

EddyTM means
real-time

Eddy-Serial

User's Guide

Ver 1.0
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Table of Contents

Contents

Table of Contents.....	I
Contents	I
Figures	IV
Tables	V
Chapter 1. Introduction.....	1-1
1.1 About this manual	1-1
1.2 Who should read this manual	1-1
1.3 Contents	1-2
1.4 Eddy Documents	1-2
1.5 Technical Support	1-3
Chapter 2. Getting Started.....	2-1
2.1 Overview	2-1
2.2 Features	2-5
2.3 Package Checklist	2-6
Eddy Package.....	2-6
CD-ROM (Utilities and documents)	2-6
2.4 Applications	2-7
Factory / Industrial Automation	2-7
Home Appliances / Electronic Devices	2-7
Financial / Building Automation	2-7
OEM Device Server Distributors	2-7
Chapter 3. Hardware Description.....	3-1
3.1 Eddy-S1/Pin	3-1
3.1.1 Dimensions	3-2
3.1.2 Pin Specifications.....	3-3
3.1.3 Connection Notes.....	3-6
3.1.4 Serial Interface Selection	3-7
3.1.5 Terminal Resistors	3-8

3.1.6	Terminal Resistor Installation Guide	3-8
3.2	Eddy-S1/TTL	3-9
3.2.1	Dimensions	3-10
3.2.2	Pin Specifications	3-11
3.2.3	Serial Interface Selection	3-16
3.3	Eddy-S1/DB9	3-17
3.3.1	Dimensions	3-18
3.3.2	Pin Specifications	3-19
3.4	Eddy-S2/Pin	3-23
3.4.1	Dimensions	3-24
3.4.2	Pin Specifications	3-25
3.4.3	Serial Interface Selection	3-30
3.5	Eddy-S1/DB9-PoE	3-32
3.5.1	Dimensions	3-33
3.5.2	Pin Specifications	3-34
Chapter 4	Integration	4-1
4.1	Connection Guide	4-1
4.2	First-time Bootup	4-2
4.3	Connecting to Eddy with IP address	4-3
Chapter 5	Configuration via Web	5-1
5.1	Connection	5-1
5.2	Setup Menu	5-2
5.3	Network Settings	5-3
5.4	Serial Settings	5-5
5.5	GPIO Settings	5-10
5.6	Admin Settings	5-12
5.7	Change Password	5-13
5.8	Update Firmware	5-14
5.9	Factory Default	5-15
5.10	Save & Reboot	5-16
Chapter 6	Configuration via Telnet	6-1
6.1	Connection	6-1
6.2	View commands	6-2
6.3	Network commands	6-3
6.4	Serial Commands	6-4
6.5	GPIO commands	6-6

6.6 Username/Password Commands	6-6
6.7 System Commands	6-6
Chapter 7. Appendix.....	7-1
7.1 Firmware Updates	7-1
7.2 Technical Specifications	7-5
7.3 Ordering Information	7-7
7.4 FCC Statement	7-8

Figures

Figure 3-1. Eddy-S1/Pin - Product Picture and Block Diagram	3-1
Figure 3-2. Eddy-S1/Pin Front View	3-2
Figure 3-3. Eddy-S1/Pin Side View	3-2
Figure 3-4. Eddy-S1/TTL - Product Picture and Block Diagram	3-9
Figure 3-5. Eddy-S1/TTL Front View	3-10
Figure 3-6. Eddy-S1/TTL Side View	3-10
Figure 3-7. Eddy-S1/DB9 - Product Picture and Block Diagram	3-17
Figure 3-8. Eddy-S1/DB9 Front View	3-18
Figure 3-9. Eddy-S1/DB9 Side View	3-18
Figure 3-10. Eddy-S2/Pin - Product Picture and Block Diagram	3-23
Figure 3-11. Eddy-S2/Pin Front View	3-24
Figure 3-12. Eddy-S2/Pin Side View	3-24
Figure 3-13. Eddy-S1/DB9-PoE - Product Picture and Block Diagram	3-32
Figure 3-14. Eddy-S1/DB9-PoE Front View	3-33
Figure 3-15. Eddy-S1/DB9-PoE Side View	3-33
Figure 5-1. Eddy Login Page	5-1
Figure 5-2. Main Page	5-2
Figure 5-3. Network Settings Configuration Page	5-3
Figure 5-4. Eddy-S1/DB9, Eddy-S1/DB9-PoE serial communication setting page	5-5
Figure 5-5. Eddy-S1/Pin, S1/TTL, S2/Pin serial communication setting page . .	5-6
Figure 5-6. Eddy-S1/PIN, Eddy-S1/TTL, Eddy-S2/PIN - GPIO Setting Page . .	5-10
Figure 5-7. Eddy-S1/DB9, Eddy-S1/DB9-PoE - GPIO Setting Page	5-11
Figure 5-8. Admin Settings Page	5-12
Figure 5-9. Change Password Setting Page	5-13
Figure 5-10. Update Firmware Setting Page	5-14
Figure 5-11. Factory Default Setting Page	5-15
Figure 5-12. Save & Reboot Setting Page	5-16
Figure 6-1. Connection via Telnet	6-1

Figure 7-1. Firmware updates via FTP	7-1
Figure 7-2. Firmware Update via Telnet	7-2
Figure 7-3. Firmware upgrade via TFTP	7-3
Figure 7-4. Firmware upgrade via TFTP (Command Line)	7-4

Tables

Table 1-1. Eddy Documents	1-2
Table 5-1. Main features of Setup Menu	5-2
Table 5-3. Main features for NMS Configuration	5-4
Table 5-5. Main features for GPIO Settings	5-11
Table 5-6. Main features for Admin Setting	5-12
Table 5-7. Main features for Save & Reboot Save & Reboot	5-16
Table 6-1. View commands	6-2
Table 6-2. Network general configuration commands	6-3
Table 6-3. Network NMS configuration commands	6-3
Table 6-4. Serial commands	6-4
Table 6-5. GPIO commands	6-6
Table 6-6. User/Password configurations	6-6
Table 6-7. System Commands	6-6

Chapter 1. Introduction

SystemBase Embedded Module lineup is composed of largely three categories; The Eddy Serial Series, Eddy-DIO Series and Eddy CPU Series. This manual gives an introduction to the Eddy Serial Series.

1.1 About this manual

This manual includes all necessary information from installation to operating Eddy-Serial Series (Eddy-S1/Pin, Eddy-S1/TTL, Eddy-S1/DB9, Eddy-S2/Pin, Eddy-S1/DB9-PoE). Setting Eddy's configurations, status monitoring, firmware update, and other administration work are also included, H/W level integration and S/W setting information can also be found.

1.2 Who should read this manual

This guide is designed for Eddy-Serial users and administrators. It is strongly recommended that anyone trying to apply, use, and maintain Eddy read this document. It will be a great starting point for any administrator who wants to easily monitor and control Eddy and its connected devices.

1.3 Contents

- Chapter 1. Introduction** is a preface with general information and introductory notices.
- Chapter 2. Getting Started** gives a brief introduction to Eddy series, including features and applications.
- Chapter 3. Hardware Descriptions** explains the layout and pin specifications with block diagram and drawings.
- Chapter 4. Integration** assists you connecting Eddy to serial and network environment. It covers first time boot-up and status check procedures.
- Chapter 5. Configuration via Web** provides ways to configure and to connect Eddy via web browser.
- Chapter 6. Configuration via Telnet** provides commands and its explanation to configure and to connect Eddy via web Telnet.
- Chapter 7. Appendix** provides firmware update guides and detailed technical specifications .

1.4 Eddy Documents

The following table summarizes documents included in the Eddy document set.

Table 1-1. Eddy Documents

Document	Description
User's Guide (Serial, DIO, CPU)	Eddy's Configuration, and Management Information
Programmer's Guide	Programmer's application development guide, including in-depth approach to compiling, linking, creating and uploading firmware API reference is included with a list of available functions for customized application programming
Portview User's Manual	Guide for SystemBase device server management application Portview
COM Port Redirector User Manual	Guide for SystemBase COM Port Redirector

General information on Eddy or embedded device servers can be obtained at our website at <http://www.sysbas.com/>. Latest documents, software and firmware downloads are available.

Other relevant documents are as follows:

Document	Description
Eddy Spec Sheet (Serial, DIO, CPU)	Eddy Specifications
Eddy White Paper	An introductory reading for anyone new to embedded device server. Deals with background, history, market environment, and technology
Eddy Application Notes	Various applications of Eddy presented in diagrams and images

All documents are updated promptly, so check for the recent document updates. The contents in these documents are subject to change without a prior notice.

1.5 Technical Support

You can reach our tech support by following 3 ways;

1. Visit us at <http://www.sysbas.com/> and go to 'Technical Support'menu. FAQ and questions can be reviewed and submitted.
2. E-mail our technical support team to tech@sysbas.com. Any kind of inquiries, requests, and comments are welcomed.
3. Call us at our customer center at 82-2-855-0501 for immediate support.

Our technical support team will kindly help you get over with the problem.

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Homepage: <http://www.sysbas.com/>

Tel: 02-855-0501

Fax: 02-855-0580

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Guro-dong, Guro-gu, Seoul, Korea

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Chapter 2. Getting Started

Welcome to Eddy! This chapter includes Eddy series overview, main and distinctive features, package contents for each product, and application fields.

2.1 Overview

There are 5 modules in Eddy-Serial Series; Eddy-S1/Pin, Eddy-S1/TTL, Eddy-S1/DB9, Eddy-S2/Pin, and Eddy-S1/DB9-PoE.

Each module includes default applications for serial and LAN communication, and supports plug-and-play features. By switching to the custom mode, users can program any application and upload it on to the module. This application then is executed on the module. In order to write and compile programmer's source code, Software Development Kit (SDK) is required. SDK is included in the Development Kit package. Please refer to Programming Guide included in the Development Kit for detailed information on the SDK.

SDK is not necessary for users using Eddy in default presettings.

◆ Eddy-S1/Pin

RJ-45 Ethernet port is included to provide direct connection to network.

For serial communication, RS232/422/485 interface is provided through pin header, and users can easily connect it to either customized connectors or to standard DB9 and DB25 connectors.

External power of 3.3V or 5V can be fed to the module through pin headers.

Please check labeled input voltage on top of the module before supplying power. Improper voltage feed may damage the module.



◆ Eddy-S1/TTL

Pin header interface provides Ethernet connectivity. Users can connect it either to standard RJ-45 port or to any customized LAN interface connector.

For serial communication, RS232/422/485 interface is provided through pin header in 5V TTL signals, and users can implement their own UART controller hardware to convert the signals into RS232/422/485 lines.

External power of 3.3V or 5V can be fed to the module through pin headers.

Please check labeled input voltage on top of the module before supplying power. Improper voltage feed may damage the module.

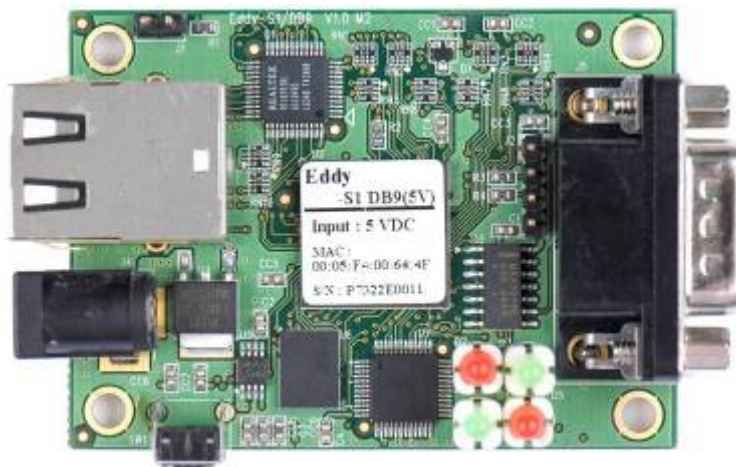


◆ Eddy-S1/DB9

RJ-45 Ethernet port provides direct connection to network.

For serial communication, RS232/422/485 interface is provided through DB9 connector, providing simple connectivity to field devices.

5V DC power input is required for this module proper operate correctly. Please check labeled input voltage on top of the module before supplying power. Improper voltage feed may damage the module.



◆ Eddy-S2/Pin

This module is a 2-serial port version of Eddy-S1/Pin. SystemBase designed UART 16C1054, with large FIFO size of 256 bytes, is used in the module to maximize the performance of serial communication.

External power of 3.3V or 5V can be fed to the module through pin headers.

Please check labeled input voltage on top of the module before supplying power. Improper voltage feed may damage the module.

**◆ Eddy-S1/DB9-PoE**

This module can operate as a powered device (PD), which accepts power input from the twisted pair Category 5 Ethernet cable as specified in IEEE 802.3af Power-over-Ethernet (PoE) standard.

With an auxiliary 5V DC power jack, power supply can be automatically channeled to 5V adaptor when PSE (Power Sourcing Equipment) is out of order. Seamless power supply is guaranteed. PSE power can be used again when the PSE resumes to normal operation.

RS232/422/485 interface is supported in a single module, with a DB9 male connector. RS232/422/485 can be configured with software, including Web or Telnet interface.



◆ Eddy Development Kit (Eddy DK)

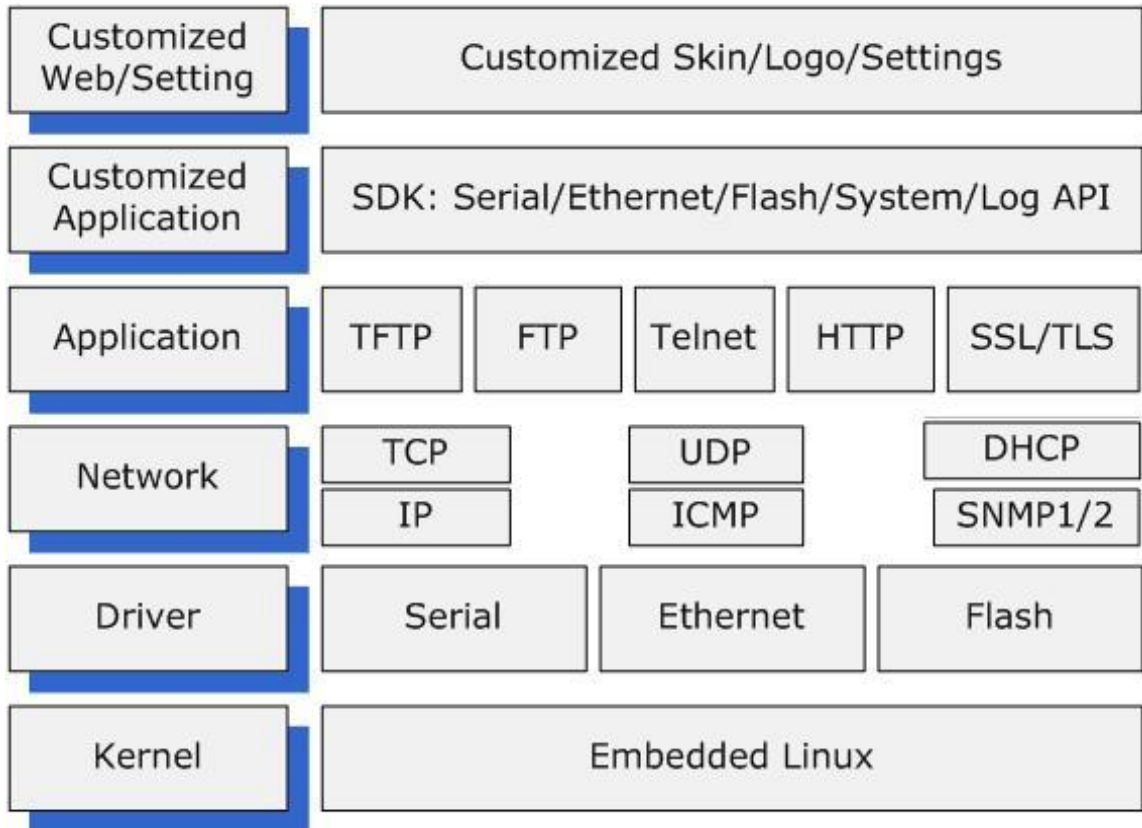
Eddy Development Kit (Eddy DK) helps programmers to test and customizes their own Eddy applications easily. The kit includes evaluation board, all necessary connectors, and programming environment with documentations and guidelines. Please refer to Programming Guide included in the Development Kit for detailed information on the DK.

◆ Selection Guide

	Eddy-S1/Pin-3 Eddy-S1/Pin-5	Eddy-S1/TTL-3 Eddy-S1/TTL-5	Eddy-S1/DB9	Eddy-S1/DB9-PoE	Eddy-S2/Pin-3 Eddy_S2/Pin-5
CPU	ARM940T(168MHz)				
Memory	4MB Flash / 8 MB SDRAM				
Serial Interface	RS232/422/485	TTL	RS232/422/485	RS232/422/485	RS232/422/485
Serial Port	1 * Pin Header	1 * TTL	1 * DB9	1 * DB9	2 * Pin Header
Ethernet Interface	10BASE-T/100BASE-TX				
Ethernet Port	1 * RJ45	1 * TTL	1 * RJ45	1 * RJ45	1 * RJ45
GPIO	4	9	-	-	4
Power Input*	3.3V or 5V pin input	3.3V or 5V pin input	5V power jack	5V power jack or PoE(48V)	3.3V or 5V pin input
Dimensions	55 x 38 mm	50 x 35 mm	62 x 45 mm	70 x 50 mm	62 x 45 mm
Programmability	Yes	Yes	Yes	Yes	Yes

* Power Input indicated as 3.3V or 5V means that there are two different types of modules available (the input is indicated in a label attached on the top of the module)

◆ Eddy Software Architecture



2.2 Features

Various features of Eddy make it a universal yet distinctive embedded solution.

Below lists main features of Eddy Serial Series. Others will explicitly appear throughout this guide.

- Premium-level hardware with ARM9 168MHz CPU, 4MB Flash, and 8MB SDRAM
- Selectable RS232/422/485 interfaces
- Max 921.6Kbps serial speed
- Program and run your own application
- SystemBase SDK and API support for application programming (included in Development Kit)
- Small size to fit in to any hardware
- 10/100Mbps Ethernet port with transformer
- SystemBase COM Port Redirector for better adaptability
- Extensive configuration and monitoring with Portview
- Firmware upload with Web, FTP, and TFTP
- Configuration with Web, Telnet, SNMP, and Portview
- Various customizing options
- Standard Linux environment for openness in executable applications

- Multiple Programmable IO pins for customized applications

2.3 Package Checklist

Eddy package is composed of following components. Make sure every component is included with your package.

Eddy Package

All module packages include a module and a CD with utilities and documents.

- Module 1pc (One among Eddy-S1/Pin, Eddy-S1/TTL, Eddy-S1/DB9, Eddy-S2/Pin, Eddy-S1/DB9-PoE)
- CD-ROM (Utilities and documents)

2.4 Applications

Eddy can be applied to many practical applications in various fields. Some are presented below.

Factory / Industrial Automation

PLC, Robot arms, Human-Machine Interface, Warehouse rails
Medical instruments, Inspection equipment controllers
Alarming units

Home Appliances / Electronic Devices

Power controller, Gaming machines
Scales, Gas detection units, Water & pollution metering devices
Data collection and distribution units

Financial / Building Automation

Card readers, Barcode scanners, Kiosks, Point-Of-Sale related devices
Serial printers, Cash registers, Credit card authorization terminals
Biometric detection units, Security devices

OEM Device Server Distributors

OEM device server with distributor's own case & brand
Ready-to-go device or customized application / setup mode can be inserted

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Chapter 3. Hardware Description

This chapter provides Eddy’s hardware information, including block diagram, layout, pin specifications, dimensions and other hardware-related issues.

3.1 Eddy-S1/Pin

Ethernet LAN port is in RJ-45 form factor to provide direct network connection.

One serial port is provided in pin header interface, configurable to use any of RS232/422/485. Pins can be connected to any kind of external serial interface of user’s preference.

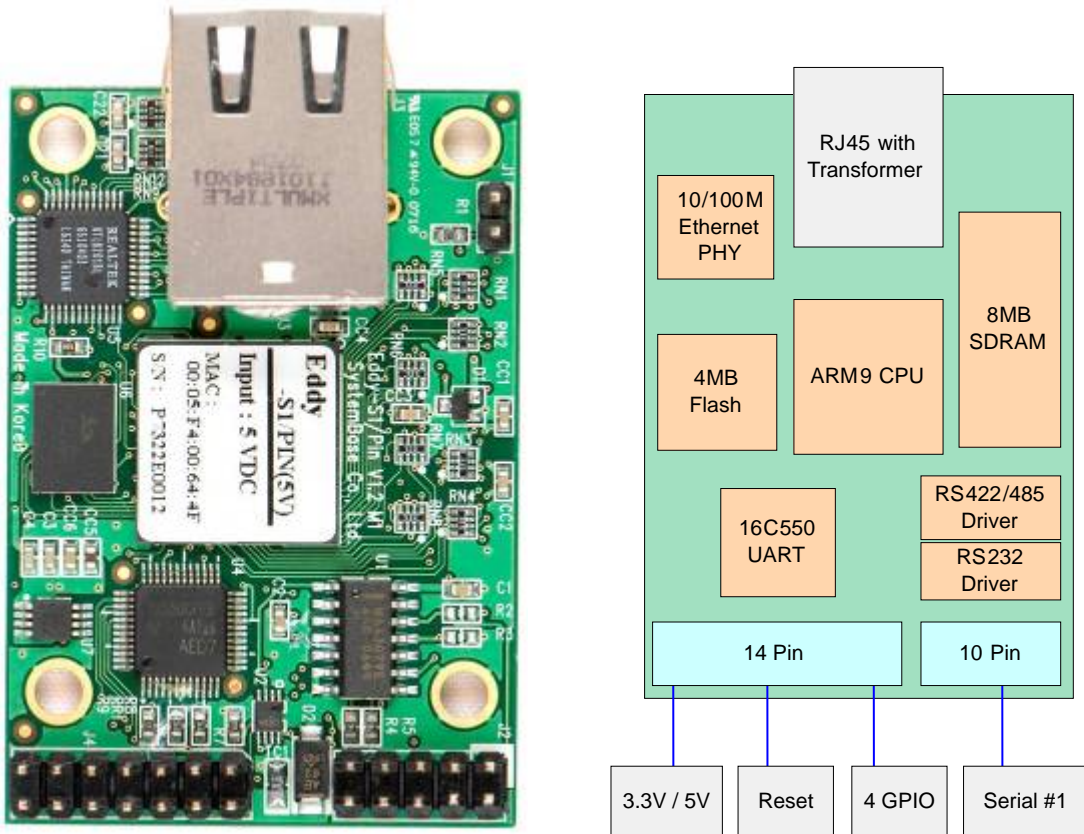


Figure 3-1. Eddy-S1/Pin - Product Picture and Block Diagram

3.1.1 Dimensions

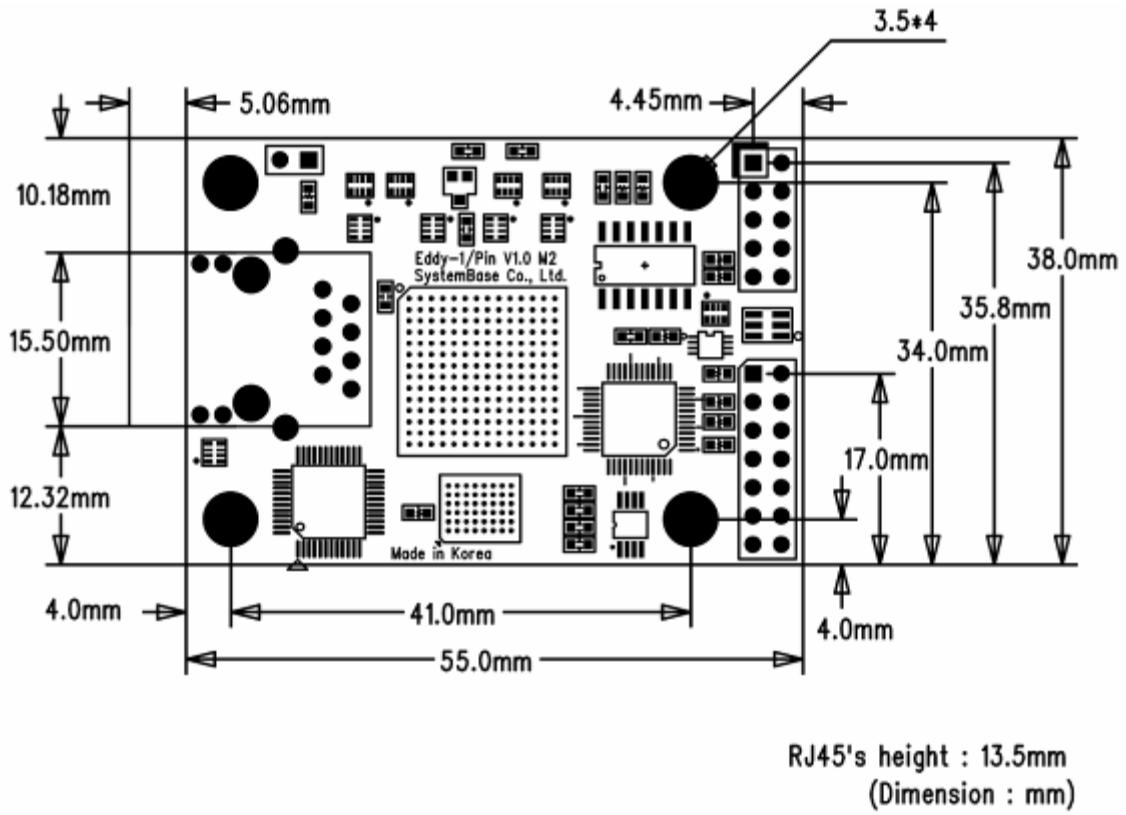


Figure 3-2. Eddy-S1/Pin Front View

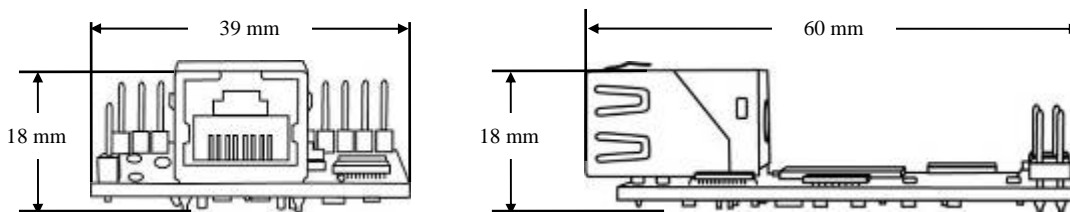
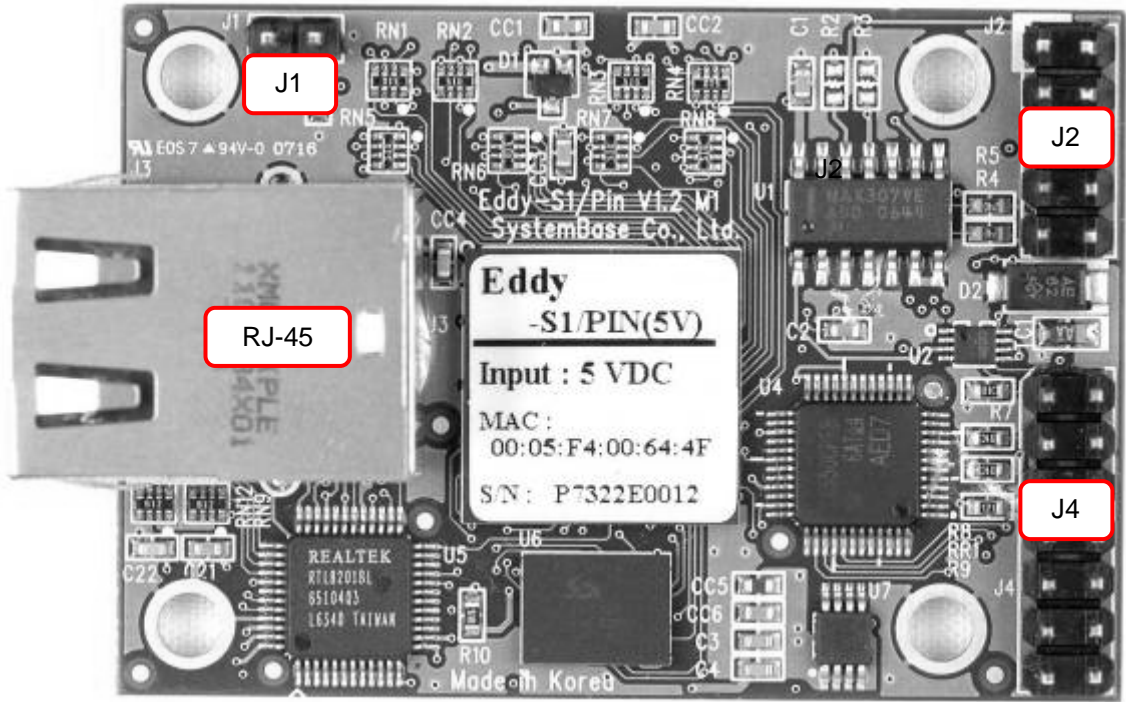


Figure 3-3. Eddy-S1/Pin Side View

3.1.2 Pin Specifications

Pin Specification and its usages are as follows.

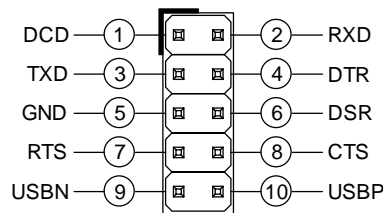


◆ J1

Used only for development purposes. (Please refer to the Programmer’s Guide for details)

◆ J2

Serial 10-pin header connector



◇ J2 : RS232

Pin	Signal	Description
1	DCD	Data Carrier Detection (Input)
2	RXD	Receive Data (Input)
3	TXD	Transmit Data (Output)
4	DTR	Data Terminal Ready (Output)
5	GND	Ground

Pin	Signal	Description
6	DSR	Data Set Ready (input)
7	RTS	Request to Send (Output)
8	CTS	Clear to Send (Input)
9	USBN	Differential data negative on USB port (Used only for development purposes)
10	USBP	Differential data positive on USB port (Used only for development purposes)

◇ J2 : RS422 Full Duplex

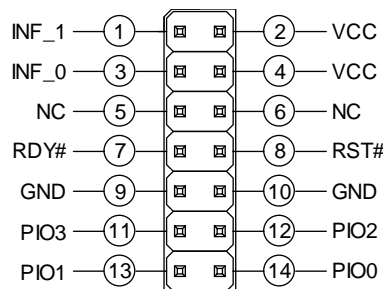
Pin	Signal	Description
2	RXD+	Receive differential data positive (Input)
3	TXD+	Transmit differential data positive (Output)
6	RXD-	Receive differential data negative (input)
7	TXD-	Transmit differential data negative (Output)

◇ J2 : RS485 Half Duplex

Pin	Signal	Description
3	TRX+	Transmit/Receive differential data positive
7	TRX-	Transmit/Receive differential data negative

◆ J4

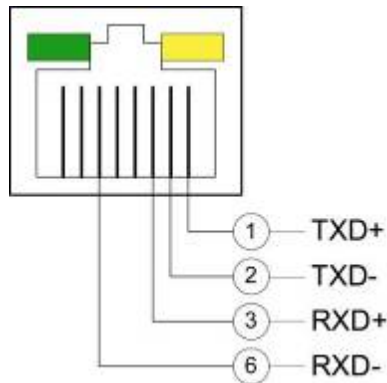
14-pin header connector



Pin	Signal	Description
1	INF_1	Serial Interface Select 1 Serial interface can be set up in combination with INF_0. When RS232, INF[1:0] = '00', When RS422, INF[1:0] = '01', When RS422, INF[1:0] = '10' (Make sure that '0' is connected to either open or GND, while '1' is connected to 3.3V)
2	VCC	Make sure that correct input voltage is provided. (Two types of model ,5V and 3.3V modules are available)
3	INF_0	Serial Interface Select 0 Serial interface can be set up in combination with INF_1.
4	VCC	Eddy-S1/Pin-3 requires DC 3.3V power supply Eddy-S1/Pin-5 requires DC 5V power supply (Two types of model ,5V and 3.3V modules are available)
5	NC	No Connection
6	NC	No Connection
7	RDY#	Ready indicator (Active low output) Processor status can be indicated, when connected as below. <div style="text-align: center;"> </div>
8	RST# *	Connection to external reset switch (Input) As reset logic is built-in, this pin can be connected directly to the switch without any additional circuit.
9	GND	Ground
10	GND	Ground
11	PIO3	Programmable I/O 3 (user-defined I/O)
12	PIO2	Programmable I/O 2 (user-defined I/O)
13	PIO1	Programmable I/O 1 (user-defined I/O)
14	PIO0	Programmable I/O 0 (user-defined I/O)

※Eddy-S1/Pin V1.0 users must connect 3.3V input to RST# pin.

◆ RJ-45 Ethernet



Pin	Signal	Description
1	TXD+	Transmit Data +
2	TXD-	Transmit Data -
3	RXD+	Receive Data +
6	RXD-	Receive Data -
LED		Description
	Left Green	On: 100Base-TX Link is available Blinking: Data is transmitted or received.
	Right Yellow	On: 10Base-T Link is available Blinking: Data is transmitted or received.

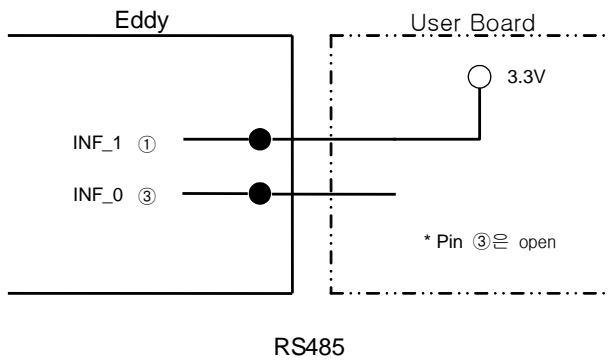
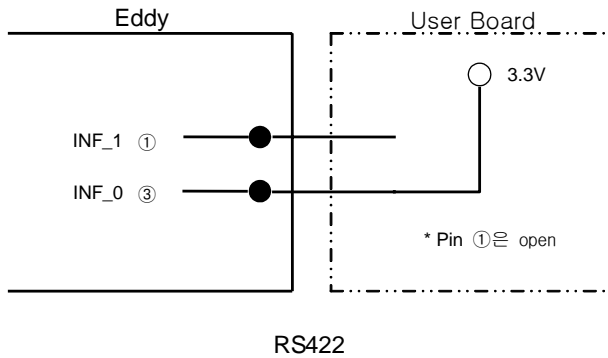
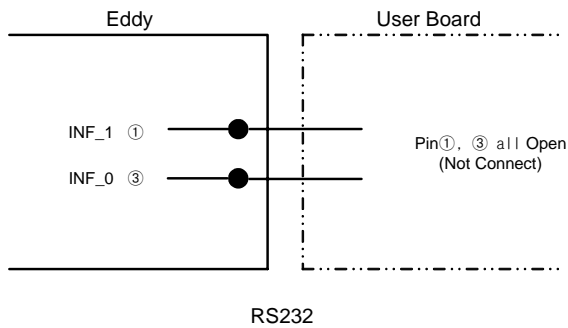
3.1.3 Connection Notes

Eddy-S1/Pin V1.0 users must connect 3.3V, GND, and RST# pins to ensure a proper connection. RST# (Reset) pin needs to be supplied with high signal at normal operation, and after longer than 200ms of low signal, the module will be reset. In order to implement reset function in Eddy, you must turn the switch ON and supply input power.

3.1.4 Serial Interface Selection

Eddy-S1/Pin supports hardware configuration of RS232 / RS422 / RS485, and each interface can be configured by a combination of INF_1 and INF_0 signals.

Serial	INF_1	INF_0
RS232	Low	Low
RS422 Full Duplex	Low	High
RS485 Half Duplex	High	Low



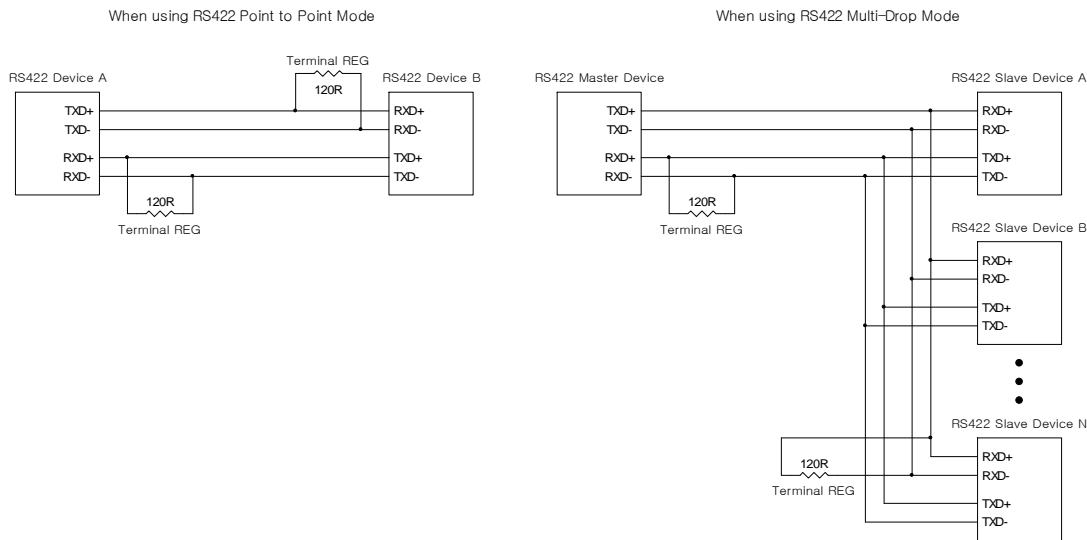
3.1.5 Terminal Resistors

Terminal Resistors are installed in RS422 or RS485 communication to prevent noise and distortion of long distance data transfer. They help by matching impedance in communication line, and normally 120 ohm resistors are used. The decision to use terminal resistor lies with the user, and one may choose to either install or not install terminal resistors in RS422 or RS485 mode. Installation can be done by connecting RX+ and RX- pin on J2 pin header to the resistor if in RS422 mode, or TRX+ and TRX- pin in RS485 mode.

3.1.6 Terminal Resistor Installation Guide

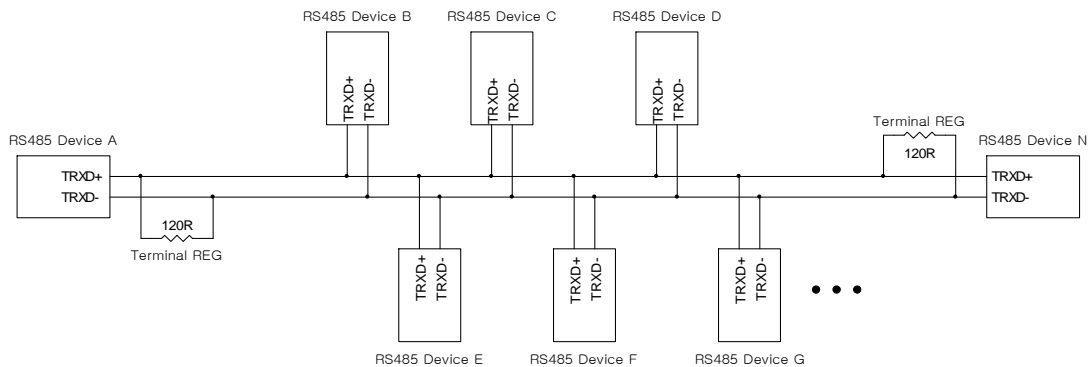
◆ RS422

Install terminal resistors at each end (terminal)



RS485

Install terminal resistors only at each end (not in the middle ones in Multi-Drop structure)



3.2 Eddy-S1/TTL

Ethernet LAN port is provided in pin header. Users can connect these pins either directly to Ethernet device interface or to RJ-45 connector.

One serial port is provided in TTL interface, and users can attach these pins to their UART controller to implement RS232/422/485 communication.

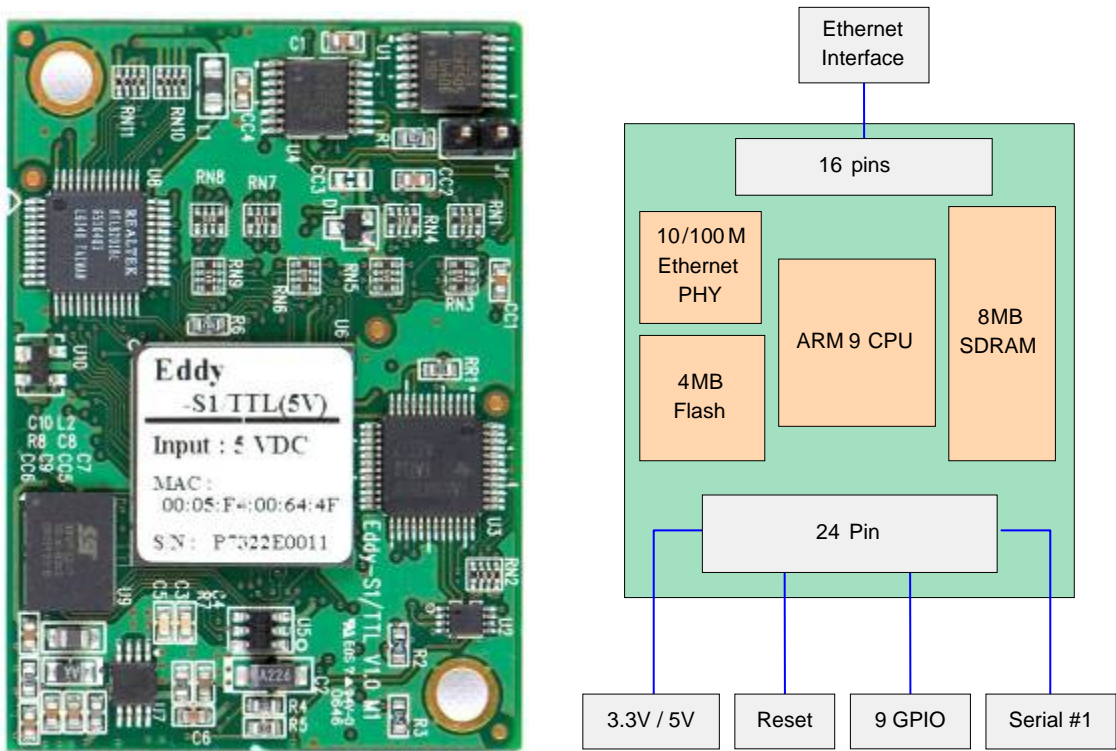


Figure 3-4. Eddy-S1/TTL - Product Picture and Block Diagram

3.2.1 Dimensions

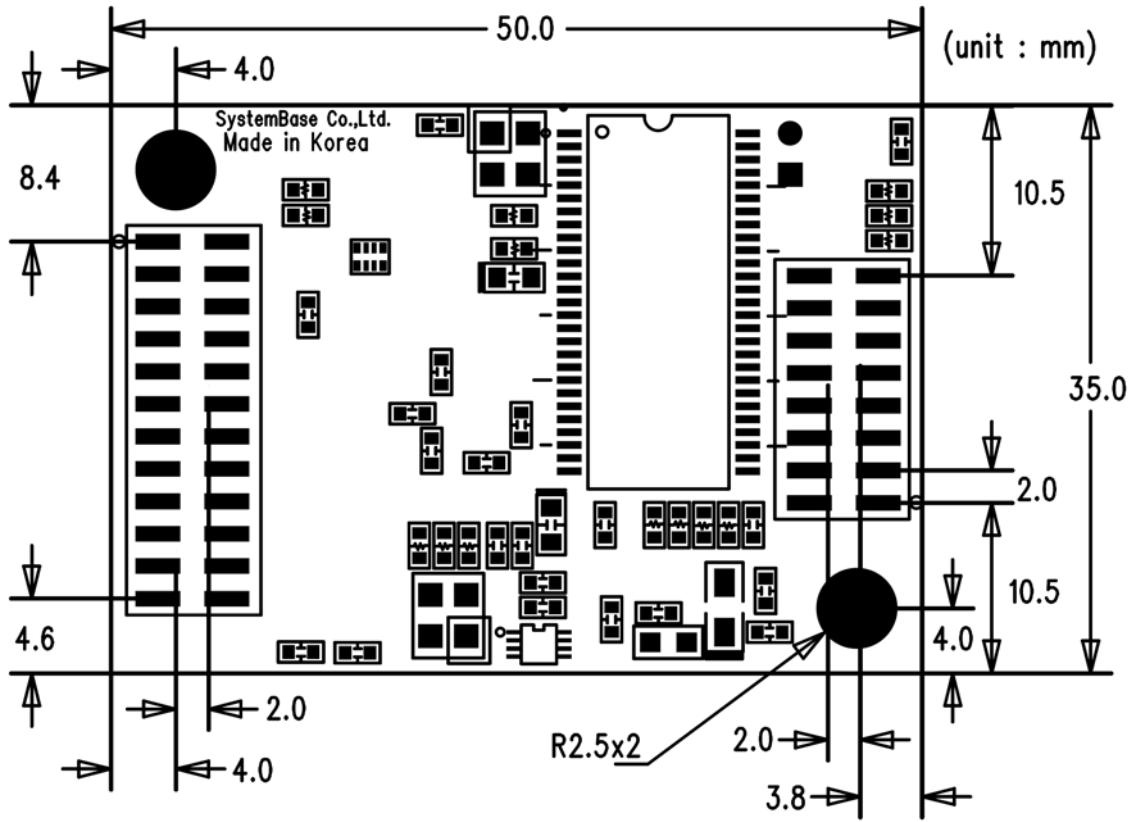


Figure 3-5. Eddy-S1/TTL Front View

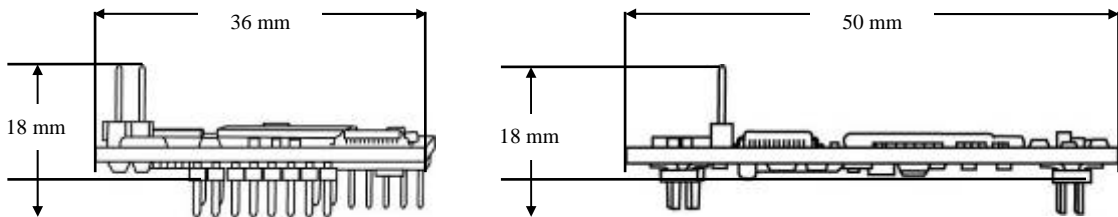
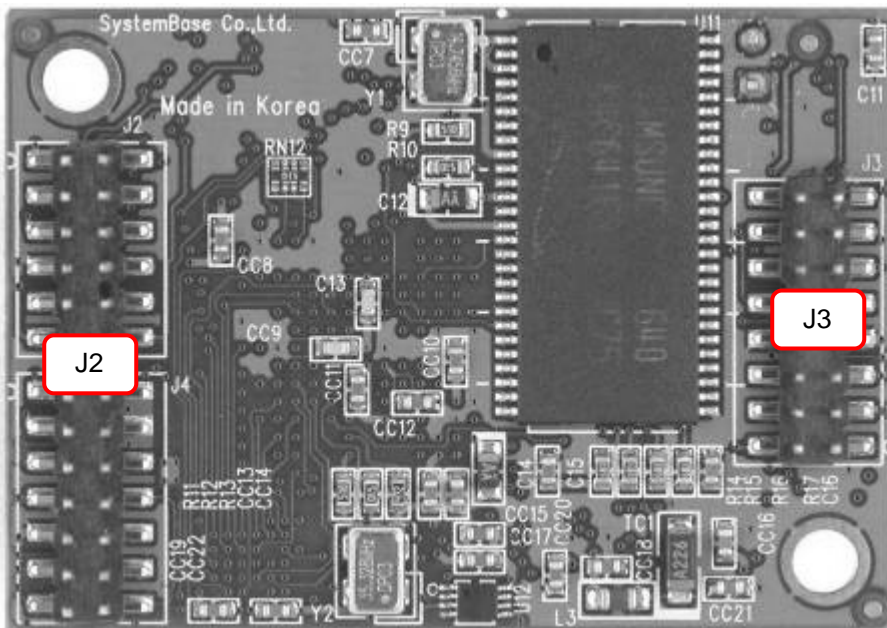
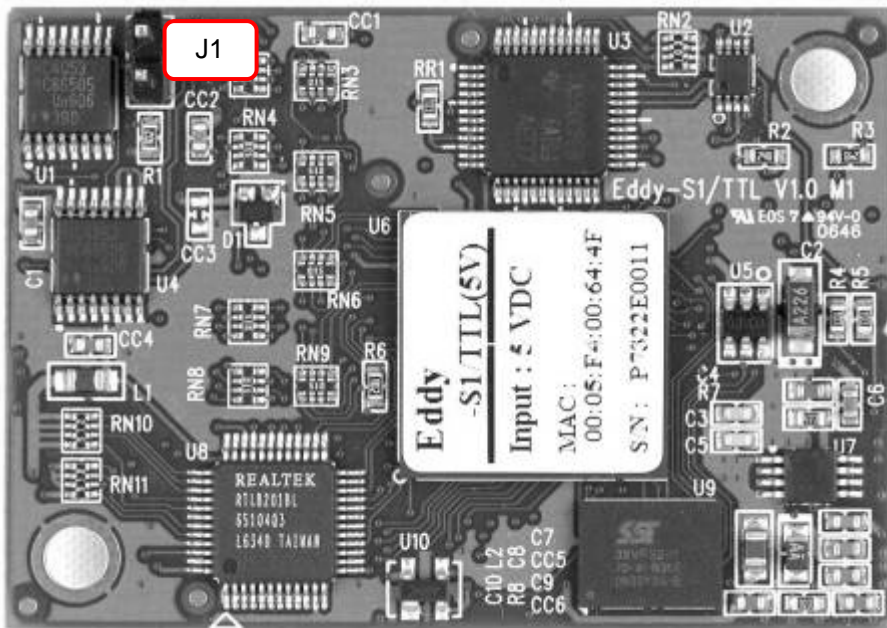


Figure 3-6. Eddy-S1/TTL Side View

3.2.2 Pin Specifications

Pin Specification and its usages are as follows

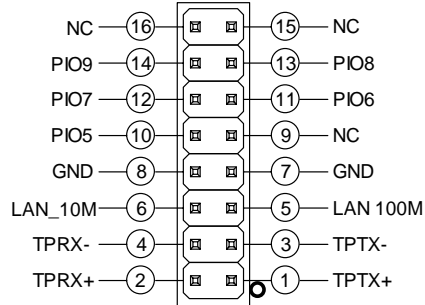


◆ J1

Used only for development purposes. (Please refer to the Programmer's Guide for details)

◆ J2

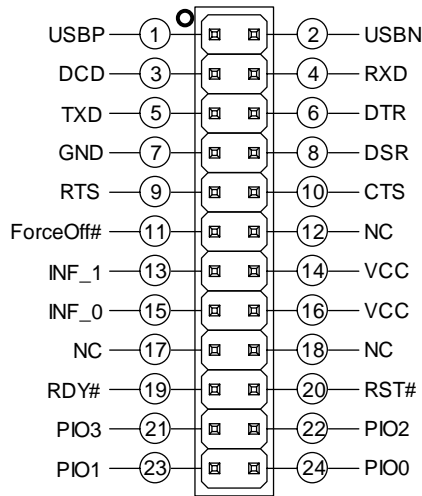
Ethernet & GPIO header connector



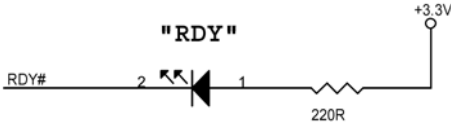
Pin	Signal	Description
GPIO1	TPTX+	Transmit Data(+) from the PHY chip When implementing Ethernet, transformer and RJ45 connector need to be implemented separately.
GPIO2	TPRX+	Receive Data(+) from the PHY chip When implementing Ethernet, transformer and RJ45 connector need to be implemented separately.
GPIO3	TPTX-	Transmit Data(-) from the PHY chip When implementing Ethernet, transformer and RJ45 connector need to be implemented separately.
GPIO4	TPRX-	Receive Data(-) from the PHY chip When implementing Ethernet, transformer and RJ45 connector need to be implemented separately.
LAN5	LAN 100M	LED signal associated with the PHY chip embedded in the module On: 100Base-TX Link is available Blinking: Data is transmitted or received.
LAN6	LAN 10M	LED signal associated with the PHY chip embedded in the module On: 10Base-T Link is available Blinking: Data is transmitted or received.
7	GND	Ground
8	GND	Ground
9	NC	No Connection
10	GPIO5	Programmable I/O 5
11	GPIO6	Programmable I/O 6
12	GPIO7	Programmable I/O 7
13	GPIO8	Programmable I/O 8
14	GPIO9	Programmable I/O 9
15	NC	No Connection
16	NC	No Connection

◆ J3

Serial 24-pin Connector



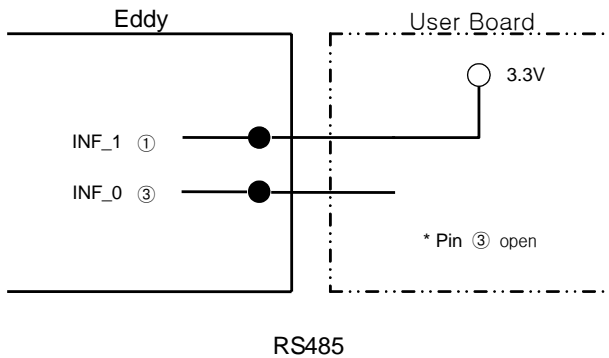
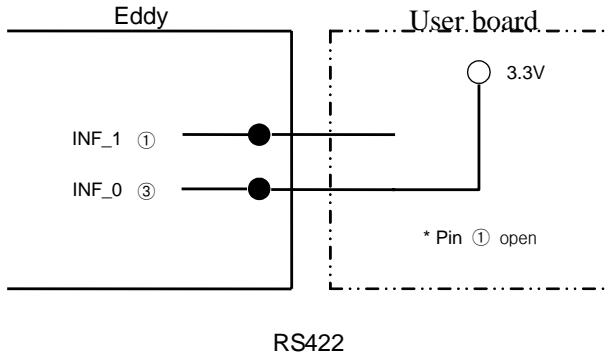
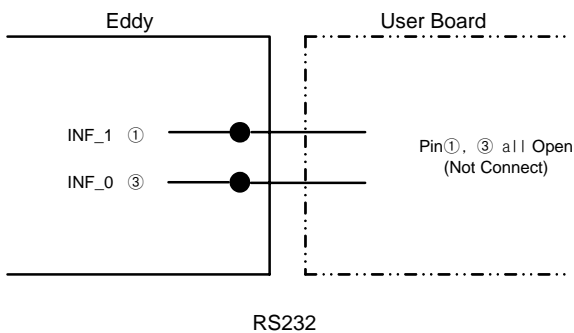
Pin	Signal	Description
1	USBP	Differential data positive for USB port (Used only for development purposes)
2	USBN	Differential data negative for USB port (Used only for development purposes)
3	DCD	UART Data Carrier Detection (Input)
4	RXD	UART Receive Data (Input)
5	TXD	UART Transmit Data (Output)
6	DTR	UART Data Terminal Ready (Output)
7	GND	Ground
8	DSR	UART Data Set Ready (input)
9	RTS	UART Request to Send (Output)
10	CTS	UART Clear to Send (Input)
11	ForceOff#	RS232 Driver IC shutdown signal Used only when RS232/RS422/RS485 IC needs to be implemented on a single board. (Applicable only to ICs with Shutdown function).
12	NC	No Connection

Pin	Signal	Description
13	INF_1	<p>Serial Interface Select 1 Serial interface can be set up in combination with INF_0 (pin 15) When RS232, INF[1:0] = '00', When RS422, INF[1:0] = '01', When RS422, INF[1:0] = '10' (Make sure that '0' is connected to either open or GND, while '1' is connected to 3.3V)</p>
14	VCC	Make sure that correct input voltage is provided. (Two types of model ,5V and 3.3V modules are available)
15	INF_0	<p>Serial Interface Select 0 Serial interface can be set up in combination with INF_1.</p>
16	VCC	Eddy-S1/TTL-3 requires DC 3.3V power supply Eddy-S1/TTL-5 requires DC 5V power supply (Two types of model ,5V and 3.3V modules are available)
17	NC	No Connection
18	NC	No Connection
19	RDY#	<p>Ready indicator (Active low output) Processor status can be indicated, when connected as below.</p> 
20	RST#	Connected to external reset switch (Input) As reset logic is built-in, this pin can be connected directly to the switch without any additional circuit..
21	PIO3	Programmable I/O 3 (user-defined I/O)
22	PIO2	Programmable I/O 2 (user-defined I/O)
23	PIO1	Programmable I/O 1 (user-defined I/O)
24	PIO0	Programmable I/O 0 (user-defined I/O)

3.2.3 Serial Interface Selection

Since serial signals are provided in TTL level, UART controller or line driver circuit must be implemented to enable communication in RS242/422/485. Please note that the serial interface is determined by the combination of INF_1 and INF_0 pins.

Serial	INF_1	INF_0
RS232	Low	Low
RS422 Full Duplex	Low	High
RS485 Half Duplex	High	Low



3.3 Eddy-S1/DB9

Ethernet LAN port is in RJ-45 form factor to provide direct network connection. One serial port is provided in DB9 interface with configurable RS232/422/485. The serial interface can be configured by software, through web configuration interface.

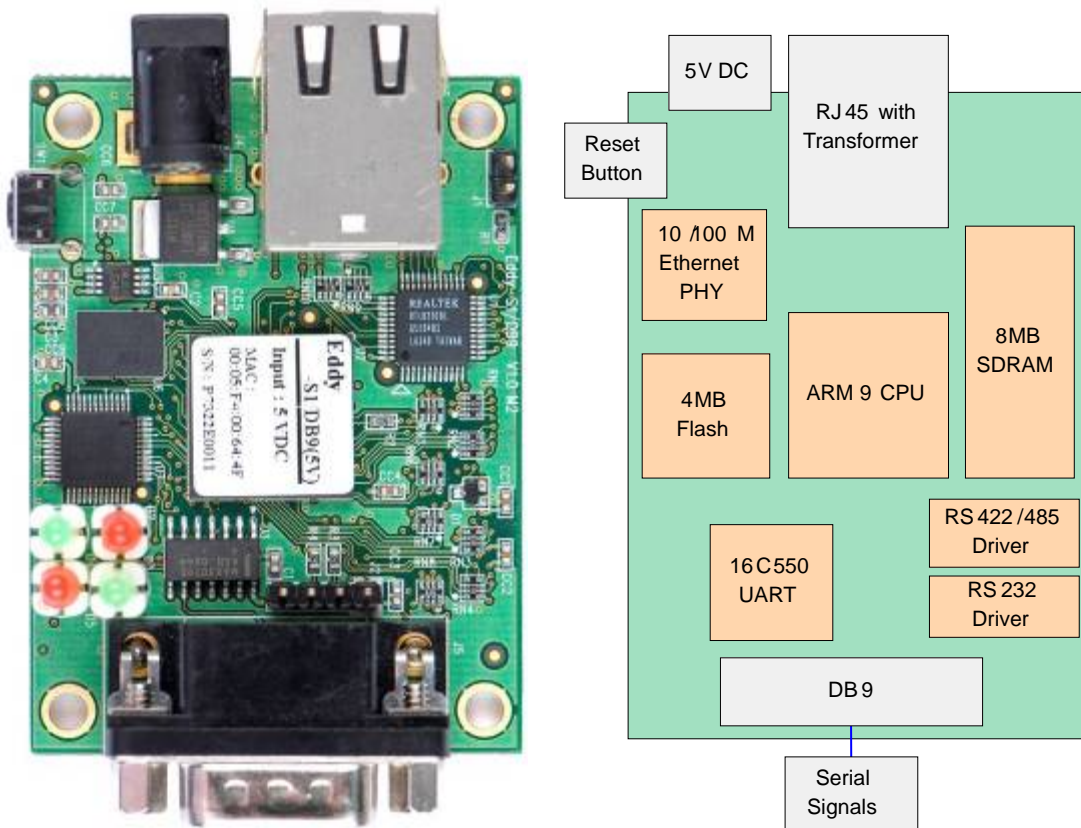


Figure 3-7. Eddy-S1/DB9 - Product Picture and Block Diagram

3.3.1 Dimensions

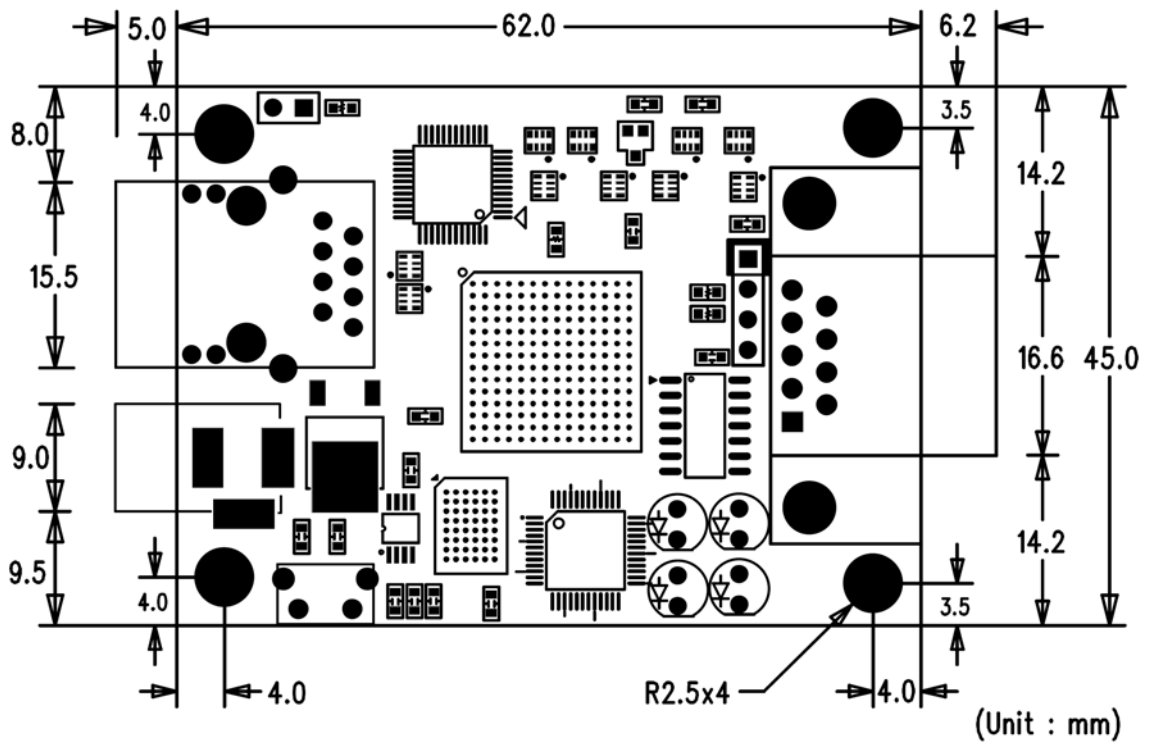


Figure 3-8. Eddy-S1/DB9 Front View

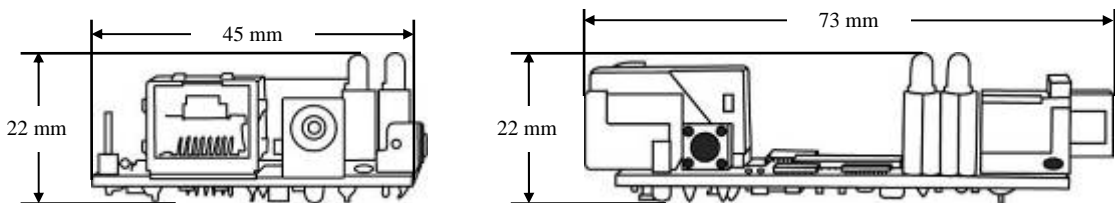
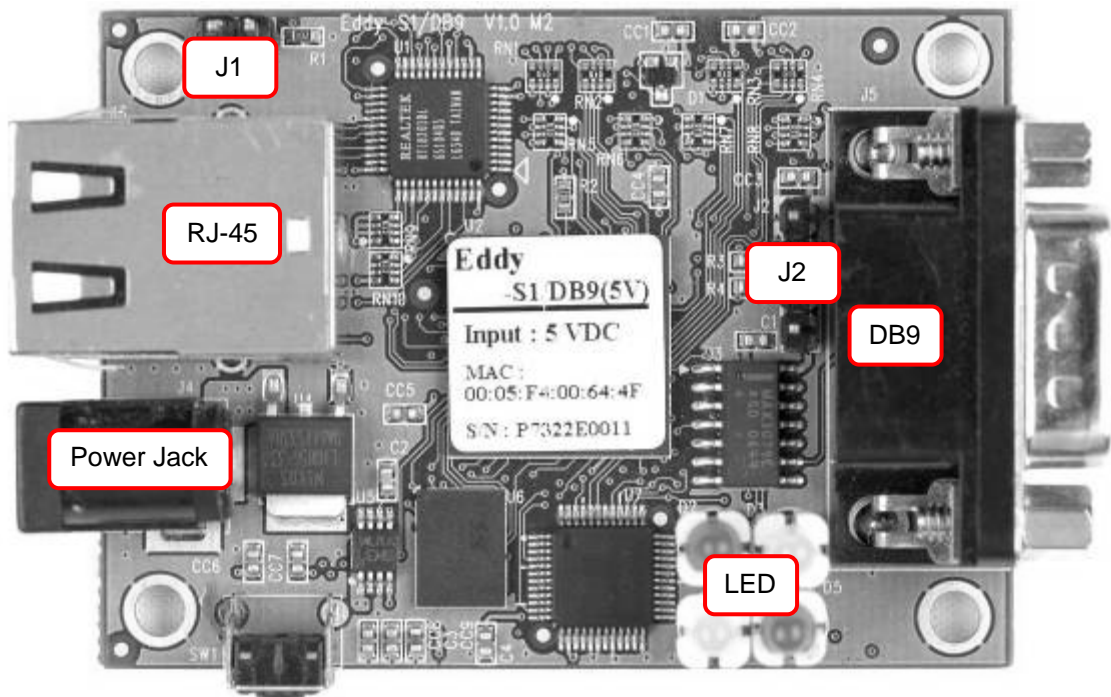


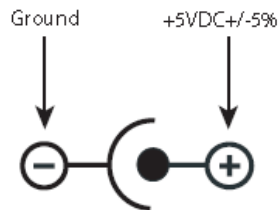
Figure 3-9. Eddy-S1/DB9 Side View

3.3.2 Pin Specifications

Pin Specification and its usages are as follows



◆ Power JACK



Contact	Polarity
Center	+5VDC ± 5%(over 400mA)
Outer	Ground

◆ J1

Used only for development purposes. (Please refer to the Programmer's Guide for details)

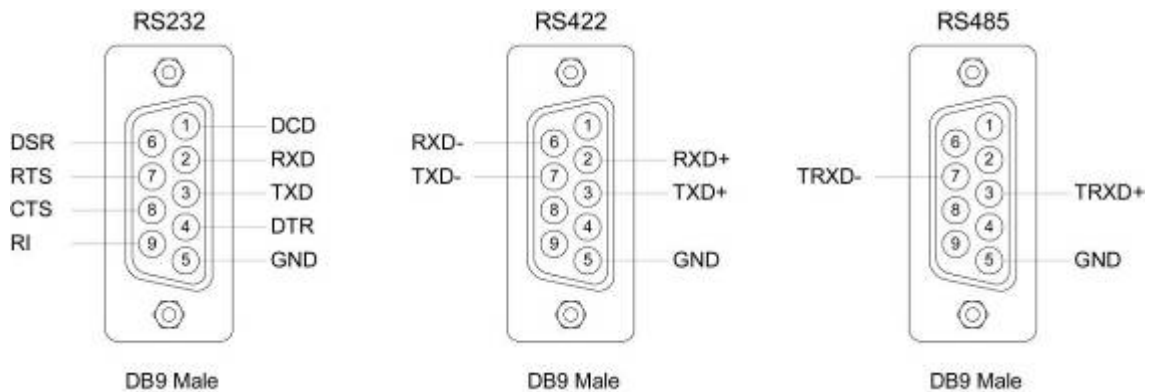
◆ J2

USB Connector

Pin	Signal	Description
1	NC	No Connection
2	USBN	USB port 의 differential data negative (Used only for development purposes)
3	USBP	USB port 의 differential data positive (Used only for development purposes)
4	GND	Ground

◆ DB9

Serial Connector



◆ RS232

Pin	Signal	Description
1	DCD	Data Carrier Detection (Input)
2	RXD	Receive Data (Input)
3	TXD	Transmit Data (Output)
4	DTR	Data Terminal Ready (Output)
5	GND	Ground
6	DSR	Data Set Ready (input)
7	RTS	Request to Send (Output)

Pin	Signal	Description
8	CTS	Clear to Send (Input)
9	RI	Ring Indicator (Input)

◆ RS485 Half Duplex

Pin	Signal	Description
3	TRX+	Transmit/Receive differential data positive
7	TRX-	Transmit/Receive differential data negative

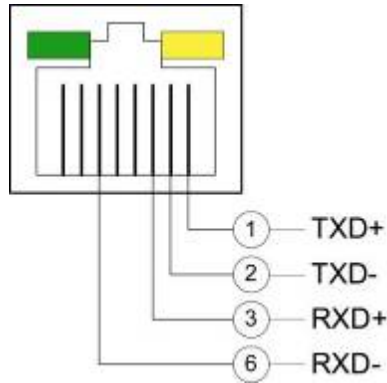
◆ RS422 Full Duplex

Pin	Signal	Description
2	RXD+	Receive differential data positive (Input)
3	TXD+	Transmit differential data positive (Output)
6	RXD-	Receive differential data negative (input)
7	TXD-	Transmit differential data negative (Output)

◆ LED

Pin	Signal	Description
1	POWER	LED ON when power is on
2	READY	Indicates the processor status
3	TXD	LED ON when serial data is transmitted
4	RXD	LED ON when serial data is received.

◆ RJ-45 Port



Pin	Signal	Description
1	TXD+	Transmit Data +
2	TXD-	Transmit Data -
3	RXD+	Receive Data +
6	RXD-	Receive Data -
LED		Description
	Left Green	On: 100Base-TX Link is available Blinking: Data is transmitted or received.
	Right Yellow	On: 10Base-T Link is available Blinking: Data is transmitted or received.

3.4 Eddy-S2/Pin

Ethernet LAN port is in RJ-45 form factor to provide direct network connection. Two serial ports are provided in pin header interface, each configurable to use any of RS232/422/485. Pins can be connected to any kind of external serial interface of user's preference.

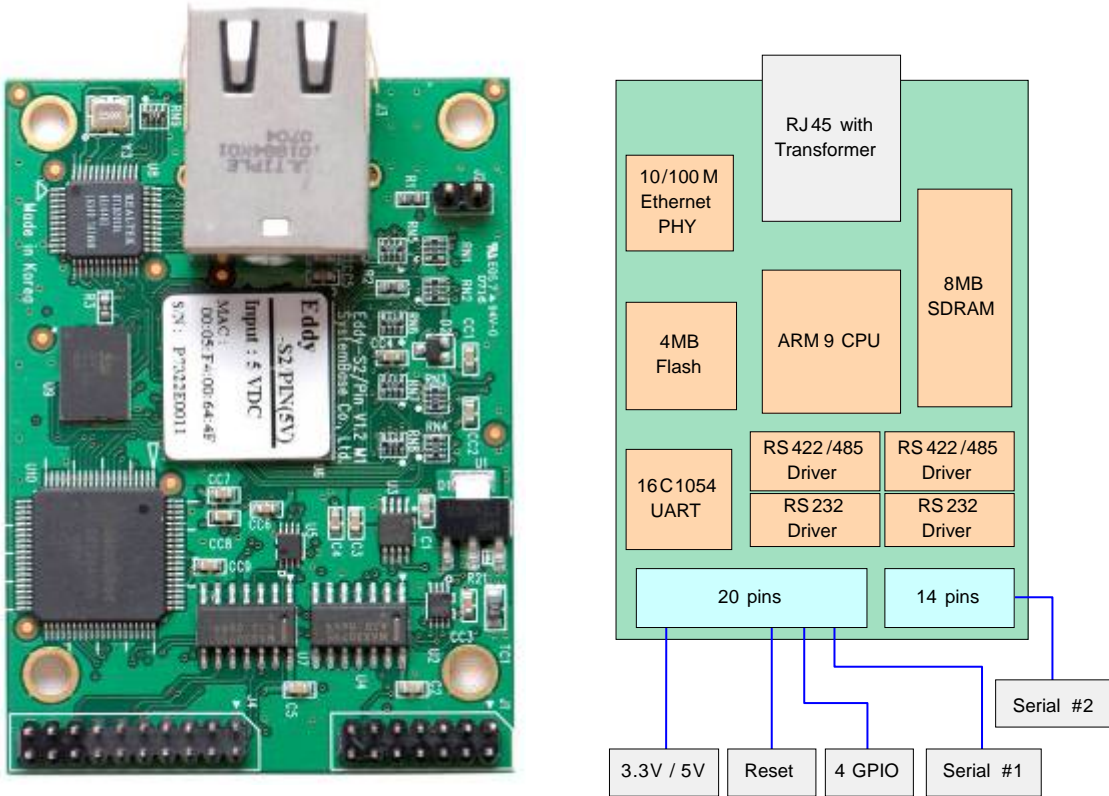


Figure 3-10. Eddy-S2/Pin - Product Picture and Block Diagram

3.4.1 Dimensions

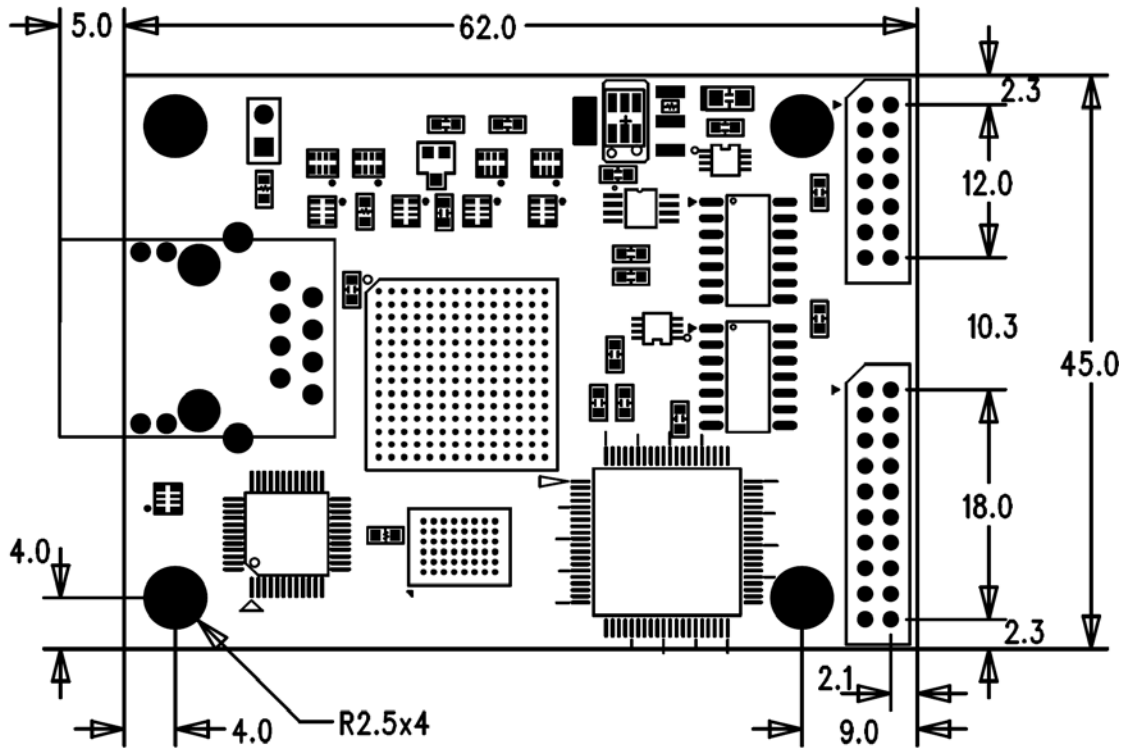


Figure 3-11. Eddy-S2/Pin Front View

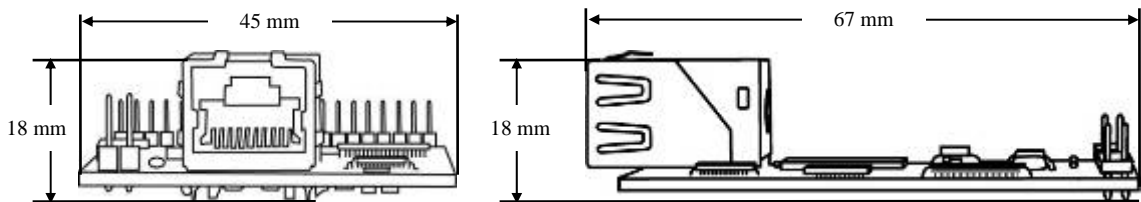
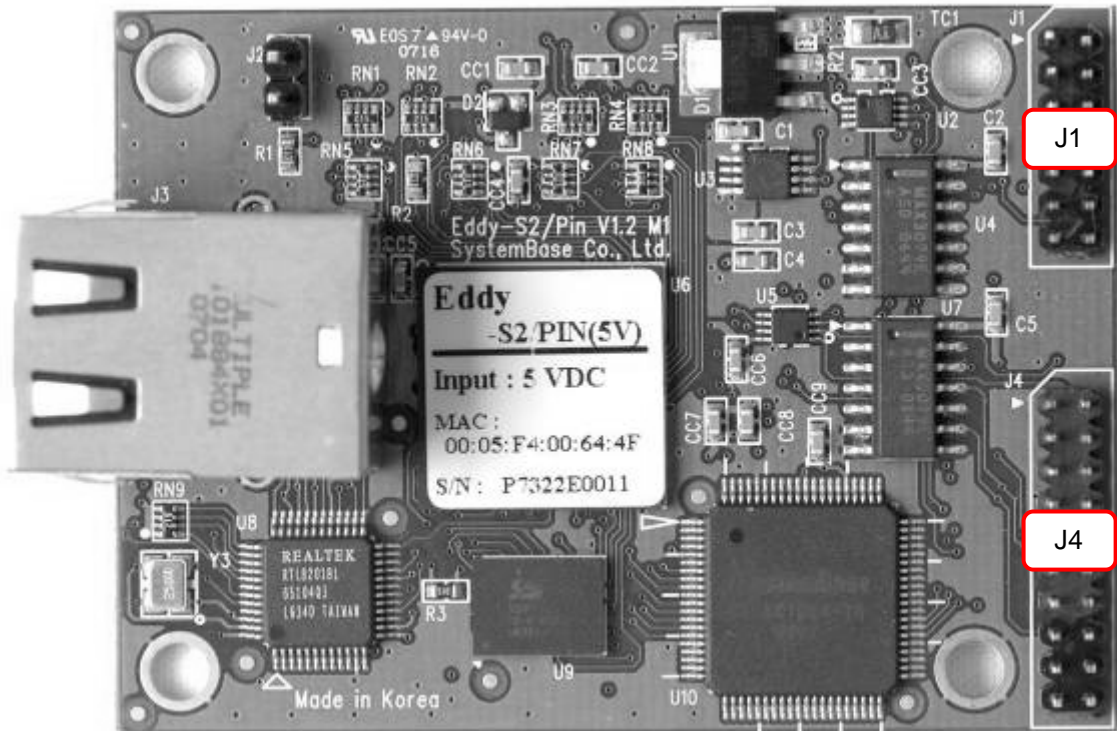


Figure 3-12. Eddy-S2/Pin Side View

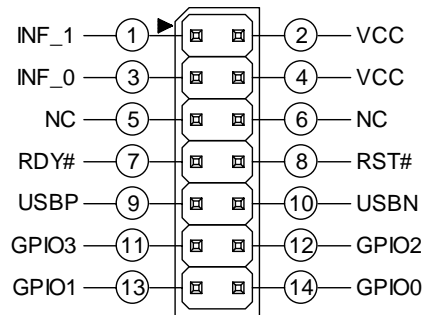
3.4.2 Pin Specifications

Pin Specification and its usages are as follows.




◆ J1

14-pin header connector (2mm pin pitch)

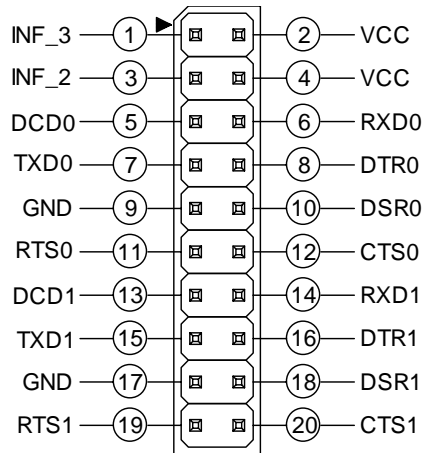


Pin	Signal	Description
1	INF_1	Serial Interface Select 1 Serial interface can be set up in combination with INF_0 (pin 3) When RS232, INF[1:0] = '00' When RS422, INF[1:0] = '01' When RS422, INF[1:0] = '10'

Pin	Signal	Description
		(Make sure that '0' is connected to either open or GND, while '1' is connected to 3.3V)
2	VCC	Make sure that correct input voltage is provided. (Two types of model ,5V and 3.3V modules are available)
3	INF_0	Serial Interface Select 0 Serial interface can be set up in combination with INF_1.
4	VCC	Eddy-S2/Pin-3 requires DC 3.3V power supply Eddy-S2/Pin-5 requires DC 5V power supply (Two types of model ,5V and 3.3V modules are available)
5	NC	No Connection
6	NC	No Connection
7	RDY#	Ready indicator (Active low output) Processor status can be indicated, when connected as below. 
8	RST#	Connected to external Reset switch (Input) As reset logic is built-in, this pin can be connected directly to the switch without any additional circuit.
9	USBP	Differential data positive on USB port (Used only for development purposes)
10	USBN	Differential data negative on USB port (Used only for development purposes)
11	GPIO3	Programmable I/O 3 (User defined I/O)
12	GPIO2	Programmable I/O 2 (User defined I/O)
13	GPIO1	Programmable I/O 1 (User defined I/O)
14	GPIO0	Programmable I/O 0 (User defined I/O)

◆ J4

Serial 20-pin header connector (2mm pin pitch)



◇ J4 : RS232

Pin	Signal	Description
1	INF_3	Serial Interface Select 3 (Port #2) Serial interface can be set up in combination with INF_2. (pin 3) When using RS232, INF[1:0] = '00' When using RS422, INF[1:0] = '01' When using RS485, INF[1:0] = '10' (Make sure that '0' is connected to either open or GND, while '1' is connected to 3.3V)
2	VCC	Make sure that correct input voltage is provided. (Two types of models, 5V and 3.3V modules are available)
3	INF_2	Serial Interface Select 2 Serial interface can be set up in combination with INF_3.
4	VCC	Eddy-S2/Pin-3 requires DC 3.3V power supply Eddy-S2/Pin-5 requires DC 5V power supply. (Two types of models, 5V and 3.3V modules are available)
5	DCD 0	Port #1 - Data Carrier Detection (Input)
6	RXD 0	Port #1 - Receive Data (Input)
7	TXD 0	Port #1 - Transmit Data (Output)
8	DTR 0	Port #1 - Data Terminal Ready (Output)
9	GND	Ground

Pin	Signal	Description
10	DSR 0	Port #1 - Data Set Ready (input)
11	RTS 0	Port #1 - Request to Send (Output)
12	CTS 0	Port #1 - Clear to Send (Input)
13	DCD 1	Port #2 - Data Carrier Detection (Input)
14	RXD 1	Port #2 - Receive Data (Input)
15	TXD 1	Port #2 - Transmit Data (Output)
16	DTR 1	Port #2 - Data Terminal Ready (Output)
17	GND	Ground
18	DSR 1	Port #2 - Data Set Ready (input)
19	RTS 1	Port #2 - Request to Send (Output)
20	CTS 1	Port #2 - Clear to Send (Input)

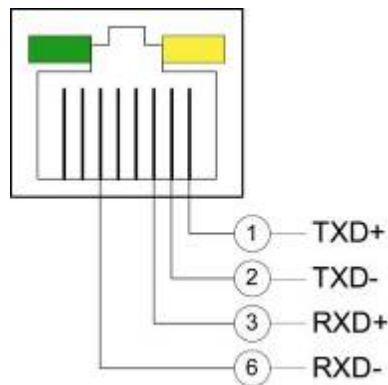
◇ J4 : RS422

Pin	Signal	Description
PORT #1		
6	RX0+	Port #1 Receive differential data positive (Input)
7	TX0+	Port #1 Transmit differential data positive (Output)
10	RX0-	Port #1 Receive differential data negative (input)
11	TX0-	Port #1 Transmit differential data negative (Output)
PORT #2		
14	RX0+	Port #2 Receive differential data positive (Input)
15	TX0+	Port #2 Transmit differential data positive (Output)
18	RX0-	Port #2 Receive differential data negative (input)
19	TX0-	Port #2 Transmit differential data negative (Output)

◇ J4 : RS485

Pin	Signal	Description
PORT #1		
7	TX0+	Port #1 Transmit/Receive differential data positive
11	TX0-	Port #1 Transmit/Receive differential data negative
PORT #2		
15	TX1+	Port #2 Transmit/Receive differential data positive
19	TX1-	Port #2 Transmit/Receive differential data negative

◆ RJ-45 Ethernet



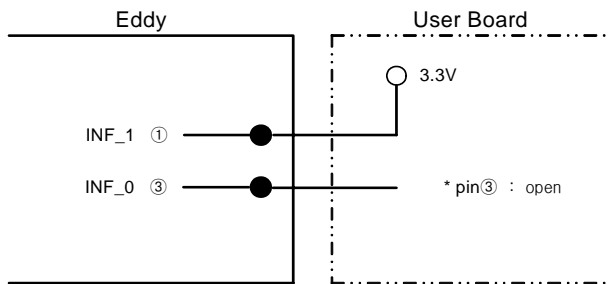
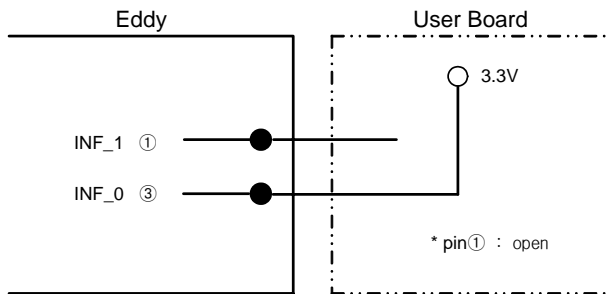
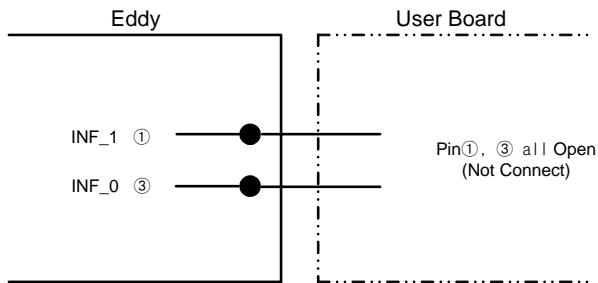
Pin	Signal	Description
1	TXD+	Transmit Data +
2	TXD-	Transmit Data -
3	RXD+	Receive Data +
6	RXD-	Receive Data -
LED		Description
Left Green		On: 100Base-TX Link is available Blinking: Data is transmitted or received.
Right Yellow		On: 10Base-T Link is available Blinking: Data is transmitted or received.

3.4.3 Serial Interface Selection

Eddy-S2/Pin includes two serial ports, and each port can be independently set to use either of RS232 / RS422 / RS485. Port interface is determined by the input combination of INF_3, INF_2, INF_1, and INF_0 pins.

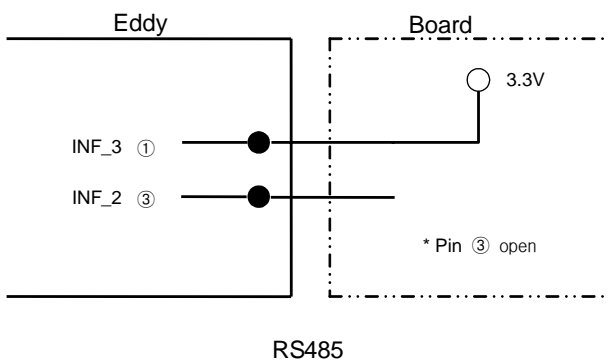
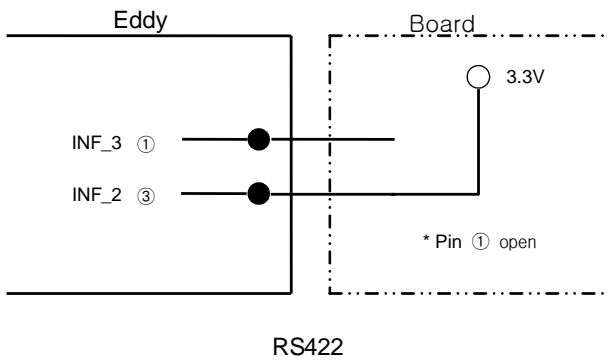
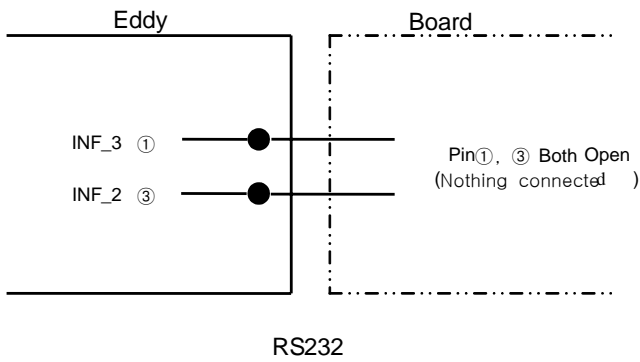
◆ PORT #1

Serial Port #1	INF_1	INF_0
RS232	Low	Low
RS422 Full Duplex	Low	High
RS485 Half Duplex	High	Low



◆ PORT #2

Serial Port #2	INF_3	INF_2
RS232	Low	Low
RS422 Full Duplex	Low	High
RS485 Half Duplex	High	Low



3.5 Eddy-S1/DB9-PoE

This module can operate as a powered device (PD), which accepts power input from the twisted pair Category 5 Ethernet cable as specified in IEEE 802.3af Power-over-Ethernet (PoE) standard.

With a backup 5V DC power jack, power supply can be automatically channeled to 5V adaptor when PSE (Power Sourcing Equipment) is out of order. Seamless power supply is guaranteed. PSE power can be used again when the PSE is in normal operation.

RS232/422/485 interface is supported in a single module, with a DB9 male connector. RS232/422/485 can be configured with software, including web or Telnet interface.

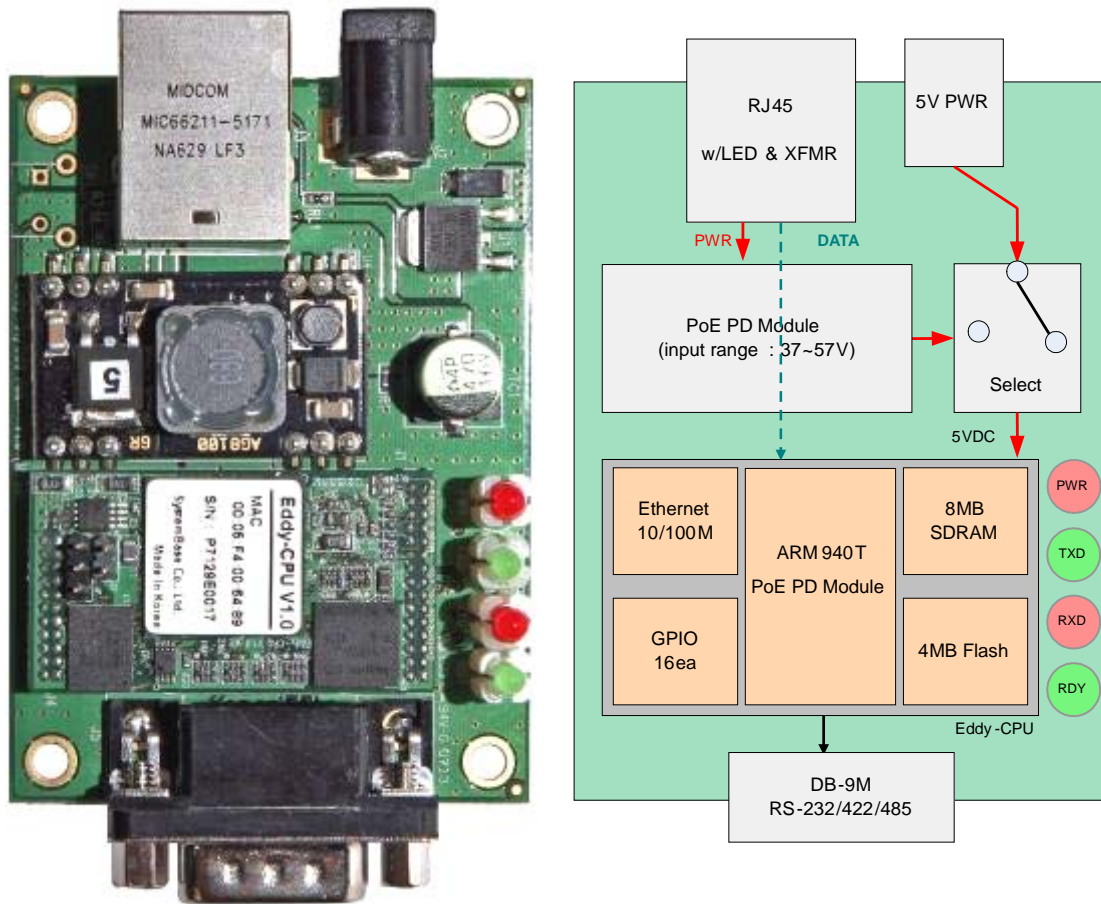


Figure 3-13. Eddy-S1/DB9-PoE - Product Picture and Block Diagram

3.5.1 Dimensions

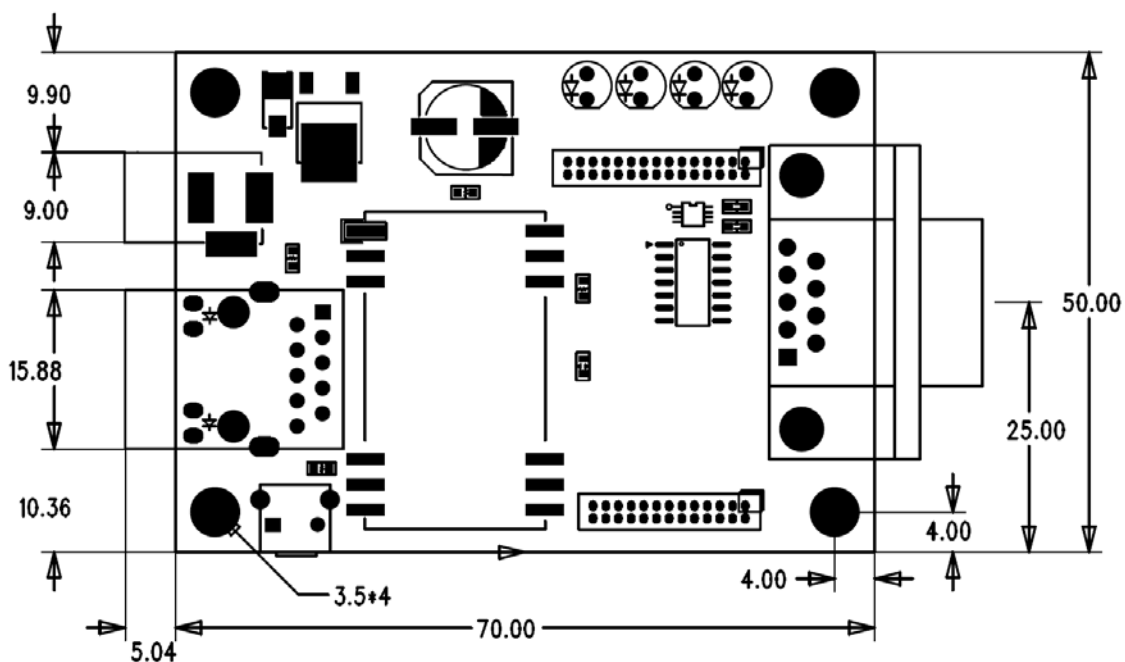


Figure 3-14. Eddy-S1/DB9-PoE Front View

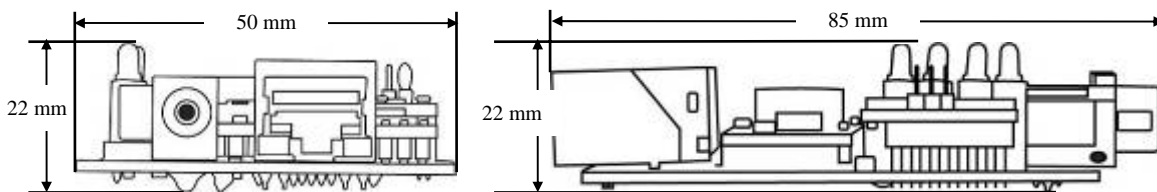
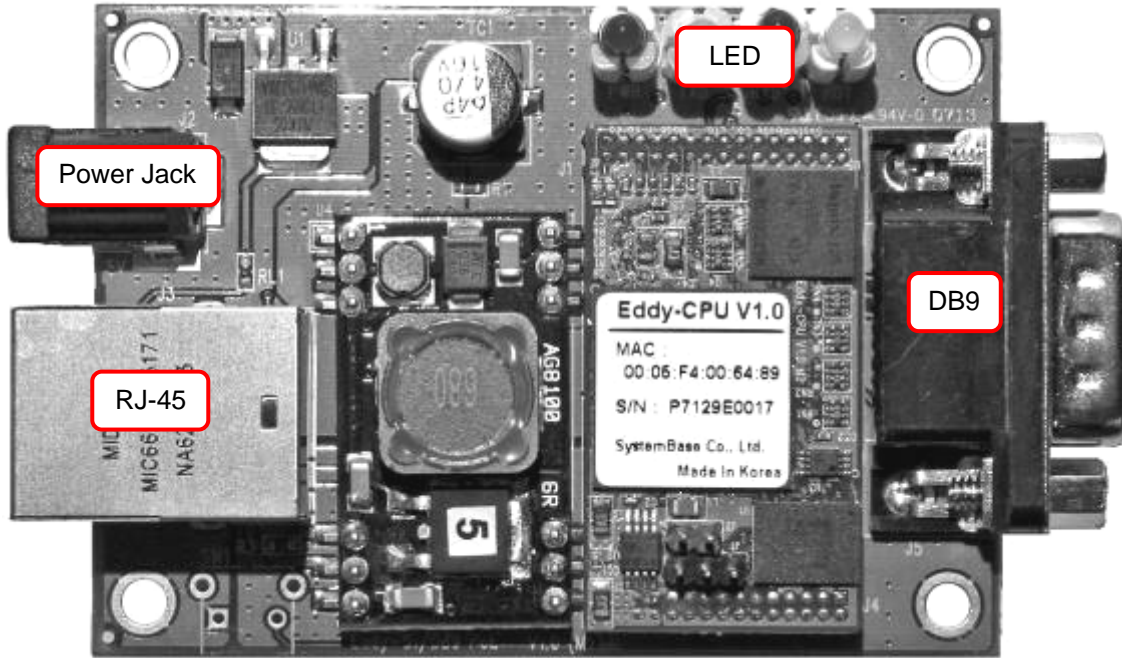


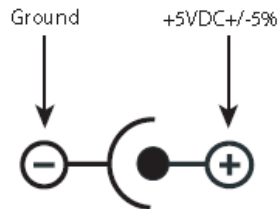
Figure 3-15. Eddy-S1/DB9-PoE Side View

3.5.2 Pin Specifications

Pin Specification and its usages are as follows.



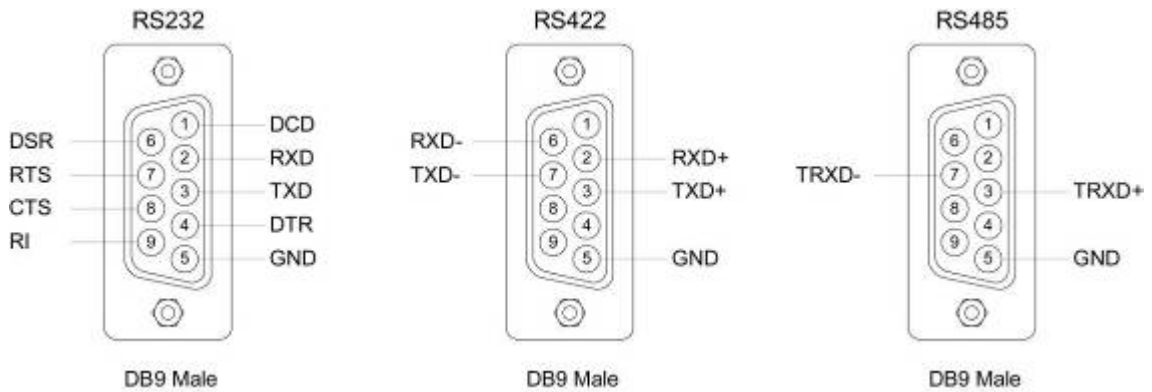
◆ Power JACK



Contact	Polarity
Center	+5VDC ± 5%(400mA or above)
Outer	Ground

◆ **DB9**

Serial Connector



◆ **RS232**

Pin	Signal	Description
1	DCD	Data Carrier Detection (Input)
2	RXD	Receive Data (Input)
3	TXD	Transmit Data (Output)
4	DTR	Data Terminal Ready (Output)
5	GND	Ground
6	DSR	Data Set Ready (input)
7	RTS	Request to Send (Output)
8	CTS	Clear to Send (Input)
9	RI	Ring Indicator (Input)

◆ **RS485 Half Duplex**

Pin	Signal	Description
3	TRX+	Transmit/Receive differential data positive
7	TRX-	Transmit/Receive differential data negative

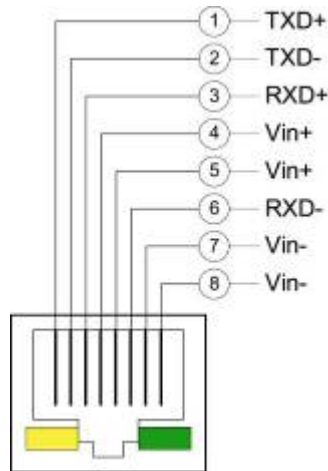
◆ RS422 Full Duplex

Pin	Signal	Description
2	RXD+	Receive differential data positive (Input)
3	TXD+	Transmit differential data positive (Output)
6	RXD-	Receive differential data negative (input)
7	TXD-	Transmit differential data negative (Output)

◆ LED

Pin	Signal	Description
1	POWER	LED ON when power is on
2	TXD	LED ON when serial data is transmitted
3	RXD	LED ON when serial data is received.
4	READY	Indicates the processor status

◆ RJ-45 Port(w/PoE PD Functionality)



Pin	Signal	Description
1	TXD+	Transmit Data +
2	TXD-	Transmit Data -
3	RXD+	Receive Data +
4	Vin+	PSE positive connection
5	Vin+	PSE positive connection
6	RXD-	Receive Data -
7	Vin-	PSE negative connection
8	Vin-	PSE negative connection

LED	Description
Left Yellow	On: 100Base-TX Link is available Blinking: Data is transmitted or received.
Right Green	On: 10Base-T Link is available Blinking: Data is transmitted or received.

Chapter 4. Integration

This chapter explains how you can make Eddy to communicate. It deals with LAN and pin header connection guides for Eddy to operate together with the target serial device.

Follow these steps to connect Eddy to the device and network.

4.1 Connection Guide

1) LAN

In order to connect Eddy to network, you need to use RJ45 Ethernet port. It supports both 10Mbps and 100Mbps Ethernet connection (auto-sensing). If you would like to connect Eddy to PC directly, use a cross LAN cable. Otherwise, plug one end of a direct LAN cable to Eddy and the other end to a hub, switch, or any other network device that can provide you with network access.

2) Pin Header

For those models with pin header interface, it is important that you clearly understand which pins you are to connect and how you connect them. For pin specifications, please refer to Chapter 3. Hardware Description. Please note that not all pins must be used. You can selectively connect only those pins relevant to your application.

3) DB9

For Eddy-S1/DB9, you can simply connect Eddy to the destination serial device with a DB9 cable. For pin specifications, please refer to Chapter 3.

4.2 First-time Bootup

First of all, please make sure the power input you supply to the module is corresponding with the Eddy model that you have. There are two types of power input possible, 5V and 3.3V. If an appropriate power input has been successfully supplied, Eddy will power on and start booting. For those models that require power input through pins (this will leave out DB9 models), you can notice that there are two Power In pins per serial port. It is a good practice to connect both power pins to the power supply for more stability in operation.

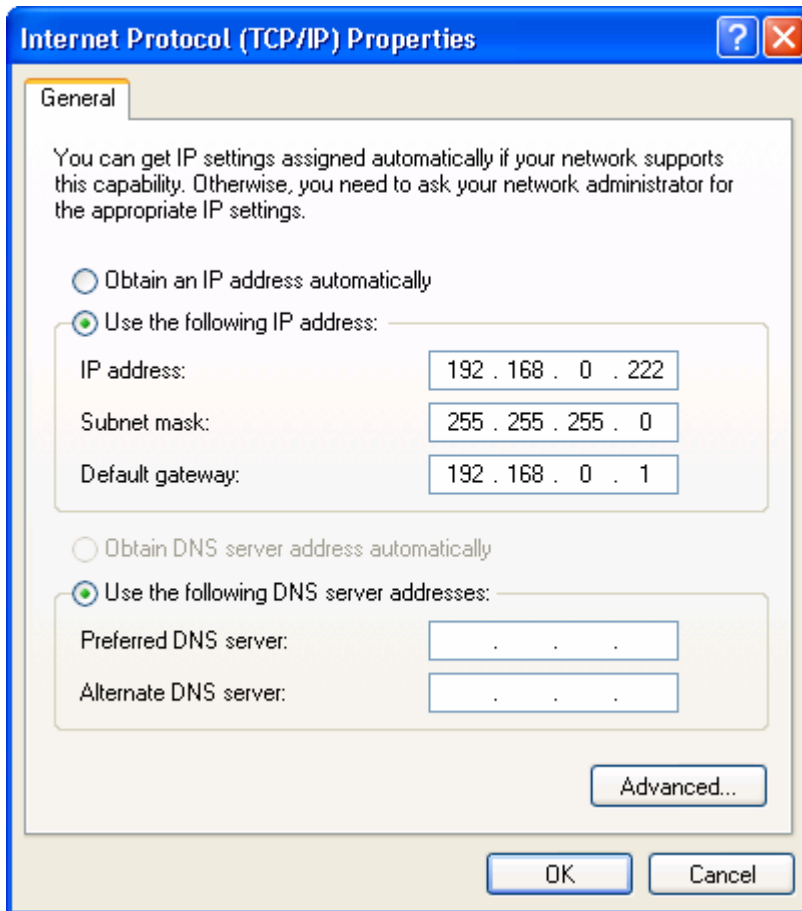
Although there is no power LED to check the status, you can check by LEDs on the RJ45 Ethernet port. LED status operation is described in Chapter 3. Hardware Description. In models with DB9, you can simply use a 5V DC power adaptor and on-board LEDs for status monitoring.

An IP address is required to access Eddy's web interface or telnet command-line configuration tool. By factory default, Eddy is assigned a static IP address. After the initial connection, you can either manually assign a different IP address or set Eddy to automatically get an IP address from a DHCP server. While this depends on your network environment and policy, it is strongly recommended that you assign Eddy with a unique static IP.

4.3 Connecting to Eddy with IP address

- ◆ The factory default IP address: **192.168.0.223**

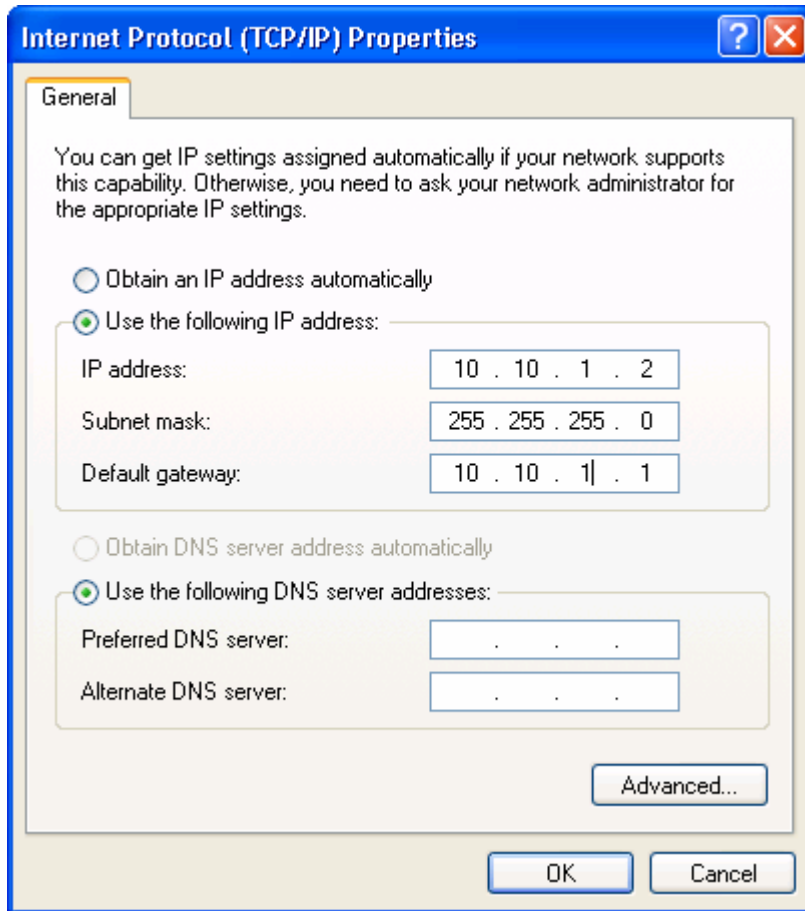
Eddy's default IP address is set to 192.168.0.223. In order to connect with this address, you need to change network configurations so that your PC can connect to the IP 192.168.0.223. Please refer to an example below, and note that values don't necessarily have to be identical to the example below.



In case you configure Eddy to use DHCP to obtain an IP address automatically, you might find it hard to know the IP address to connect to. To provide users with an easier way to know the current IP address, Eddy has a fixed alias IP that is always accessible. Use the address below whenever you cannot find out Eddy's IP address.

◆ Factory default alias IP address: **10.10.1.1**

In order to connect with this address, you need to change network configurations so that your PC can connect to the IP 10.10.1.1. Please refer to an example below, and note that values do not necessarily have to be identical to the example below.



Now you are ready to connect to Eddy! There are three options to configure Eddy.

1) Web

You can easily configure Eddy with web interface, accessible from any web browser. For more information, please refer to Chapter 5. Configuration via Web.

2) Telnet

You can configure Eddy with commands after accessing Eddy through Telnet. For more information, please refer to Chapter 6. Configuration via Telnet.

3) Portview

You can use a Windows-based utility Portview from SystemBase to monitor Eddy. For more information on using the utility for your administration purpose, please refer to Portview User Guide.

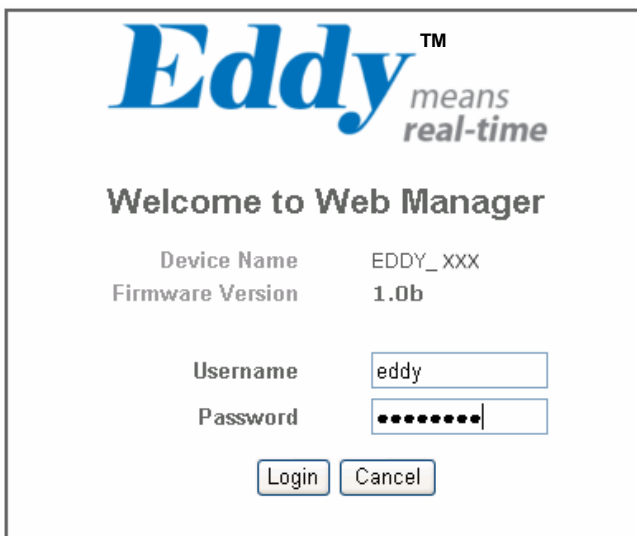
Chapter 5. Configuration via Web

5.1 Connection

Open your favorite web browser and enter the IP address of Eddy to access Eddy's web manager. Once you are successfully connected, the following front page will show up. You need to enter appropriate username and password to login.

Please note that this username and password is used as authentication method for Telnet as well. This means if username or/and password has been modified from the web interface, modified values have to be entered to connect to Telnet, and vice versa.

- ◆ Factory default username: eddy
- ◆ Factory default password: 99999999



EddyTM
means
real-time

Welcome to Web Manager

Device Name EDDY_XXX
Firmware Version 1.0b

Username
Password

Figure 5-1. Eddy Login Page

5.2 Setup Menu

If login process is successful, you will see a web manager's main page, showing summary of your device. On the left, you will see a setup menu, and you can navigate through these options.

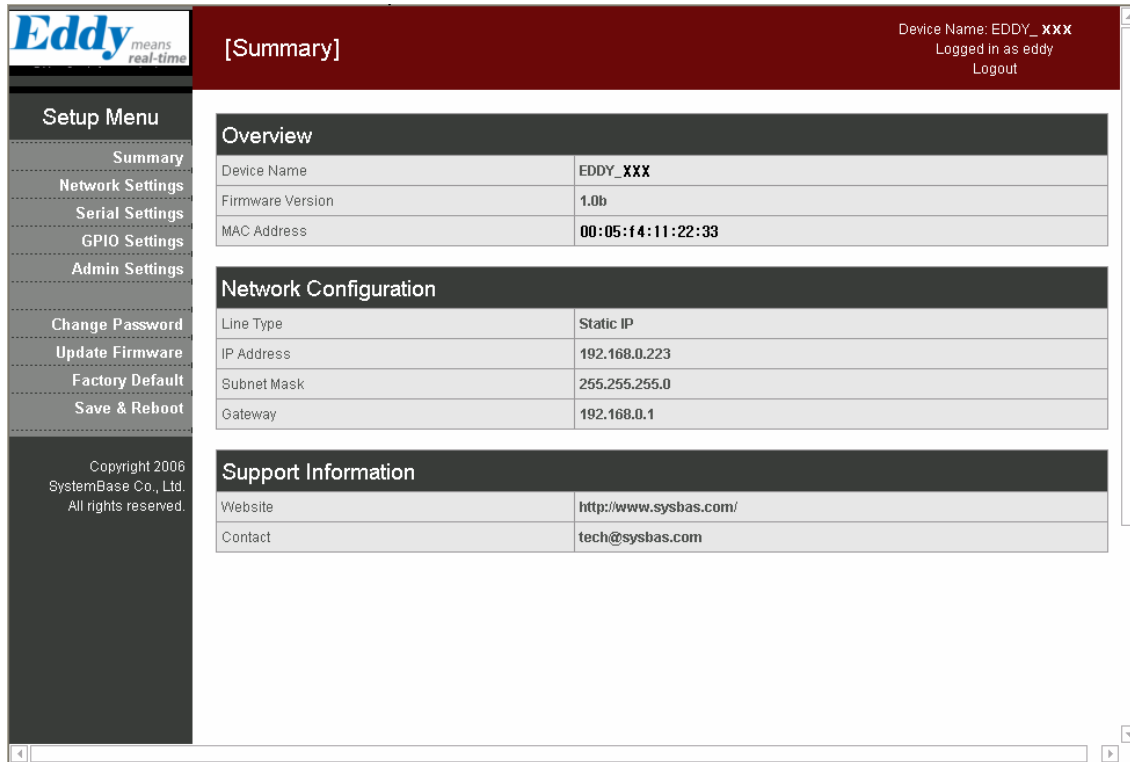


Figure 5-2. Main Page

Main features of Setup Menu are as follows.

Table 5-1. Main features of Setup Menu

Menu	Descriptions
Summary	View a summary of Eddy.
Network Settings	Configure network connection settings.
Serial Settings	Configure detailed operation environment for serial communication.
GPIO Settings	Configure programmable I/O pins.
Admin Settings	View and change device information and support information
Change Password	Change ID and password for both Web and Telnet interface.
Update Firmware	Update Eddy's firmware.
Factory Default	Restore all the factory default settings.
Save & Reboot	Save the configurations and reboot Eddy.

5.3 Network Settings

Configure general network environment and network management. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to 'Save & Reboot' in order to see these changes in effect. Changes will be discarded if you do not save current settings.

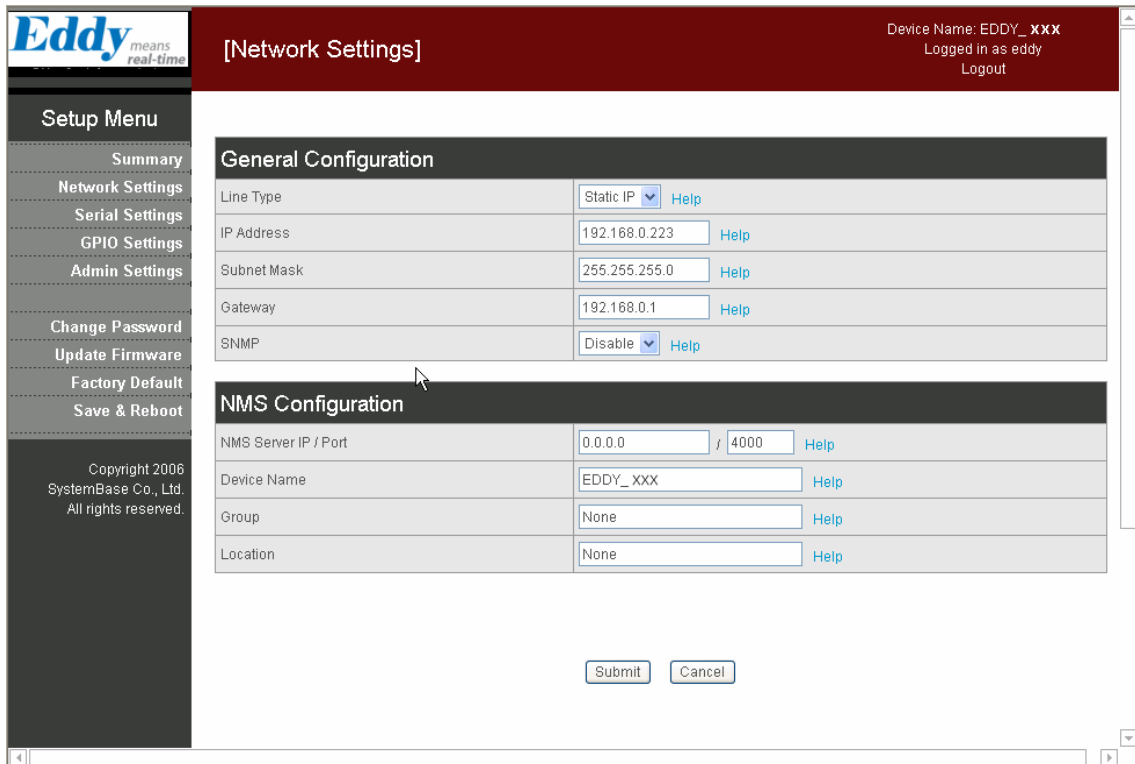


Figure 5-3. Network Settings Configuration Page

Main features for General Configuration is as follows.

Table 5-2. Main features of General Configuration of Setup Menu

Menu	Default	Descriptions
Line Type	Static IP	IP obtaining method for Eddy's network connection.
IP Address	192.168.0.223	Current IP address Eddy is assigned to. (When line type is Static IP, manually enter an appropriate IP address. When line type is DHCP, current IP is displayed, but it is not editable.)
Subnet Mask	255.255.255.0	Current subnet mask Eddy is assigned to. (When line type is Static IP, manually enter an appropriate subnet mask. When line type is DHCP, current subnet mask is displayed, but it is not editable.)
Gateway	192.168.0.1	Current default gateway Eddy is assigned to (When line type is Static IP, manually enter an appropriate default gateway. When line type is DHCP, current default gateway is displayed, but it is not editable.)..
SNMP	Disable	Enable or disable SNMP(Simple Network Management Protocol) support •MIB-II (RFC 1213): System, Interface, IP, ICMP, TCP, UDP •MIB-I (RFC 1317): Serial Interface

If multiple devices are installed and managed together, integration in management is necessary. In addition, it is often the case when the device reports an erroneous status, figuring out the reason for the failure becomes a time-consuming job. To solve this inefficiency and provide better solution, Eddy includes a Network Management System software, Portview.

Main features for NMS Configuration are as follows.

Table 5-3. Main features for NMS Configuration

Menu	Default	Descriptions
NMS Server IP / Port	0.0.0.0 / 4000	Set the IP address and the port number of the PC where Portview is installed. For more information on Portview, please refer to the Portview User Manual. If IP is set to 0.0.0.0, NMS feature is disabled
Device Name	Eddy-S1/Pin	Set the device name for management. 32 Characters at maximum
Group	None	Set the group name for management. 32 Characters at maximum
Location	None	Set the location name for management. 32 Characters at maximum

5.4 Serial Settings

You can set the communication and operation environment for the serial port. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to 'Save & Reboot' in order to see these changes in effect. Changes will be discarded if you do not save current settings.

The screenshot shows the 'Serial Settings' page for 'Serial Port 1'. The interface includes a left-hand navigation menu with options like 'Setup Menu', 'Summary', 'Network Settings', 'Serial Settings', 'GPIO Settings', 'Admin Settings', 'Change Password', 'Update Firmware', 'Factory Default', and 'Save & Reboot'. The main content area contains a table of settings for the serial port, including fields for Status, Interface, Operation Mode, Local Socket Port, Port Alias, Baud Rate, Data Bits, Stop Bits, Parity, Flow Control, Device Type, Remote IP Address / Port, Alive Check Time, MTU, Port Login, Passive Username, and Passive Password. Each field has a 'Help' link next to it. At the bottom of the page, there are 'Submit' and 'Cancel' buttons.

Serial Port 1	
Status	Enabled Help
Interface	RS232 Help
Operation Mode	COM Port(Win2000/XP) Help
Local Socket Port	4001 Help
Port Alias	Port1 Help
Baud Rate	9600 bps Help
Data Bits	8 bits Help
Stop Bits	1 bit Help
Parity	None Help
Flow Control	None Help
Device Type	Data Only Help
Remote IP Address / Port	0.0.0.0 / 4000 Help
Alive Check Time	0 sec(s) Help
MTU	1 byte(s) Help
Port Login	Disable Help
Passive Username	none Help
Passive Password	none Help

Figure 5-4. Eddy-S1/DB9, Eddy-S1/DB9-PoE serial communication setting page

At the bottom of the screen shows the current port.

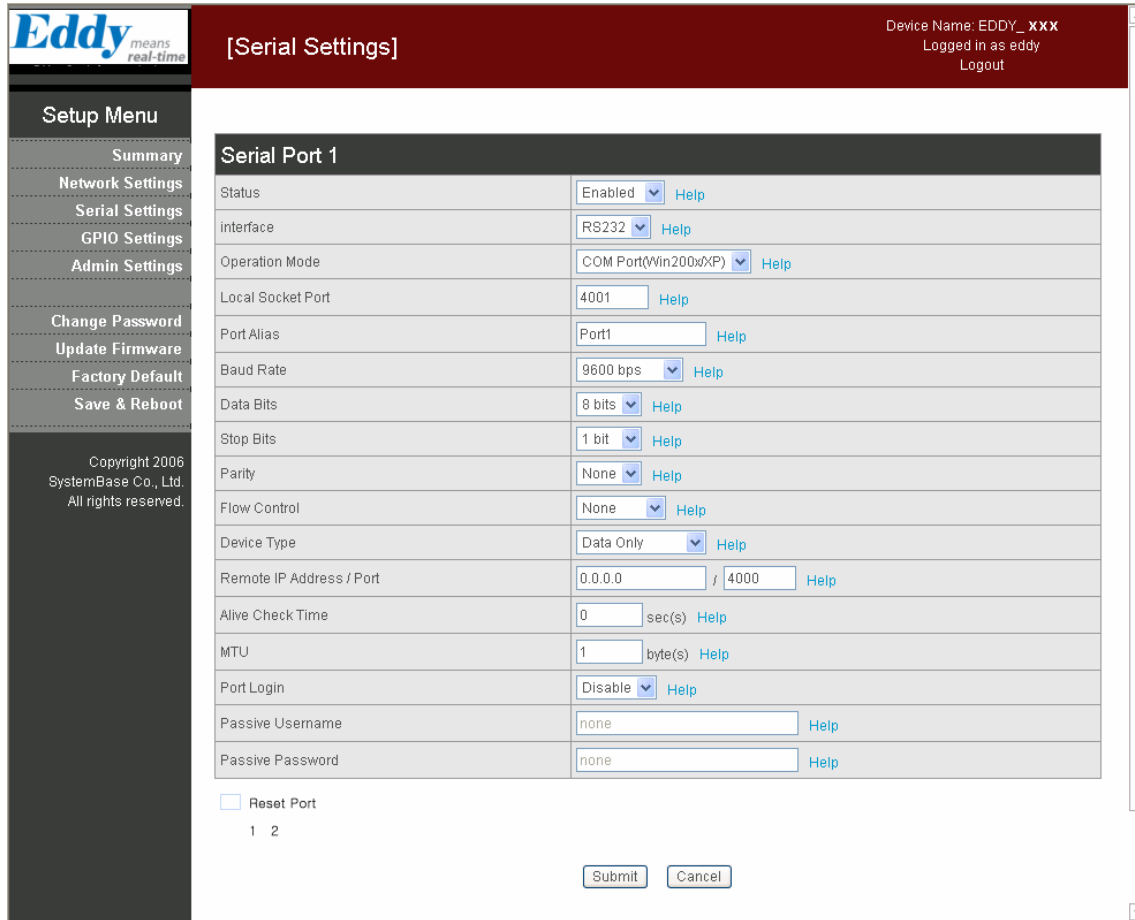


Figure 5-5. Eddy-S1/Pin, S1/TTL, S2/Pin serial communication setting page

Serial communication settings for Eddy-S1/Pin, S1/TTL, S2/Pin are as follows.

Table 5-4. Main features for Serial Settings

Menu	Default	Descriptions
Status	Enabled	Choose to use or not to use this port.
Interface	RS232	<p>•Eddy-S1/Pin, Eddy-S2/Pin: Eddy-S1/Pin and Eddy-S2/Pin only support hardware-level interface configuration of RS232 / RS422 / RS485. Eddy-S2/Pin supports RS422 PTP(Point-to-Point) mode, RS422 Multi-drop mode, RS485 Echo mode, and RS485 Non-Echo mode.</p> <p>If you are using RS422, you can select between RS422 PTP mode and RS422 Multi-drop mode through web or telnet interface. (Default: RS422 PTP mode)</p> <p>If you are using RS485, you can select between RS485 Echo mode and RS485 Non-Echo mode through web or telnet interface. (Default: RS485 Non-Echo mode)</p>

Menu	Default	Descriptions
		<p>•Eddy-S1/TTL: Eddy-S1/TTL requires manual interface selection from the user by hardware. Interface setup on web or telnet is not supported For detailed information please refer to Chapter 3. Hardware Configuration.</p> <p>•Eddy-S1/DB9, Eddy-S1/DB9-PoE: Eddy-S1/DB9 and Eddy-S1/DB9-PoE shows current serial interface, and you can select RS232 / RS422 / RS485 through web or telnet.</p> <p>Refer to Chapter 3. Hardware for detailed information on changing serial interface type.</p>
Operation Mode	COM (Win200x /XP)	<p>Select the operation protocol, which the serial port would use.</p> <p>•COM(Win200x/XP) Use the serial port of Eddy as the COM ports of Windows 2000/XP/2003 operated PC. (Both the data and the signal line information of the serial port can be controlled.)</p> <p>•COM(Win98/ME) Use the serial ports of Eddy as the COM ports of Windows 98/ME operated PC. (Both the data and the signal line information of the serial port can be controlled.)</p> <p>•TCP Server Eddy works as a socket server, waiting for the client connection on the network. Socket number for awaiting connections can be set in 'Local socket port' field. All data between the socket and the serial port is transferred untouched after the socket connection is established.</p> <p>•TCP Client Eddy acts as a socket client in this mode. It tries to connect to the server IP address and the socket number assigned when a certain server waits for connection on the network. All data between the socket and the serial port is transferred untouched after the socket connection is established.</p> <p>•TCP Multi-Server Eddy works as a server, accepting up to 5 simultaneous connections from socket clients. Data transmitted from Eddy is broadcast to each socket client.</p> <p>•UDP Server Eddy works as a UDP server, waiting for UDP connection from the client on the network. Socket number for awaiting connections can be set in 'Local socket port' field. Once a UDP packet is received to the socket that waits for the connection, the data is transmitted to the serial port. The data input from the serial port is put into UDP packets, which</p>

Menu	Default	Descriptions
		eventually are sent to the client. •UDP Client When the data is input to the serial port, UDP packets are sent using the preset IP address and the socket number of the server.
Local Socket Port	4001	Set the socket number for the port. TCP server and UDP server operation mode makes use of this port for awaiting network socket connections.
Port Alias	Port1	Port alias name for convenience. 16 Characters at maximum.
Baud Rate	9600 bps	Set communication speed. (Options: 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600 bps)
Data Bits	8	Set the number of bits in each character size. (Options: 5, 6, 7, 8)
Stop Bits	1	Set the number of stop bits.. (Options: 1, 2)
Parity	None	Set parity bit check scheme.. (Options: None, Odd, Even)
Flow Control	None	Set the flow control scheme. (Options: None, Xon/Xoff, RTS/CTS)
Device Type	DataOnly	Set the signal line checking method for the device to be connected to the given serial port. If the mode is set to Data Only, only Txd, Rxd, and Gnd signal lines are used in inter-device communication. If the mode is set to Modem Signals, all modem signals except RI(Ring Indicator) are asserted, tested, and used in communication. (Options: Data Only, Modem Signals)
Remote IP Address / Port	0.0.0.0 / 4000	When the Operation Mode is either TCP Client or UDP Client, set the IP address and the socket number to connect to..
Alive Check Time	0 sec	After a certain amount of time passes without any communication after the socket connection between the given serial port and the server is established, automatically disconnect the socket connection. Valid from 0 to 32767. For example, if the operation mode is set to TCP Server and Alive Check Time is configured to 10, TCP Server will listen for the client's connection and eventually establish a connection. Since the check time is 10 seconds, the server will wait for 10 seconds until the client connected to it sends any packet. If there is no data for 10 seconds, server will quit the connection and return to the listening state. This option is helpful in preventing communication obstacles that occur when either Eddy or the client quits unexpectedly (i.e. Sudden black out, reboot, LAN cable cut, etc.). In these cases, the other part of communication might not recognize the failure of its partner. Such misunderstanding can cause communication errors. If the value is set to 0, this function is disabled. Once connected socket will be retained until explicitly disconnected.

Menu	Default	Descriptions
		(Only applies to TCP Client, TCP Server, TCP Multi-Server operation modes.)
MTU	1 byte	<p>MTU stands for Maximum Transmission Unit, and this option needs to be set when consecutive data from the given serial port needs to be transmitted to socket at once. If 100 bytes of character string are to be transmitted from the serial device and MTU is set to '100', Eddy waits until the entire 100 bytes are received. After receiving 100 bytes, it transmits this data to the server as a single packet, using the socket. If 200 bytes of character string are to be transmitted from the serial device, Eddy breaks this data into 2 packets of 100 bytes. If data less than 100 bytes is received, Eddy will wait for a certain amount of time. While the duration is determined by the communication speed, it normally is around 20 msec. If there is no further data incoming during this time, Eddy will send what is stored until then, though not a full 100-byte data it may be, as one packet.</p> <p>If MTU is set to '1', however, each byte is transmitted right away in a packet, therefore multiple packets sent to the server. Valid from 1 to 1100.</p>
Port Login	Disable	When the Operation Mode is set to TCP Server, ask for the username and password when the client tries to connect (Options: Enable, Disable)
Passive Username	conuser	When the Operation Mode is set to TCP Server, set the username to ask for. 32 Characters at maximum.
Passive Password	99999999	When the Operation Mode is set as TCP Server, set the password to ask for. 32 Characters at maximum.

5.5 GPIO Settings

Configure operation mode and value for each Programmable I/O pins.

Eddy includes 4 GPIO pins that output 3.3V or detect 3.3V signals. But Eddy-S1/DB9 and Eddy-S1/DB9-PoE models do not have any GPIO pins. You can detect either any 3.3V signals from external device, or output 3.3V signal to the external device. You can also program a customized GPIO application, and you can implement it with the SDK included in the Eddy development kit.

After changing values, you need to click ‘Submit’ button. Then you will see the same page with modified values. Please note that you have to ‘Save & Reboot’ in order to see these changes in effect. Changes will be discarded if you do not save current settings.

Different Eddy modules support different port number of GPIOs. Eddy Web server automatically senses connected Eddy module and its supported GPIO ports and displays it on the Web.

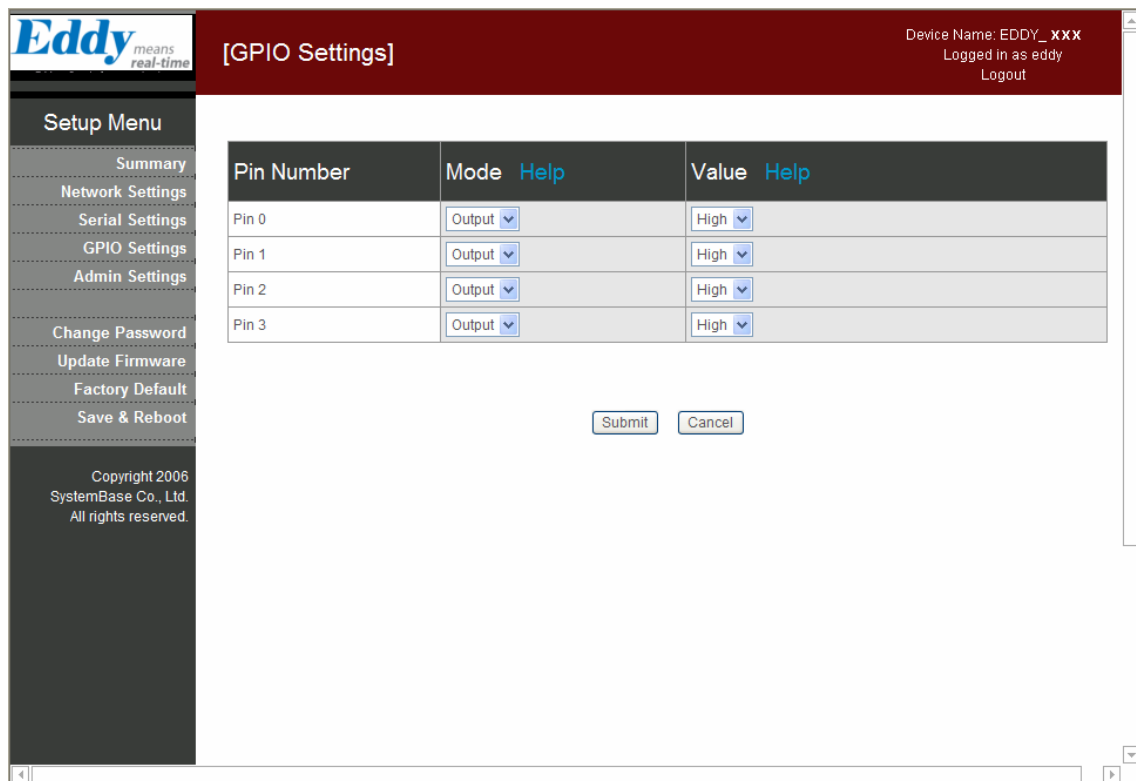


Figure 5-6. Eddy-S1/PIN, Eddy-S1/TTL, Eddy-S2/PIN - GPIO Setting Page

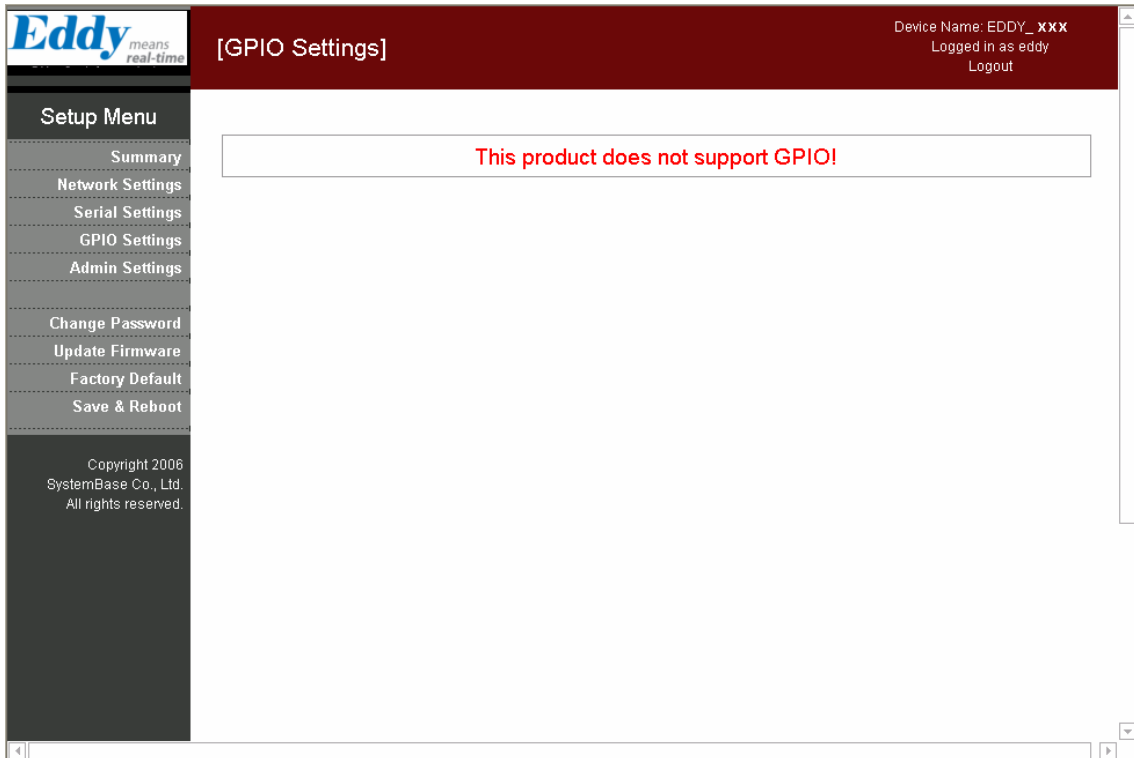


Figure 5-7. Eddy-S1/DB9, Eddy-S1/DB9-PoE - GPIO Setting Page

Table 5-5. Main features for GPIO Settings

Menu	Default	Descriptions
Mode	Output	Set current pin's I/O mode. When in output mode, 3.3V output can be controlled. When in input mode, any 3.3V from outside can be detected (Options: Output, Input)
Value	High	Set current pin's output value. (This option only applies to output mode pins) If the value is High, 3.3V is output through the port. (Options: High / Low)

5.6 Admin Settings

Device information and support information settings. After changing values, you need to click ‘Submit’ button. Then you will see the same page with modified values. Please note that you have to ‘Save & Reboot’ in order to see these changes in effect. Changes will be discarded if you do not save current settings.

Figure 5-8. Admin Settings Page

Main features for Admin Setting are as follows.

Table 5-6. Main features for Admin Setting

Menu	Default	Descriptions
Device Name	Eddy	Name of the current device.
Firmware Version	-	Current firmware version.
Hardware Version	-	Current hardware version.
Kernel Version	-	Current kernel version.
Website	-	Website for help and support.
Contact	-	Contact information for technical support.

5.7 Change Password

Change Web/Telnet access username and password. After changing values, you need to click ‘Submit’ button. Then you will see the same page with modified values. Please note that you have to ‘Save & Reboot’ in order to see these changes in effect. Changes will be discarded if you do not save current settings.

- ◆ Default user id : eddy
- ◆ Default password : 99999999

The screenshot shows the Eddy web interface for changing ID and password. The header includes the Eddy logo and the text "[Change ID/Password]". The top right corner displays "Device Name: EDDY_XXX", "Logged in as eddy", and a "Logout" link. The left sidebar menu contains the following items: Setup Menu, Summary, Network Settings, Serial Settings, GPIO Settings, Admin Settings, Change Password, Update Firmware, Factory Default, and Save & Reboot. The main content area is divided into two sections: "Change ID" and "Change Password". The "Change ID" section has a "Current ID" field with the value "eddy" and a "New ID" field. The "Change Password" section has three fields: "Enter Current Password", "Enter New Password", and "Retype New Password". At the bottom of the form are "Submit" and "Cancel" buttons. The footer of the page contains the copyright information: "Copyright 2008 SystemBase Co., Ltd. All rights reserved."

Figure 5-9. Change Password Setting Page

5.8 Update Firmware

Firmware is an application embedded in Flash memory of Eddy. Set the location of the firmware file to update, using the 'Browse...' button. The selected firmware will be transferred to Eddy when you click 'Start Update'. After the transmission is complete, Eddy will be automatically restarted to operate with the new firmware.

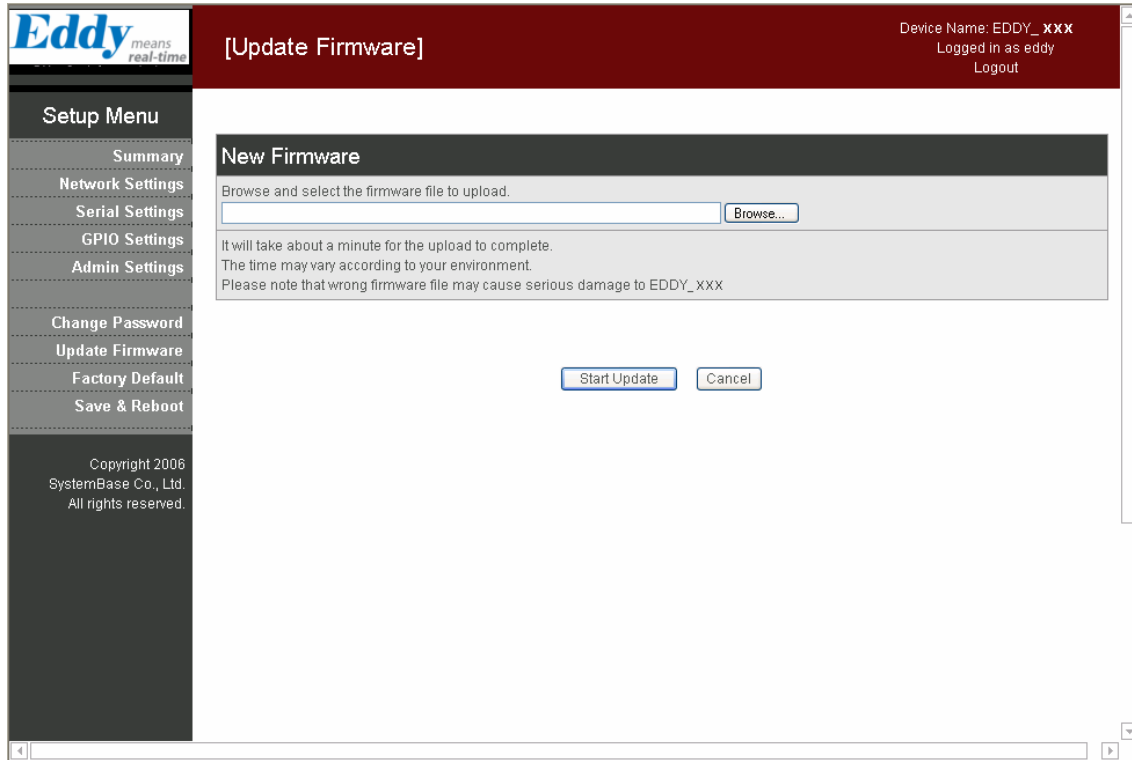


Figure 5-10. Update Firmware Setting Page

5.9 Factory Default

Restore all the configuration parameters to the factory default values. Clicking on 'Restore Factory Defaults' button will delete all current settings and restore settings to the initial status. Eddy will automatically reboot. You cannot turn back the decision once you select this option.

- ◆ The factory default IP address of Eddy : 192.168.0.223

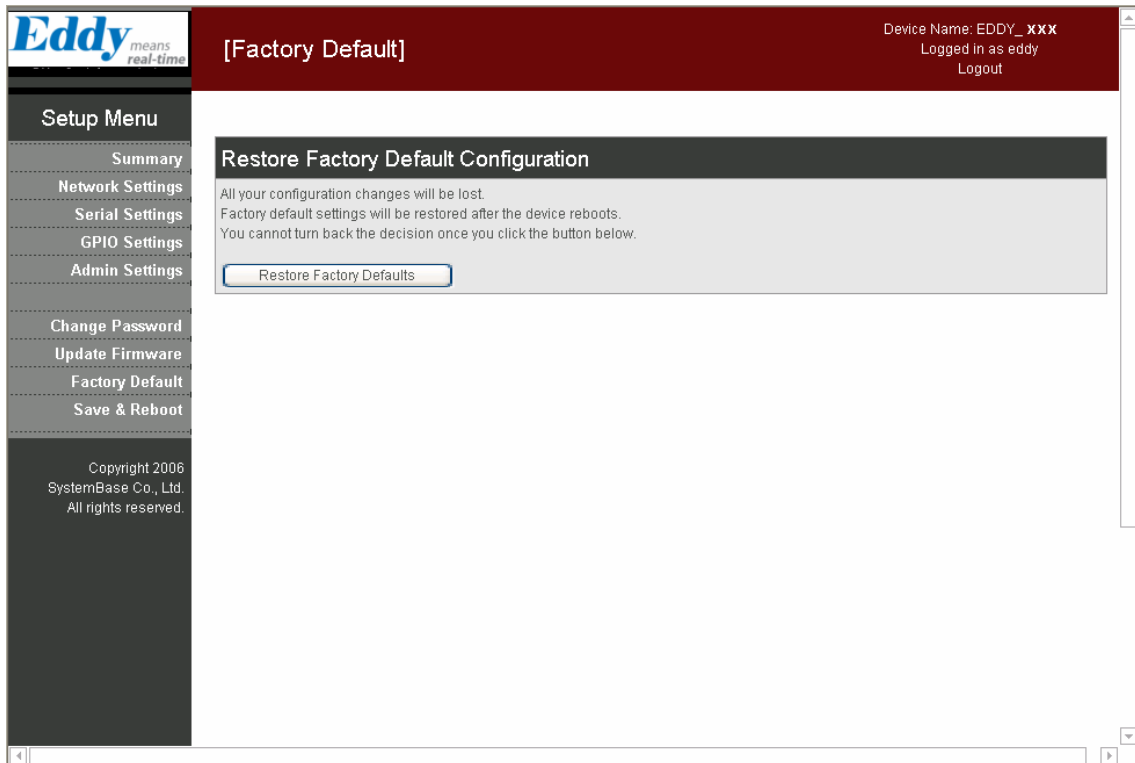


Figure 5-11. Factory Default Setting Page

5.10 Save & Reboot

This option saves changes to the Flash memory and restarts the system to let the changes to take place in the operation.

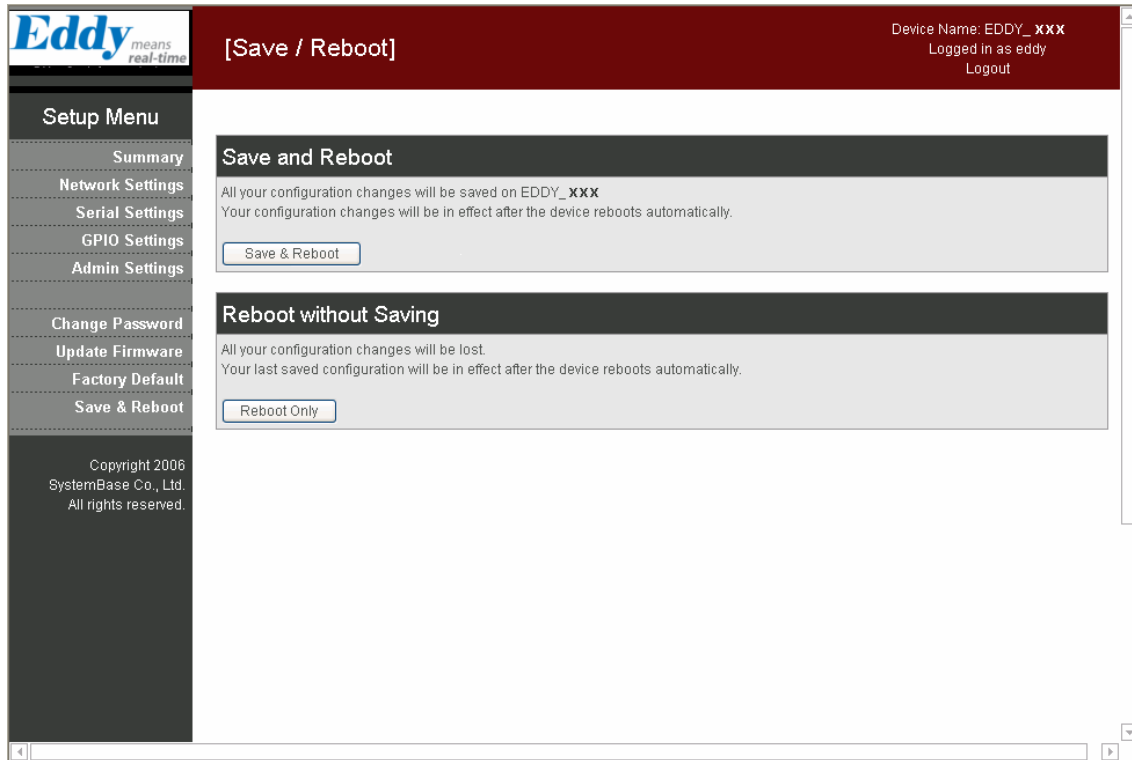


Figure 5-12. Save & Reboot Setting Page

Main features for Save & Reboot are as follows

Table 5-7. Main features for Save & Reboot Save & Reboot

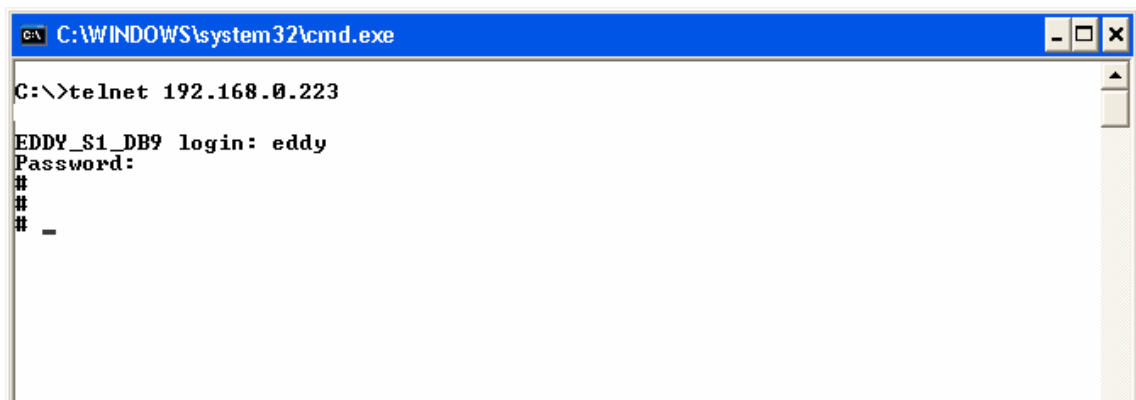
Menu	Descriptions
Save and Reboot	'Save & Reboot' reboots Eddy after saving changes to Flash memory.
Reboot without Saving	'Reboot Only' option just reboots Eddy without saving changes. This option can be used to rollback the changes you have mistakenly made.

Chapter 6. Configuration via Telnet

6.1 Connection

Open your telnet client and enter Eddy's IP address to connect. You need to enter appropriate username and password to login. Please note that this username and password is used as authentication method for Web as well. This means if username or/and password has been modified from the telnet interface, modified values have to be entered to connect to web, and vice versa.

- ◆ Factory default username: eddy
- ◆ Factory default password : 99999999



```
C:\WINDOWS\system32\cmd.exe
C:\>telnet 192.168.0.223
EDDY_S1_DB9 login: eddy
Password:
#
#
# _
```

Figure 6-1. Connection via Telnet

[set] command - you can configure Eddy's settings

[view] command - you can view current Eddy's settings

After changing values, you can see modified values with 'view' commands. But be careful because these values are not in effect unless you issue a 'set save' command. Changes will be discarded if you do not save current settings.

Command notations

set line [ip / dhcp]: Either enter set line ip or set line dhcp

set ip <IP address>: Enter actual values such as set ip 192.168.0.223

6.2 View commands

Commands related to View are as follows.

Table 6-1. View commands

Commands	Descriptions
view	Show summarized information about Eddy.
view all	Show all available information about Eddy.
view server	Show network and device server's settings.
view port	Show serial port settings.
view gpio	Show GPIO pin settings.
view version	Show version and support information.
view command	Show 'set' command list.
view help	[Show 'view' command list.

6.3 Network commands

Configure general network environment and network management.

◆ General configuration

Table 6-2. Network general configuration commands

Commands	Default	Descriptions
set line [ip / dhcp]	Static IP	IP obtaining method for Eddy's network connection.
set ip <IP Address>	192.168.0.223	Set the current IP address Eddy is assigned to. When line type is Static IP, manually enter an appropriate IP address. When line type is DHCP, it is not editable
set mask <Subnet mask>	255.255.255.0	Set the subnet mask Eddy is assigned to. When line type is Static IP, manually enter an appropriate subnet mask. When line type is DHCP, it is not editable.)
set gateway <Gateway address>	192.168.0.1	Set the default gateway Eddy is assigned to. When line type is DHCP, it is not editable.
set snmp [Enable / Disable]	Disable	Enable or disable SNMP(Simple Network Management Protocol) support. •MIB-II (RFC 1213): System, Interface, IP, ICMP, TCP, UDP •MIB-I (RFC 1317): Serial Interface

◆ NMS Configuration

If multiple devices are installed and managed together, integration in management is necessary. In addition, it is often the case when the device reports an erroneous status, figuring out the reason for the failure becomes a time-consuming job. To solve this inefficiency and provide better solution, Eddy includes a Network Management System software, Portview

Commands related to NMS are as follows.

Table 6-3. Network NMS configuration commands

Commands	Default	Descriptions
set nms <IP address>	0.0.0.0	Configures IP of PC which Portview is installed If IP is set to 0.0.0.0, NMS feature is disabled. (Please refer to Portview User's Manual for detailed information.)
set nport <Port number>	4000	NMS socket number (if NMS is used).
set name	Product name	Set the device name for management. 32 Characters at maximum
set group	None	Set the group name for management. 32 Characters at maximum.
set location	None	Set the location name for management. 32 Characters at maximum.

6.4 Serial Commands

You can set the communication and operation environment for the serial port. Chapter 5 describes each option in detail. Only a summary of each option is presented here.

Table 6-4. Serial commands

Commands	Default	Descriptions
set port 1 status [Enable / Disable]	Enable	Choose to use or not use this port.
set port 1 protocol [com2kxp / com98 / tcp_server / tcp_client / tcp_mserver / udp_server / udp_client]	com2kxp	Select the operation protocol, which the serial port would use.
set port 1 if_type [RS232 RS422P RS485NE]	RS232	Eddy-S1/DB9 and Eddy-S1/DB9-PoE can be configured to use either RS232, RS422 Point-to-Point, or RS485 Non-echo mode through this telnet command.
set port 1 if_type [RS422P RS422MD]	RS422P	When Eddy-S2/Pin is set to use RS422 by hardware, this command enables selection between RS422 Point-to-Point mode and Multi-drop mode.
set port 1 if_type [RS485NE RS485E]	RS485NE	When Eddy-S2/PIN is set to use RS485, this command can be used to configure the RS422 None echo mode, RS422 echo. This command is not supported for Eddy-S1/PIN, Eddy-S1/TTL modules
set port 1 <port number>	4001	Set the socket number for the port. TCP server and UDP server operation mode makes use of this port for awaiting network socket connections.
set port 1 name <name>	Port 1	Port alias name for convenience. 16 Characters at maximum
set port 1 speed [150 / 300 / 600 / 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 230400 / 460800 / 921600]	9600bps	Set communication speed..
set port 1 data [5 / 6 / 7 / 8]	8	Set the number of bits in each character size.
set port 1 stop [1 / 2]	1	Set the number of stop bits.
set port 1 parity [none / odd / even]	none	Set parity bit check scheme.
set port 1 flow [none / xon / rts]	none	Set the flow control scheme.
set port 1 signal [data / modem]	data	Set the signal line checking method for the device to be connected to the given serial port.

Commands	Default	Descriptions
set port 1 remote <IP address>	0.0.0.0	When the Operation Mode is set to TCP Client, set the IP address to connect to.
set port 1 rport <socket number>	4000	When the Operation Mode is set to TCP Client, set the socket number to connect to.
set port 1 keepalive <0 - 32767>	0	After a certain amount of time passes without any communication after the socket connection between the given serial port and the server is established, automatically disconnect the socket connection. If the value is set to 0, this function is disabled.
set port 1 mtu <1 - 1100>	1	MTU stands for Maximum Transmission Unit, and this option needs to be set when consecutive data from the given serial port needs to be transmitted to socket at once.
set port 1 uselogin [0 / 1]	0-Disable	When the Operation Mode is set to TCP Server, ask for the username and password when the client tries to connect. Set to 1 to enable.
set port 1 conuser name <username>	conuser	When the Operation Mode is set to TCP Server, set the username to ask for(Max 32 bytes)
set port 1 con password <password>	99999999	When the Operation Mode is set as TCP Server, set the password to ask for(Max 32 bytes)

6.5 GPIO commands

Configure operation mode and value for each Programmable I/O pins.
(Eddy-S1/DB9 and Eddy-S1/DB9-PoE do not support this function.)

Table 6-5. GPIO commands

Commands	Default	Descriptions
set gpio <0-3> mode [in / out]	Output	Set current pin's I/O mode.
set gpio <0-3> value [low / high]	High	Set current pin's output value. (This option only applies to output mode pins)

6.6 Username/Password Commands

Configure username and password for Web/Telnet.

Table 6-6. User/Password configurations

Commands	Default	Descriptions
set user <username>	eddy	Set username. 16 Characters at maximum.
set pass <password>	99999999	Set password. 16 Characters at maximum.

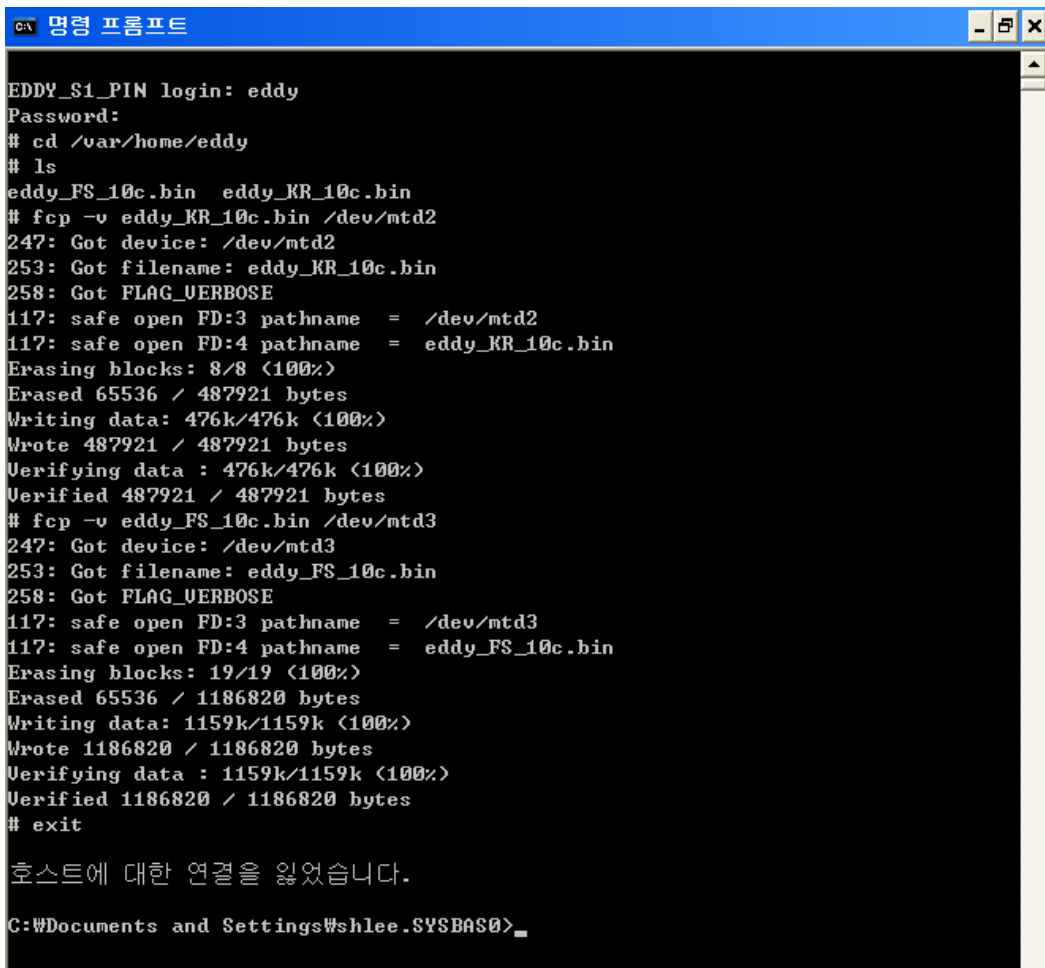
6.7 System Commands

Table 6-7. System Commands

Commands	Descriptions
set default	Restore all settings to factory default. Requires reboot for changes to take effect.
set save	Save current configuration settings. Requires reboot for changes to take effect.
reboot	Reboot Eddy.

◆ Updates via Telnet

- ① Connect to Eddy with Telnet. Enter eddy for the username and 99999999 for the password. (When using the default settings). After the connection, activate the FTP service with 'set ftp on' command
- ② Move to folder where firmware to upload is located.
(In this example, firmware images are stored under C:\veddy_firmware. Here we use firmware files named Eddy_FS_10c.bin and Eddy_KR_10c.bin.)
- ③ Connect to Eddy via ftp command. You can also use GUI-style FTP clients.
- ④ Enter **anonymous** for username. Password is not required, so just leave it blank.
- ⑤ Type in [cd /var/home/eddy] command to move to the directory where firmware can be uploaded. Please note that write attempts to any other directories are restricted for security reasons.
- ⑥ Issue a command 'bin' for binary file transfer mode. Optionally use 'hash' to see the data transfer mark.
- ⑦ Issue both commands [put eddy_FS_10b.bin], [put eddy_KR_10b.bin] to start upload. The image files must reside in the same directory with current directory where you are running the ftp command
- ⑧ After getting a 'Transfer complete' message, issue a command 'quit' or 'bye' to disconnect.



```
C:\ 명령 프롬프트
EDDY_S1_PIN login: eddy
Password:
# cd /var/home/eddy
# ls
eddy_FS_10c.bin  eddy_KR_10c.bin
# fcp -v eddy_KR_10c.bin /dev/mtd2
247: Got device: /dev/mtd2
253: Got filename: eddy_KR_10c.bin
258: Got FLAG_VERBOSE
117: safe open FD:3 pathname = /dev/mtd2
117: safe open FD:4 pathname = eddy_KR_10c.bin
Erasing blocks: 8/8 <100%>
Erased 65536 / 487921 bytes
Writing data: 476k/476k <100%>
Wrote 487921 / 487921 bytes
Verifying data : 476k/476k <100%>
Verified 487921 / 487921 bytes
# fcp -v eddy_FS_10c.bin /dev/mtd3
247: Got device: /dev/mtd3
253: Got filename: eddy_FS_10c.bin
258: Got FLAG_VERBOSE
117: safe open FD:3 pathname = /dev/mtd3
117: safe open FD:4 pathname = eddy_FS_10c.bin
Erasing blocks: 19/19 <100%>
Erased 65536 / 1186820 bytes
Writing data: 1159k/1159k <100%>
Wrote 1186820 / 1186820 bytes
Verifying data : 1159k/1159k <100%>
Verified 1186820 / 1186820 bytes
# exit
호스트에 대한 연결을 잃었습니다.
C:\Documents and Settings\shlee.SYSBAS0>_
```

Figure 7-2. Firmware Update via Telnet

- ⑨ Now connect to Eddy with Telnet, if you are not connected.
- ⑩ Issue a command ('cd /var/home/eddy') to move to the upload directory.
- ⑪ Issue a command 'ls' to make sure firmware files are both successfully uploaded
- ⑫ Issue [fcpx -v eddy_KR_10b.bin /dev/mtd2], [fcpx -v eddy_FS_10b.bin /dev/mtd3] command to write the new kernel image to the Flash memory of Eddy. Commands are case sensitive. Please recheck upper and lower case character before inputting.
[Eddy_KR_xxx.bin] is a kernel firmware and '/dev/mtd2' option must be set,
[Eddy_FS_xxx.bin] is a file system and '/dev/mtd3' option must be used.
'/dev/mtd2' option is a kernel upgrade option, and '/dev/mtd3' is a file system option.
Please verify whether firmware to upgrade is a kernel or file system before carrying on upgrade process.
- ⑬ Check if [Erase / Write / Verify] process is successful.
- ⑭ Issue [exit] command to close the telnet, and reset Eddy to start with new firmware.

◆ **Updates via TFTP**

TFTP Server must be installed on your PC in order to update firmware via TFTP.

There are various freeware, so install any TFTP server software of your choice . Execute TFTP program and move to folder where firmware is located.

The below is an example where firmware is located at root directory of C drive. It also checks if there is any firmware to upgrade in the Current Directory.

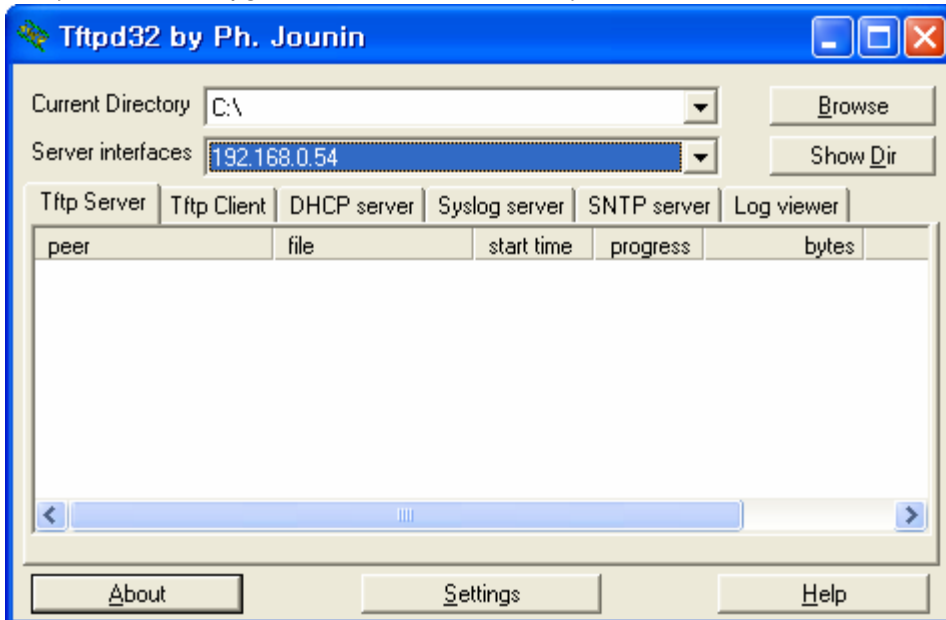
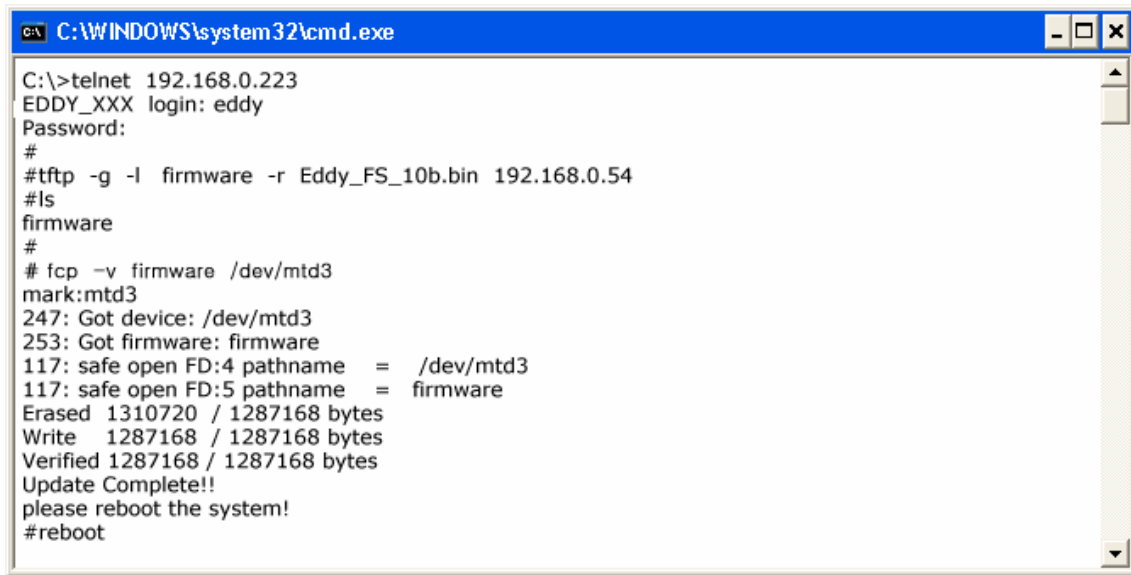


Figure 7-3. Firmware upgrade via TFTP



```
C:\>telnet 192.168.0.223
EDDY_XXX login: eddy
Password:
#
#tftp -g -l firmware -r Eddy_FS_10b.bin 192.168.0.54
#ls
firmware
#
# fcp -v firmware /dev/mtd3
mark:mtd3
247: Got device: /dev/mtd3
253: Got firmware: firmware
117: safe open FD:4 pathname = /dev/mtd3
117: safe open FD:5 pathname = firmware
Erased 1310720 / 1287168 bytes
Write 1287168 / 1287168 bytes
Verified 1287168 / 1287168 bytes
Update Complete!!
please reboot the system!
#reboot
```

Figure 7-4. Firmware upgrade via TFTP (Command Line)

- ① Connect to Eddy with Telnet.
- ② Enter your username and password.
- ③ After receiving a prompt, issue the following command to download firmware from TFTP server..

```
tftp -g -l firmware -r Eddy_FS_xxx.bin 192.168.0.54
```


[Eddy_FS_xxx.bin] firmware stored in TFTP server is downloaded to Eddy '/var/home/eddy.

- [192.168.0.174] is IP address of the PC that is executing TFTP server program.

- ④ Nothing is printed on the screen, if TFTP transmission is successful .
- ⑤ Move to the directory where the firmware is downloaded, and issue a command [ls] to make sure uploaded firmware file resides in this directory.
- ⑥ Use [fcp -v firmware /dev/mtd2] or [fcp -v firmware /dev/mtd3] command to write new firmware to Flash memory. Commands are case sensitive. Please recheck upper and lower case character before inputting.
'/dev/mtd2' option is a kernel upgrade option, and '/dev/mtd3' is a file system option.
Please verify whether firmware to upgrade is a kernel or file system before carrying on upgrade process
- ⑦ Check if [Erase / Write / Verify] process is successful.
- ⑧ Issue [exit] command to close the telnet, and reset Eddy to start with new firmware.

7.2 Technical Specifications

Category		Specifications
Network	Protocols	TCP, UDP, Telnet, SSH, SSL/TLS, DDNS, ICMP, DHCP, TFTP, HTTP, SNMP 1 & 2
	LAN Port	10/100Mbps RJ-45 Port * 1 (Eddy-S1/Pin, S1/DB9, S2/Pin) 10/100Mbps TTL * 1 (Eddy-S1/TTL)
	Connection Type	Static IP, DHCP
Hardware	CPU	32-bit ARM9 Processor with 168MHz
	Flash Memory	4 MB
	SDRAM	8 MB
	GPIO (Programmable IO)	4 (Eddy-S1/Pin, S2/Pin) 4 (Eddy-S1/TTL) 0 (Eddy-S1/DB9) 0 (Eddy-S1/DB9-PoE)
	LED	100Base-Tx Link, LAN Tx (Eddy-S1/Pin, S2/Pin) Power, Ready, Serial Tx, Rx (Eddy-S1/DB9, Eddy-S1/DB9-PoE) None (Eddy-S1/TTL)
	Power Input	3.3V model or 5V model available (Eddy-S1/Pin, S1/TTL, S2/Pin) 5V DC (Eddy-S1/DB9) 5V DC & PoE (Eddy-S1/DB9-PoE)
	Power Consumption	260mA / 1.5W
	Dimensions	55 * 38mm (Eddy-S1/Pin) 50 * 35mm (Eddy-S1/TTL) 62 * 45mm (Eddy-S1/DB9, S2/Pin)
	Weight	19g (Eddy-S1/Pin) 10g (Eddy-S1/TTL) 32.3g (Eddy-S1/DB9) 21.9g (Eddy-S2/Pin)
Serial	Port	1 (Eddy-S1/Pin, S1/TTL, S1/DB9, S1/DB9-PoE) 2 (Eddy-S2/Pin)
	Interface	Selectable RS232/RS422/RS485
	Speed	Max 921.6 Kbps
	Signals	TX, RX, DTR, DSR, CTS, RTS, DCD

Category		Specifications
Serial	Protection	15KV Surge Protection for all signals
	UART	16C550 with 16 byte FIFO (Eddy-S1/Pin, S1/TTL, S1/DB9) 16C1054 with 256 byte FIFO (Eddy-S2/Pin only)
	Data Bits	5, 6, 7, 8
	Stop Bits	1, 2
	Parity	None, Even, Odd
	Flow Control	RTS/CTS, Xon/Xoff
Environmental	Operating Temp	0 ~ 50° C
	Storage Temp.	-20 ~ 80° C
	Humidity	5 ~ 95% Non-Condensing
Software	O/S	Embedded Linux (Kernel 2.4.x)
	Mgmt. Tools	SNMP, Portview, Web
	Configuration	Telnet, Web, Portview
	Security	Telnet, Web ID/Password, SSH, SSL/TLS
	Application Upload	TFTP, FTP, Web
	Web Service	Embedded Web Server
	COM Port Redirection	SystemBase COM Port Redirector for Windows 98/ME/2K/XP/2003
Approvals	CE Class A, FCC Class A, RoHS compliant	

7.3 Ordering Information

Product	Voltage	Description
Eddy-S1/Pin-3	3.3V Power Input (Pin Header serial interface)	1-port embedded module w/programmability
Eddy-S1/Pin-5	5V Power Input (Pin Header serial interface)	
Eddy-S1/TTL-3	3.3V Power Input (Pin Header serial interface)	
Eddy-S1/TTL-5	5V Power Input (Pin Header serial interface)	
Eddy-S1/DB9	5V Power Input (DC Jack)	
Eddy-S1/DB9-PoE	PoE Input Voltage Range :37V-57V Auxiliary Power Input : 5V only (DC JACK)	1-port embedded module w/programmability & Power-over-Ethernet (PoE) Powered Device (PD) functionality (DB9 serial interface) Automatic power backup when Power Sourcing Equipment (PSE) is out of order PoE input voltage range: 37 to 57V Auxiliary backup power (5V DC) supported
Eddy-S2/Pin-3	3.3V Power Input (Pin Header serial interface)	2-port embedded module w/programmability
Eddy-S2/Pin-5	5V Power Input (Pin Header serial interface)	
Eddy-Serial DK	-	Development Kit for Eddy-Serial Series

7.4 FCC Statement

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

- (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED.
- (3) INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

FCC RF INTERFERENCE STATEMENT

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.