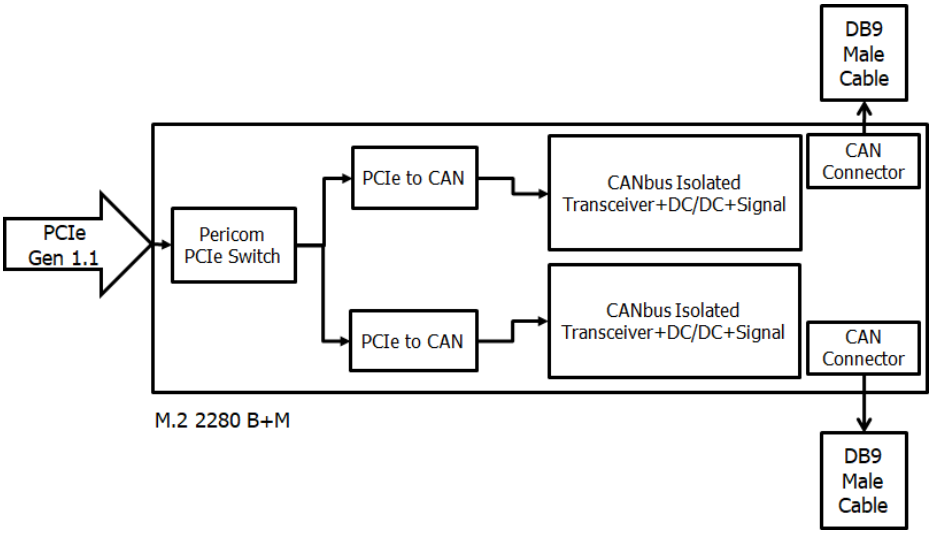

Figure 1: M.2 Board Block Diagram

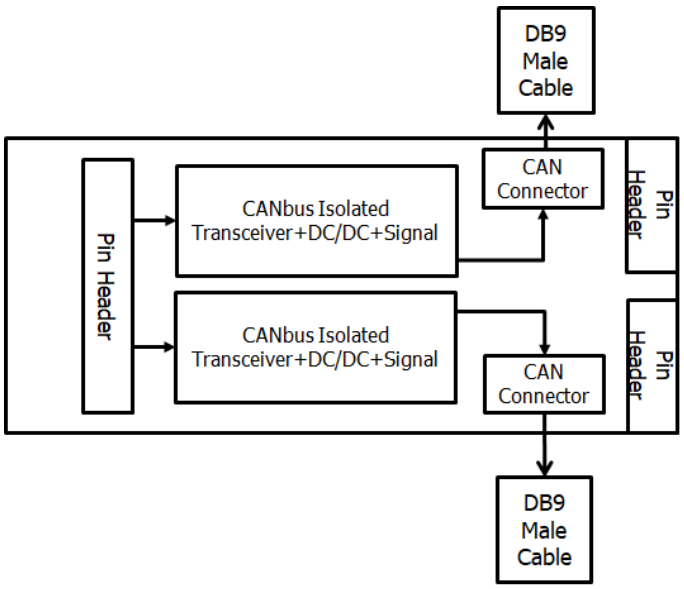

Figure 2: Daughter Board Block Diagram

1.2. Features

- Compliant with PCI Express 1.1
- Meet the Requirements of the ISO 11898-1
- CAN bus 2.0B backward compatible with 2.0A
- Support baud rate 10/20/50/100/250/500/800/1000K
- Support CAN message acceptance filter
- Support Linux SocketCAN
- Compliant with IEC 60950-1:2005 + A1: 2009 + A2:2013 2.5kV HiPOT protection
- Compliant with EN61000-4-2 (ESD) Air-15kV, Contact-8kV
- Termination resistor enabled/disabled by switch
- 30μ" golden finger, 3-year warranty
- Industrial Temperature (-40°C to +85°C) support
- Industrial design, manufactured in Innodisk Taiwan

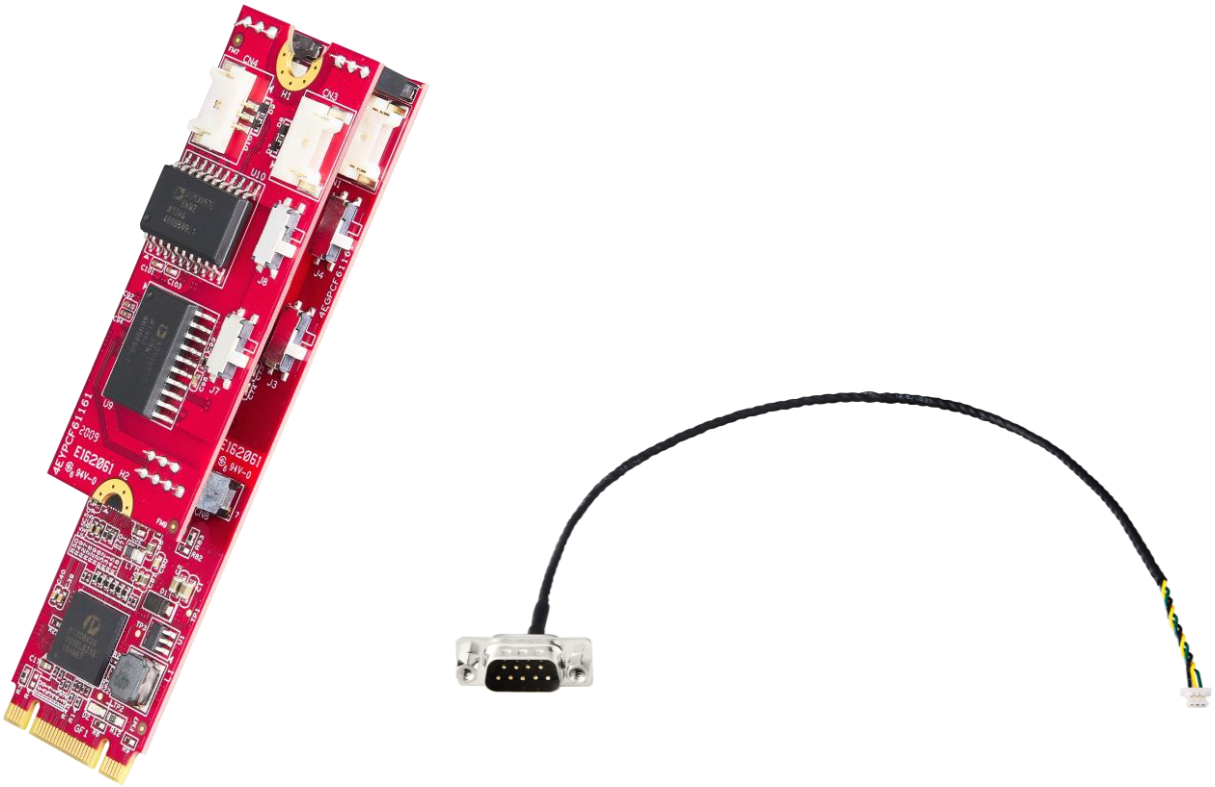

Figure 3: Picture

2. Product Specifications

2.1. Device Parameters

Table 1: Device Parameters

Form Factor	M.2 2280 B-M
Input I/F	PCI Express 1.1
Output I/F	CAN bus 2.0B
Output Connector	DB-9 x 4
Dimension (WxLxH)	22 x 80 x 12.9 mm

2.2. Performance

In performance test, we use our own stress test tool to verify the TX/RX performance.

Table 2: One Card Loopback

ID Type	Bytes	TX (frames/sec)	RX (frames/sec)
SID	0	11965	11947
	1	9439	9416
	2	9134	9115
	3	8264	8241
	4	7583	7569
	5	7045	7035
	6	6506	6493
	7	6008	5998
	8	5552	5540
EID	0	8933	8920
	1	8126	8107
	2	7382	7369
	3	6829	6818
	4	6250	6239
	5	5797	5787
	6	5349	5335
	7	3873	3867
	8	3597	3592

Table 3: Two Cards TX/RX

ID Type	Bytes	TX (frames/sec)	RX (frames/sec)
SID	0	12149	12122
	1	10622	10594
	2	9571	9557
	3	8512	8499
	4	7460	7443
	5	6580	6568
	6	6300	6290
	7	5742	5728
	8	5440	5430
EID	0	9056	9033
	1	7698	7684
	2	6946	6929
	3	6596	6577
	4	6206	6190
	5	5555	5541
	6	5392	5377
	7	5067	5057
	8	4548	4539

2.3. Electrical Specifications

2.3.1. Power Requirement

EGPC-B4S1 can connect with either mPCIe slot or USB pin header.

Table 4: Power Requirement

Item	Connector	Rating
Input voltage	M.2 Golden Finger	+3.3 DC +-5%

2.3.2. Power Consumption

Table 5: Power Consumption

Voltage(V)	RMS(mA)	Max (mA)
3.3	858	1310

2.4. Environmental Specifications

2.4.1. Temperature Ranges

Table 6: Temperature Ranges

Temperature	Range
Operating	Industrial Grade: -40°C to +85°
Storage	-55°C to +95°

2.4.2. Humidity

Relative Humidity: 10-95%, non-condensing

2.4.3. Shock and Vibration

Table 7: Shock and Vibration

Reliability	Test Conditions	Reference Standards
Vibration	7 Hz to 2K Hz, 20G, 3 axes	IEC 68-2-6
Mechanical Shock	Duration: 0.5ms, 1500 G, 3 axes	IEC 68-2-27

2.4.4. Mean Time between Failure (MTBF)

Reliability prediction methodology provides the basis for reliability evaluation and analysis. The purpose of the prediction is to predict the life time of the product in units of failure rate and MTBF.

Table 8: Mean Time between Failure (MTBF)

Product	Condition	MTBF (Hours)
EGPC-B4S1	The analysis is at 25°C ambient temperature by Telcordia SR-332, Issues 4, Method I, Case 3 under Ground Benign, Controlled environment, 50% operation stress	12,951,702

2.5. CE and FCC Compatibility

EGPC-B4S1 conforms to CE and FCC requirements.

2.6. RoHS Compliance

EGPC-B4S1 is fully compliant with RoHS directive.

2.7. Hardware

2.7.1. Layout

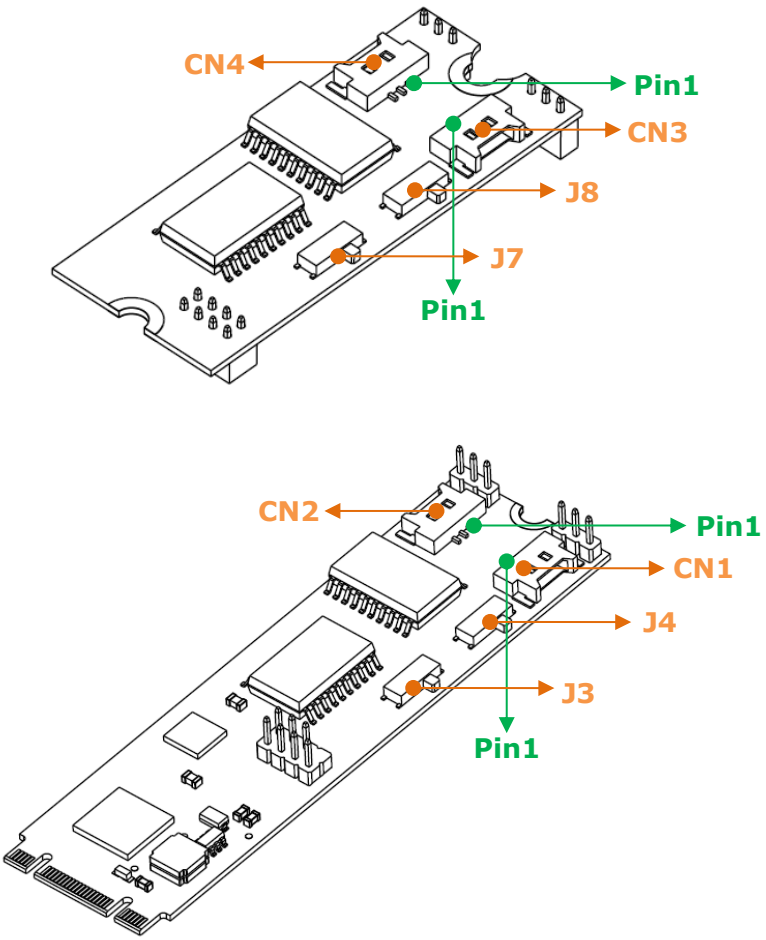

Table 9: PCB Layout Legend

Label	Connector Type	Function
CN1-CN2	SMD 1*3P 90° P:1.25mm H:1.85mm	CAN bus Port 3-4
CN3-CN4	SMD 1*3P 90° P:1.25mm H:1.85mm	CAN bus Port 1-2
J3-J4	SLIDE SWITCH	Enable Termination Resistor of Port 3-4
J7-J8	SLIDE SWITCH	Enable Termination Resistor of Port 1-2

2.7.2. Pin Define

Table 10: M.2 B-M Key Pin Define

Signal Name	Pin #	Pin #	Signal Name
		75	CONFIG_2
3.3V	**74**	**73**	GND
3.3V	**72**	**71**	GND
3.3V	**70**	**69**	CONFIG_1
NC	**68**	**67**	NC
Module Key M			
NC	**58**		
NC	**56**	**57**	GND
NC	**54**	**55**	CLK+
GND	**52**	**53**	CLK-
RST	**50**	**51**	GND
NC	**48**	**49**	RX+
NC	**46**	**47**	RX-
NC	**44**	**45**	GND
NC	**42**	**43**	TX+
NC	**40**	**41**	TX-
NC	**38**	**39**	GND
NC	**36**	**37**	NC
NC	**34**	**35**	NC
NC	**32**	**33**	GND
NC	**30**	**31**	NC
NC	**28**	**29**	NC
NC	**26**	**27**	GND
NC	**24**	**25**	NC
NC	**22**	**23**	NC
NC	**20**	**21**	CONFIG_0
Module Key B			

NC	**10**	**11**	NC
NC	**8**	**9**	NC
NC	**6**	**7**	NC
3.3V	**4**	**5**	NC
3.3V	**2**	**3**	GND
		1	CONFIG_3

2.7.3. I/O Connector Mechanical Drawing & Pin Defines

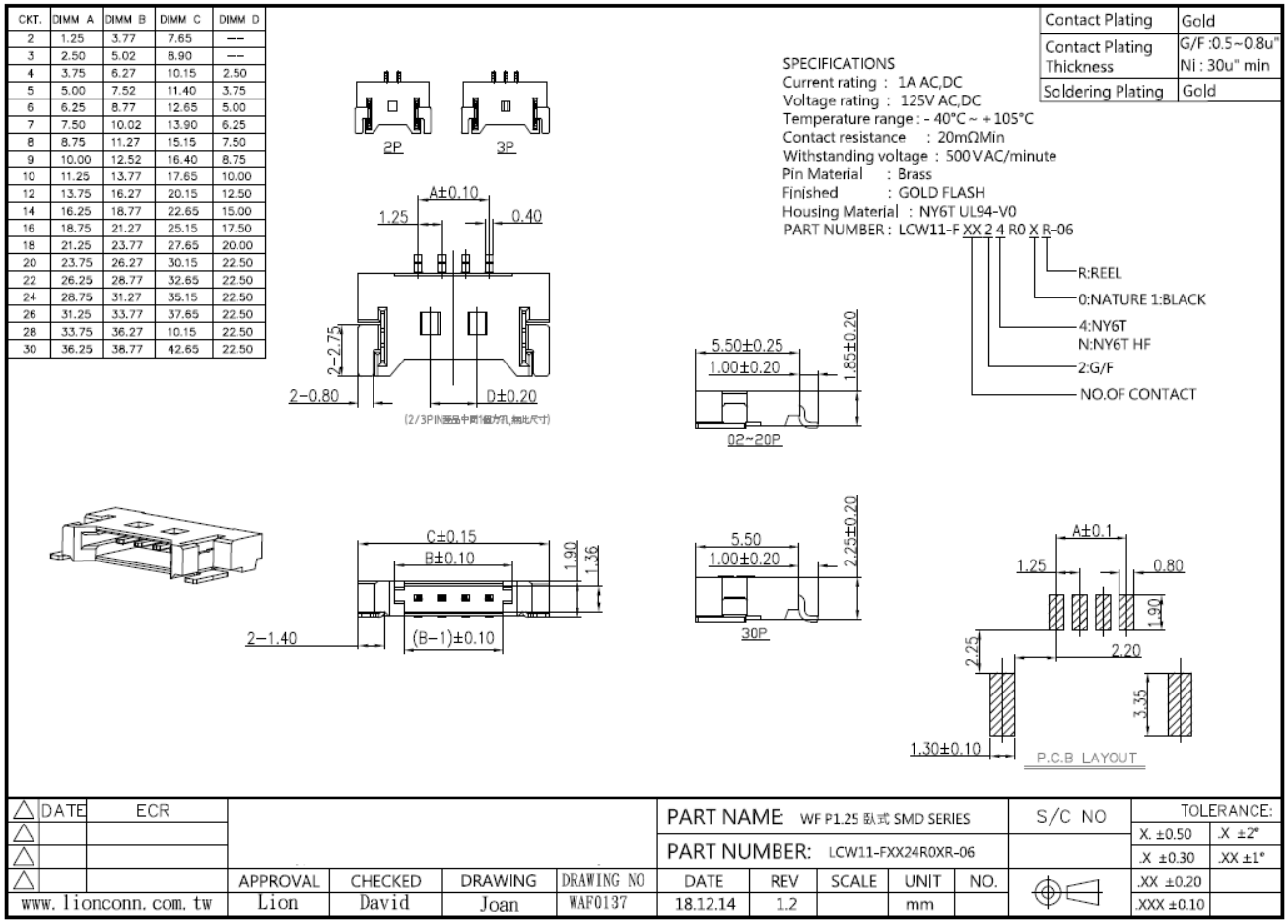

Figure 4: Wire to Board SMD 1*3P Connector Drawing (CN1-CN4)

Table 11: Wire to Board SMD 1*3P Connector Pin Define (CN1-CN4)

Pin #	**1**	**2**	**3**
Signal Name	CAN-L	CAN-H	GND

Figure 5: Slide Switch Enable Termination Resistor (J3/J4/J7/J8)

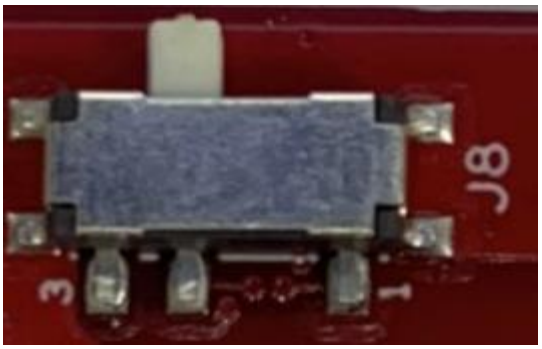

Figure 6: Slide Switch Disable Termination Resistor (J3/J4/J7/J8)

Table 12: Slide Switch Pin Define (J3/J4/J7/J8)

Pin #	1	3
Termination Resistor	ON	OFF

2.7.4. EGPC-B4S1 Mechanical Drawing

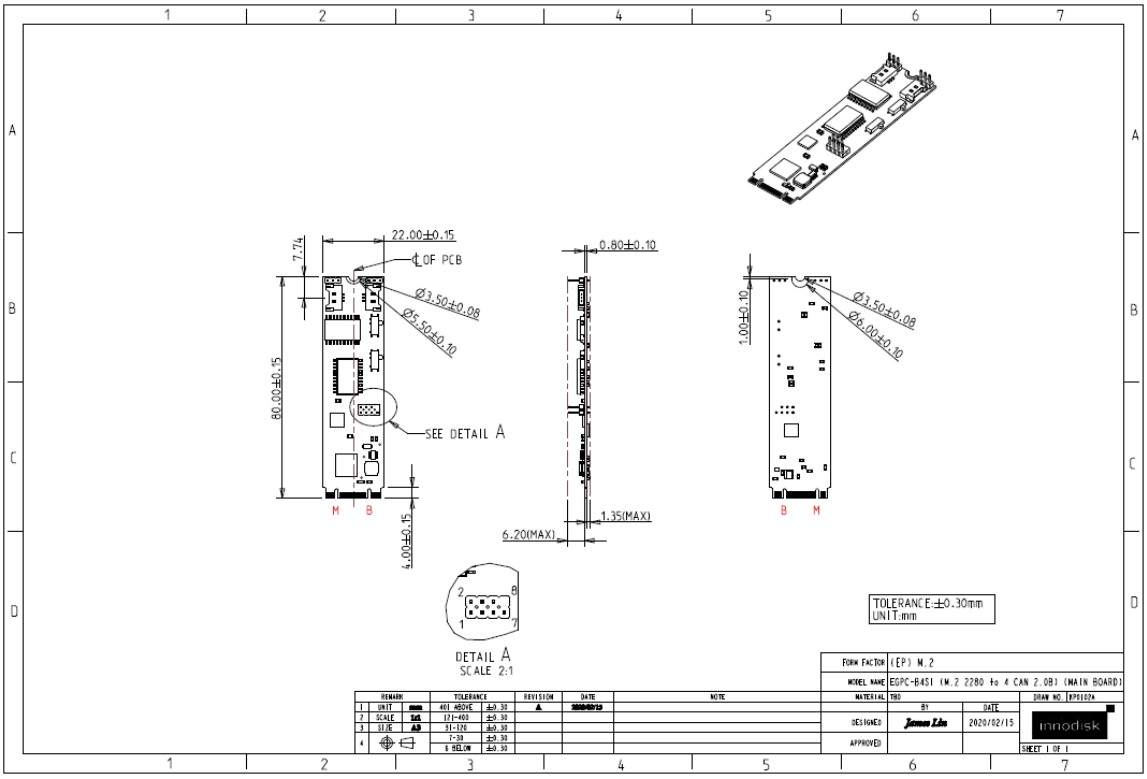

Figure 7: EGPC-B4S1 M.2 Board Drawing

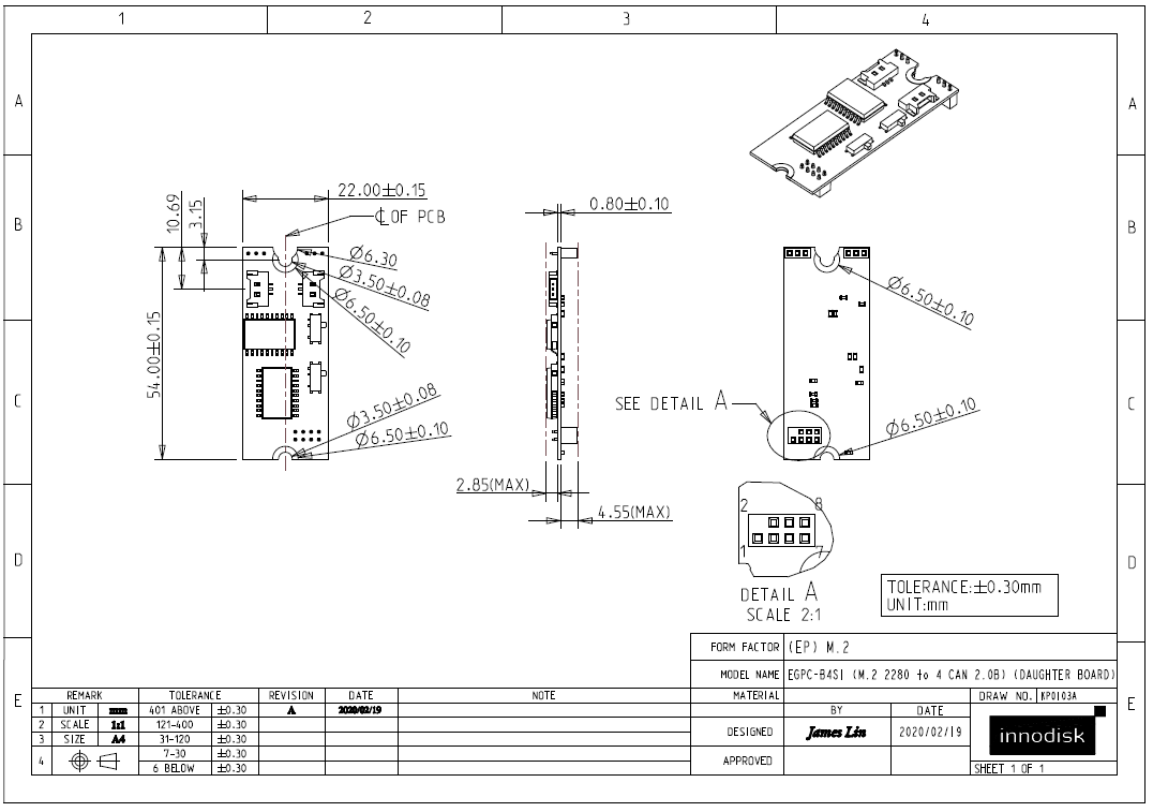

Figure 8: EGPC-B4S1 Daughter Board Drawing

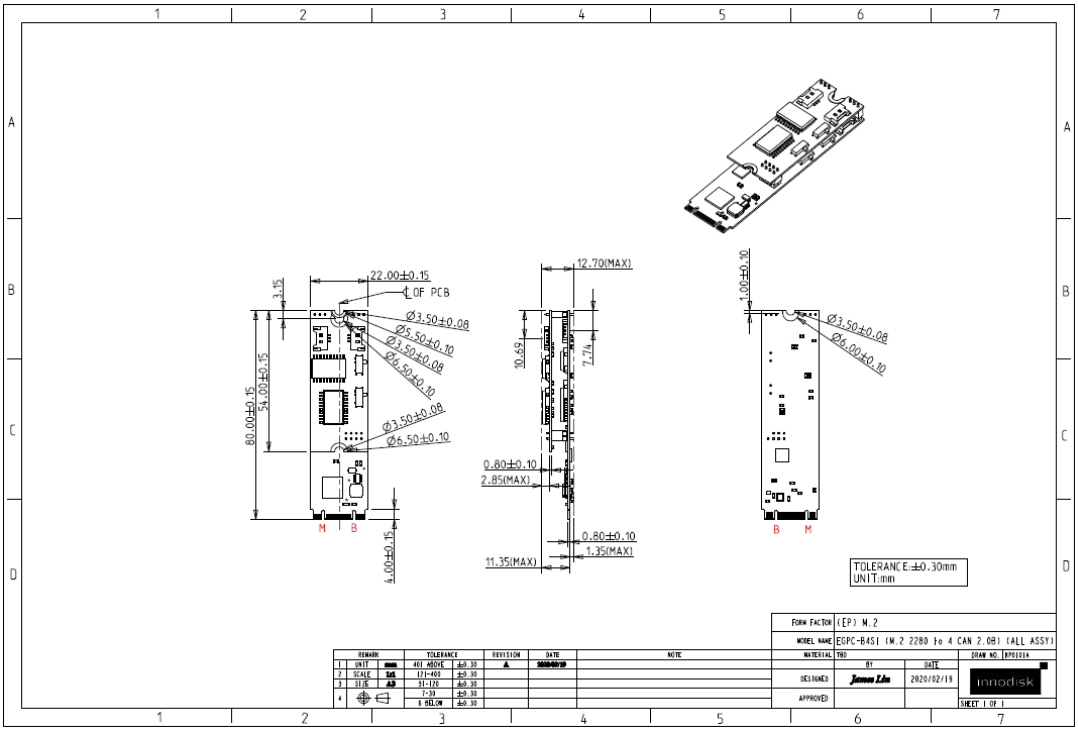

Figure 9: EGPC-B4S1 All Assy Drawing

2.7.5. Cable Mechanical Drawing & Pin Defines

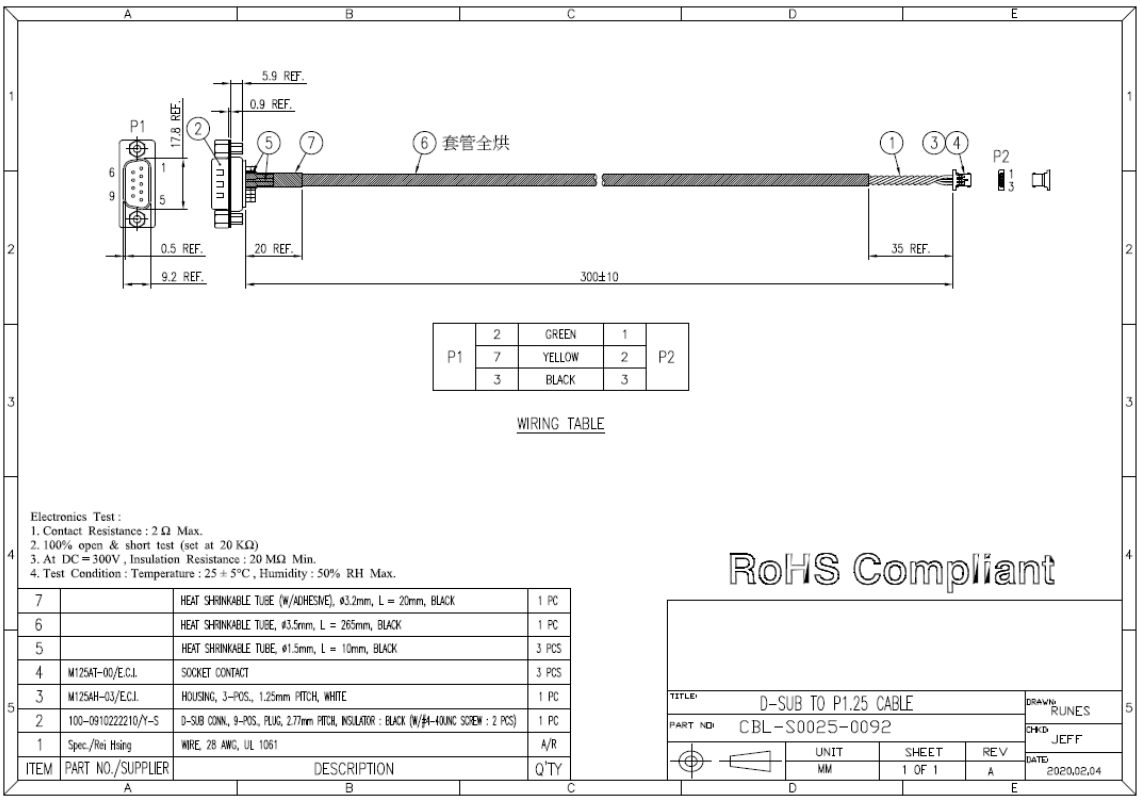

Figure 10: DB9 Cable Drawing

Table 13: DB9 Cable Pin Define

Pin #	1	2	3	4	5	6	7	8	9
Signal Name	NC	CAN-L	GND	NC	NC	NC	CAN-H	NC	NC

2.7.6. Packing List

- EGPC-B4S1 M.2 2280 board x1
- EGPC-B4S1 daughter board x1
- DB9 Cable x4

2.8. Software Support

Windows	7(32/64bit), 8/8.1(32/64bit), 10(32/64bit)
Linux (SocketCAN driver)	Kernel 2.6.38 and above, 32/64bit

3. Installation Guide

Please download driver, software API and user manual from Myinnodisk web site.
https://myinnodisk.innodisk.com/myinnodisk/Login.aspx

4. Appedix

宜鼎國際股份有限公司
Innodisk Corporation

Tel:(02)7703-3000 Fax:(02) 7703-3555 Internet: http://www.innodisk.com/

REACH Declaration of Conformity

Manufacturer Product:All Innodisk EP products

1.宜鼎國際股份有限公司（以下稱本公司）特此保證此售予貴公司之產品，皆符合歐盟化學品法案(Registration , Evaluation and Authorization of Chemicals；REACH)之規定(http://www.echa.europa.eu/de/candidate-list-table **last updated: 15/01/2018**)。所提供之產品包含：(1) 產品或產品所使用到的所有原物料；(2)包裝材料；(3)設計、生產及重工過程中所使用到的所有原物料。

We Innodisk Corporation hereby declare that our products are in compliance with the requirements according to the REACH Regulation (http://www.echa.europa.eu/de/candidate-list-table **last updated: 15/01/2018**). Products include： 1) Product and raw material used by the product； 2) Packaging material ；3) Raw material used in the process of design, production and rework

2.本公司同意因本保證書或與本保證書相關事宜有所爭議時，雙方宜友好協商，達成協議。

InnoDisk Corporation agrees that both parties shall settle any dispute arising from or in connection with this Declaration of Conformity by friendly negotiations.

立 保 證 書 人 (Guarantor)

Company name 公司名稱： InnoDisk Corporation 宜鼎國際股份有限公司

Company Representative 公司代表人： Randy Chien 簡川勝

Company Representative Title 公司代表人職稱： Chairman 董事長

Date 日期： 2018 / 02 / 08

宜鼎國際股份有限公司
Innodisk Corporation
Tel:(02)7703-3000 Fax:(02) 7703-3555 Internet: http://www.innodisk.com/

RoHS 自我宣告書(RoHS Declaration of Conformity)

Manufacturer Product: All Innodisk EP products

一、 宜鼎國際股份有限公司（以下稱本公司）特此保證售予貴公司之所有產品，皆符合歐盟 2011/65/EU 及(EU) 2015/863 關於 RoHS 之規範要求。

Innodisk Corporation declares that all products sold to the company, are complied with European Union RoHS Directive (2011/65/EU) and (EU) 2015/863 requirement.

二、 本公司同意因本保證書或與本保證書相關事宜有所爭議時，雙方宜友好協商，達成協議。

Innodisk Corporation agrees that both parties shall settle any dispute arising from or in connection with this Declaration of Conformity by friendly negotiations.

Name of hazardous substance	Limited of RoHS ppm（mg/kg）
鉛（Pb）	< 1000 ppm
汞（Hg）	< 1000 ppm
鎘（Cd）	< 100 ppm
六價鉻（Cr 6+）	< 1000 ppm
多溴聯苯（PBBs）	< 1000 ppm
多溴二苯醚（PBDEs）	< 1000 ppm
鄰苯二甲酸二(2-乙基己基)酯（DEHP）	< 1000 ppm
鄰苯二甲酸丁酯苯甲酯（BBP）	< 1000 ppm
鄰苯二甲酸二丁酯（DBP）	< 1000 ppm
鄰苯二甲酸二異丁酯（DIBP）	< 1000 ppm

立 保 證 書 人 (Guarantor)

Company name 公司名稱： Innodisk Corporation 宜鼎國際股份有限公司

Company Representative 公司代表人： Randy Chien 簡川勝

Company Representative Title 公司代表人職稱： Chairman 董事長

Date 日期： 2018 / 02 / 08

CERTIFICATE OF CONFORMITY

Equipment	:	CAN BUS Module
Test Model No.	:	E%UC-B#02
Multiple Listing	:	E%UC-B#02
		(%: Form factor: (2: 2.5"SSD, 3:DDR3 DIMM, D:Dongle, G:NGFF_M.2, H:mPCIe Half,L:PCIe Low profile, M:mPCIe,S:SATA,X:Multi,Z:Others)
		#: Output Items: (1:1Port, 2:2Ports, 3:3Ports, 4:4Ports, A~Z:TBD, X:Multi))
Applicant	:	Innodisk Corporation
Test Report No.	:	CE170907D05

We, **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, declare that the equipment above has been tested in our facility and found compliance with the requirement limits of applicable standards, in accordance with the Directive 2014/30/EU. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

EN55032:2015 +AC:2016, Class B

EN 61000-3-2:2014 (Not applicable)

EN 61000-3-3:2013 (Not applicable)

EN 55024:2010

EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0

EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2

EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0 (Not applicable)

EN 61000-4-5:2014 / IEC 61000-4-5:2014 ED. 3.0 (Not applicable)

EN 61000-4-6:2014 / IEC 61000-4-6:2013 ED. 4.0 (Not applicable)

EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0

EN 61000-4-11:2004 / IEC 61000-4-11:2004 ED. 2.0 (Not applicable)

NOTE: The above EN/IEC basic standards are applied with latest version if customer has no special requirement.

Henry Lai / Director

Sep. 18, 2017

No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)

Tel: 886-2-26052180 Fax: 886-2-26051924

http://www.bureauveritas-adt.com E-Mail: service.adt@tw.bureauveritas.com

CERTIFICATE OF CONFORMITY

Equipment	:	CAN BUS Module
Test Model No.	:	E%UC-B#02
Multiple Listing	:	E%UC-B#02 (%: Form factor: (2: 2.5"SSD, 3:DDR3 DIMM, D:Dongle, G:NGFF_M.2, H:mPCIe Half,L:PCIe Low profile, M:mPCIe,S:SATA,X:Multi,Z:Others) #: Output items: (1:1Port, 2:2Ports, 3:3Ports, 4:4Ports, A~Z:TBD, X:Multi))
Applicant	:	Innodisk Corporation
Test Report No.	:	FD170907D05

We, **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, declare that the equipment above has been tested in our facility and found compliance with the requirement limits of applicable standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

47 CFR FCC Part 15, Subpart B, Class B

ICES-003:2016 Issue 6, Class B

ANSI C63.4:2014

Henry Lai / Director
Sep. 18, 2017

No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
Tel: 886-2-26052180 Fax: 886-2-26051924
http://www.bureauveritas-adt.com E-Mail: service.adt@tw.bureauveritas.com

Contact us

Headquarters (Taiwan)

5F., No. 237, Sec. 1, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
Tel: +886-2-77033000
Email: sales@innodisk.com

Branch Offices:

USA

usasales@innodisk.com

+1-510-770-9421

Europe

eusales@innodisk.com

+31-40-3045-400

Japan

jpsales@innodisk.com

+81-3-6667-0161

China

sales_cn@innodisk.com

+86-755-2167-3689

www.innodisk.com

August 27, 2020