

BE635 User Manual

Rev. V1.0



© 2013-2014 Bolymin, Inc. All Rights Reserved.



Copyright

Copyright © 2013-2014 BOLYMIN, INC. All rights reserved. No part of the materials may be reproduced, copied or translated into any form by any means without prior written consent from BOLYMIN, INC.

Disclaimer

The contents of this document are subject to change without notice. Bolymin, Inc. reserves the right to make changes without further notice to any product herein to improve reliability, function or design. Bolymin, Inc. does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others. Customers are advised to consult with Bolymin, Inc. or its commercial distributors before ordering.

Getting Support

BOLYMIN

Contact Information

Company	BOLYMIN, INC		
A -1 -1	5F, 38 Keya Road, Daya Dist., Central Taiwan Science Park, 42881		
Address	Taichung City, Taiwan, R.O.C.		
TEL	+886-4-2565-8689		
FAX	+886-4-2565-8698		
Web Site	http://www.bolymin.com.tw		
Email	info@bolymin.com.tw		
Service Hour	r 09:00 – 18:00 (UTC/GMT + 8) , Mon. to Fri.		



Revision History

Version	Note	Date
1.0	Original Version	2014/03/17

Table of Content

Chapter 1 Introduction	7
1.1 Features	7
1.2 Board Layout	7
1.3 Block Diagram	8
1.4 Mechanical Dimension	8
1.5 Board Specification	9
1.6 Ordering Information	10
1.7 Package Content	
1.8 Absolute Maximum Ratings	
Chapter 2 Installation	13
2.1 Connectors	
CN1: ISP Pin Definitions	
CN2: System Reset Pin Definitions	
CN7: Power Pin Definitions (micro FIT 3.0)	
CN8: Dual RS232 Pin Definitions	
CN8: One RS232 / One RS422 Pin Definitions	
CN8: One RS232 / One RS485 Pin Definitions	
CN9: SPI & IIC Pin Definitions	
CN10: GPIO / ADC Pin Definitions	
CN11: Mini USB Pin Definitions	
2.2 How to install USB driver	21
Chapter 3 Software Development Tool & Utility	26
3.1 How to program the demo code	27
3.2 Connecting the device	31
3.3 How to operate the demo program	
Running Hyper Terminal	
2nd UART Test	
EEPROM Test	
I2C Test	
SPI Test	
ADC Test	
GPIO Test	
SD Card Test	
Buzzer Test	

Touch panel Draw Test	
LCD Test	
System Setting	51

Chapter 1 Introduction

Welcome to use BE635 which is designed for an embedded control board with 3.5" TFT LCD display for customer to control other peripherals or devices. This chapter is to offer you basic information regarding BE635 to help you incorporate BE635 into your system.

BOLYMIN

1.1 Features

BE635 is designed based on PIC32 32-bit microprocessor, which requires no operating system to run on. Together with a 320x240 3.5" TFT LCD and LED backlight built-in, this all-in-one LCD embedded system BE635 helps designer to enhance a compact design with cost, space, and design phase saving.

Armed with RS232, RS422, RS485, USB, SPI, and I2C interface ports, BE635 is capable of interfacing and communicating with many devices and peripherals .The BE635 is therefore suitable for any industrial control panel for factory automation equipment, electronic instrument, HMI (human-machine interface), office automation equipment, medical equipment, parking system, ticketing system and so on. 512KB in-system self-programmable Flash offers sufficient ROM size for designers to develop their applications.

BE635 is more than simply a Microchip development board: it integrates display and I/O so that developers may start her application without the hassle of hardware integration. Henceforth, a quick time to market for customers' innovative product is ensured.

1.2 Board Layout

This layout shows the location of each important IC, connector and jumper. Please refer to chapter 2 for further information on jumpers and connectors.



1.3 Block Diagram



BOLYMIN

1.4 Mechanical Dimension

(Front and side view)



(Bottom view)



BOLYMIN

1.5 Board Specification

MCU	High-performance, low-power PIC® 32-bit microprocessor		
	Microchip PIC32 MCU		
Memory	512K Bytes In-System Self-Programmable Flash		
	64K Bytes Internal SRAM		
	16K Bytes EEPROM		
Display	3.5" TFT LCD with 320x240 resolution		
	with LED backlight		
Touch Panel	Supports four-wired resistive touch panel		
Serial Ports	Supports 1 x RS232 port, and 1 x RS232/RS422/RS485/USB shared		
	port		
Power	DC 5.0V		

1.6 Ordering Information

Part No. (P/N)	Resolution	Voltage	RS-232	RS-232	RS-422	RS-485	USB (UART)
BE635BM1A1N	320 * 240	5V	\checkmark	\checkmark			
BE635BM1A2N	320 * 240	5V	\checkmark		\checkmark		
BE635BM1A3N	320 * 240	5V	\checkmark			\checkmark	
BE635BM1A4N	320 * 240	5V	\checkmark				\checkmark

BOLYMIN

Note1. If you select USB interface version, you need to install the USB to RS232 driver. Please refer the <u>section 2.2</u> to know how to install the driver.

1.7 Package Content

Please check your package content upon receiving the product parcels. Besides the BE635 unit, make sure the following accessories (User selection) are included as well.

BOLYMIN

NOTE: The term as "**S/N Number**" is the serial number of all accessories provided by Bolymin.

S/N: OPBE657AM1E00	S/N: OPBE657AM1F00	S/N: OPBE657AM1G00
Cable 1: SPI, I2C (20cm)	Cable 2: UART (50cm)	Cable 3: GPIO, ADC (50cm)

S/N: OPBE657AM1010	S/N: OPBE657AM1020	S/N: OPBE657AM1030
4GB @ mss	8 GB @ miggs	Image: Constraint of the second secon
Micro SD 4GB	Micro SD 8GB	Micro SD 16GB

S/N: OPBE657AM1040	S/N: OPBE657AM100A	S/N: OPBE657AM100B
32 GB @		
Micro SD 32GB	Microchip PICKIT 3	Program line
	+ Program line	

Note1. The Cable 1~3 is used for developed.

Note2. The Micro SD 4GB is standard accessory.

1.8 Absolute Maximum Ratings

ltem	Symbol	Min	Тур.	Max	Unit
Operating Temperature	TOP	-20	_	+70	°C
Storage Temperature	TST	-30	_	+80	°C
Supply Voltage For BE635	Vdd-Vss	_	_	6.0	V

Chapter 2 Installation

This chapter covers fundamental information of BE635 connectors, in order to help designers to configure correct settings and connections between BE635 and the respective application.

BOLYMIN

2.1 Connectors

Connectors are the key link between BE635 and external devices. Detailed locations and functions of available connectors are tabled and illustrated below.



Label	Pin No.	Function
1:CN1	5	In-System Programming (ISP)
2:CN2	2	System Reset
3:CN5	5	Mini USB Connector
4:CN6	9	Micro SD
5:CN7	2	DC Power Jack
6:CN9	8	SPI / I2C
Z:CN8	8	Series Interface Input
8:CN10	15	GPIO / ADC Input

CN1: ISP Pin Definitions

Pin No.	Signal	Description
1	/MCLR, VPP	Power
2	VDD_TGT	Power on Target
3	GND	Ground
4	PGD	Connects to PIC32 port PGD1, ICSPDAT
5	PGC	Connects to PIC32 port PGC1, ICSPCLK

BOLYMIN

We recommend using the Microchip PICKit 3 for ISP. Here is the connector definition about ISP. Please refer to the section 1.4 of the programming guide for detailed software operation.



CN2: System Reset Pin Definitions

Pin No	Signal	Pin No.	Signal
1	System Reset	2	VSS
	CNS A	► PIN1	

CN7: Power Pin Definitions (micro FIT 3.0)



Signal	Туре	Pin No.	Description
VSS	Р	1	Logic Power Supply (ground)
VDD	Р	2	Logic Power Supply DC 5.0V,

Mates with micro FIT (3.0) receptacle 43645-0200

CN8: Dual RS232 Pin Definitions



Pin No	Signal	Pin No.	Signal
1	VSS	5	NC
2	RS232 RX_1	6	RS232 RX_2
3	RS232 TX_1	7	RS232 TX_2
4	VSS	8	NC

UART1 of BE635 offers one RS232 port (the voltage level is +/- 12V) for connection with a PC or other RS232 devices.





RS232-2

BOLYMIN

Pin Definition of DB9 Connector:



CN8

CN8: One RS232 / One RS422 Pin Definitions

Pin No	Signal	Pin No.	Signal
1	VSS	5	RS422 TX+
2	RS232 RX	6	RS422 TX-
3	RS232 TX	7	RS422 RX-
4	VSS	8	RS422 RX+



RS232

RS422

Pin Definition of DB9 Connector:



BE635

or

5 TXD+ 6 TXD-

4 VSS

CN5 mini USB

CN8

CN7 OWER JACK

CN8: One RS232 / One RS485 Pin Definitions

Pin No	Signal	Pin No.	Signal
1	VSS	5	RS485 TXD+
2	RS232 RX	6	RS485 TXD-
3	RS232 TX	7	NC
4	VSS	8	NC



RS232



P

Ē

VDD

VSS

RS485

TXD+ TXD-

VSS

Pin Definition of DB9 Connector:



CN9: SPI & IIC Pin Definitions



Pin No	Signal	Pin No.	Signal
1	SDO	5	VSS
2	SS	6	SDA
3	SDI	7	SCL
4	CLK	8	VSS





IIC

CN10: GPIO / ADC Pin Definitions



Pin No	Signal	Pin No.	Signal
1	GPIO1	9	GPIO9
2	GPIO2	10	GPIO10
3	GPIO3	11	GPIO11
4	GPIO4	12	GPIO12
5	GPIO5	13	VSS
6	GPIO6	14	ADC IN
7	GPIO7	15	ADC VSS
8	GPIO8		



GPIO: (I/O Voltage 5.0V / 25mA max)



BOLYMIN

ADC: (Voltage Range = $0 \sim 5V$)

CN11: Mini USB Pin Definitions

Pin No	Signal	Pin No.	Signal
1	VUSB	4	NC
2	D-	5	VSS
3	D+		

2.2 How to install USB driver

The BE635 provides a stand-alone USB to RS232 serial converter (optional). If you select this interface, all what you need to do is to install the USB driver (please download USB driver from URL: http://www.bolymin.com.tw/dl/BE6XX_USB_driver.rar) to your Windows System by referring to below instructions. Take Windows 7 for example, to install the USB driver on Windows 7 for the first time.

BOLYMIN

Step 1: Connect BE635 device to your computer's USB port and power on the BE635.



Step 2: Right-click on Computer from your desktop or Windows Explorer, and select Device
 Manager. Locate and expand Other device, you can see the MCP2200 USB Serial
 Port Emulator.

🚔 Device Manager	
<u>File Action View Help</u>	
∠ Anterior Anteri	
⊳ 1. Computer	
 ▷ The drives ▷ The drives ▷ The drives ▷ The drives 	
P-9 Human Interface Devices □	
p - ੴ Mice and other pointing devices p - ▲ Monitors	
Tetwork adapters	
Gound, video and game controllers System devices	
Universal Serial Bus controllers	

Step 3: Right-click the device name (such as MCP220 USB Serial port Emulator) and select Update Driver Software. This will launch the Hardware Update Wizard.

BOLYMIN

🚔 Device Manager		
File Action View Help		
🔶 🏟 🗖 🗐 📓 🖬 🕺 😫	15	
vincent-PC		
Batteries		
⊳ n the Computer		
Disk drives		
Display adapters		
DVD/CD-ROM drives		
Human Interface Devices		
IDE ATA/ATAPI controllers		
Keyboards		
Mice and other pointing devices		
Monitors		
Network adapters		
Other devices		
MCP2200 USB Senai Port Emular	Undate Driver Software	
	opute on o solution	
Cound under and some some lies	Disable	
Sound, video and game controller	Uninstall	
 Juniversal Serial Bus controllers 	Scan for hardware changes	
	Properties	
Launches the Update Driver Software Wizard for	the selected device.	

Step 4: Select "Browse my computer for driver software".

Ho	w do you want to search for driver software?	
•	Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.	
6	Browse my computer for driver software Locate and install driver software manually.	
	d	

Step 5: Click Browse and locate the USB driver folder (X64 for windows 64 bit system, x86 for windows 32 bit system) and click "OK" to next.

BOLYMIN

Device Manager File Action View Help	
Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains drivers for your hardware. Image: Select the folder that contains driver Image: Select the folder that contains driver	

Step 6: Click Install to install the driver.

🚔 Device Manager			+ 4
File Action View Help			
Ce 🕞 🗓 Update Driver Software -	• Windows Security		
 D D D Installing driver softw D H Installing driver softw 	Would you like to install this device software? Name: Microchip Technology, Inc. Ports (COM & Publisher: Microchip Technology Inc.		
 ▷ ○ K ≤ ▷ ○ ○ ○ M ▷ ○ ○ N ▷ ○ ○ N □ ○ ○ O □ ○ ○ P ▷ ○ ○ Pr 	Always trust software from "Microchip Technology Inc.". You should only install driver software from publishers you device software is safe to install?	Install Don't Install)
⊳⊶¶ Sc ⊳q∰ Sy ⊳-≣ Ut		۶	Display
			9 (

Step 7: Installing driver software.

🚔 Device Manager	
File Action View Help	
Vince B C D <t< th=""><th></th></t<>	

BOLYMIN

Step 8: Now the USB driver installation for BE635 is completed.

🕞 📱 Update Driver Software - USB Serial Port (COM3)	×
Windows has successfully updated your driver software	
Windows has finished installing the driver software for this device:	
USB Serial Port	
	Close



Step 9: You can see the USB Serial Port at Ports (COM & LPT) of device Manager. The following example shows COM3 is available.

📸 Device Manager	
<u>File Action View H</u> elp	
 Wincent-PC Batteries Computer Disk drives Disk drives DVD/CD-ROM drives Wince and other pointing devices Monitors Network adapters Processors Sound, video and game controllers System devices Universal Serial Bus controllers 	

Chapter 3 Software Development Tool & Utility

This chapter will show you how to setup and how to use the hyper terminal to operate the demo program on BE635. Following table lists the recommended software development tool and hardware connection of BE635.

Item	Description
Software	MPLAB Version 8.85
Development Tool	
Programmer	PICkit3
Hardware	
Connection	
	BE 6 35 Demo Test V1 06 Del(MATTERKAM DC) SFI ACC OFFIC Del(MATTERKAM DC) SFI ACC OFFIC Concel Buzzer TP Draw LCD System Concel Buzzer TP Draw LCD System

3.1 How to program the demo code

Step 1: Connect PICkit 3 programmer to the connector **CN1** and provide the power to BE635, which is indicated in below image.

BOLYMIN



Step 2: Start MPLAB IDE by clicking either on the Desktop or Start menu item, how to install the MPLAB IDE, please refer to the BE635 programming guide section 1.2 Software Development Tool Installation.



Step 3: Inside MPLAB IDE, click in the menu bar on File → Import and load the hex file into MPLAB IDE.

MPLAB IDE v8.85							
File Edit View Project	Debugger Prog	rammer Tools	Configure	Window Help			
New Add New File to Project,.	Ctrl+N	Ø 🚚 🛼	?] ┌─	🗾 🗗 🖻	🛛 🖣 🖷 🗘	Checksum:	0×f7d837d6
Open	Ctrl+O						x
Close	Ctrl+E	n Control Fi	nd in Files				
Save	Ctrl+5						
Save As							
Save All	Ctrl+Shift+S	_					
Open Workspace							
Save Workspace							
Save Workspace As							
Close Workspace							
Import							
Export							
Print	Ctrl+P						
Recent Files	•						
Recent Workspaces	•						
Exit		-					
Files Vymbols							
	PIC32MX57	75F512L					

Step 4: Import Hex file.

💦 Open		1	×
Look in:	Hex_	💽 🥝 ৈ 📴 🖽 -	
My Recent Documents Desktop Desktop Libraries Computer My Network	635Integrate.elf	635Integrate hex	
Places	File name:	657Integrate.hex Qpen]
	Files of type:	All Load Files (".hex;".cof;".cod;".elf)	L

BOLYMIN

Step 5: Select Programmer: Inside MPLAB IDE, please select the correct programmer according to your configuration. In the menu bar, please click on Programmer → Select Programmer → PICkit3.

MPLAB IDE v8.85				
File Edit View Project Debugger	Programmer Tools Confi	gure Window Help		
D ≇ ⊟ X ħ € ∅	Select Programmer	None 1 PICSTART Plus	① Checksum:	0xfa28b22b
▏▝▙▝▙▝▙▝▙▝▖	Verify	2 MPLAB ICD 2		
Untitled Workspace Z Output	Read Blank Check All Erase Flash Device Release From Reset Hold In Reset	Steelised Debogger 4 Starter Kit on Board 5 Starter Kits 6 PICkit 3 7 MPLAB ICD 3		×
	Abort Operation Reconnect	8 AN851 Quick Programmer Beta 9 PICkit 2 10 MPLAB PM 3		
	Settings	11 REAL ICE 12 PRO MATE II 13 PICKIt 1		
Files Symbols				
PICkit 3 PIC32	MX575F512L			



Step 6: Power target circuit from PICkit3, check Programmer → Setting → Power and place a checkmark at "Power target from PICkit3".

PICkit 3 Settings	? X
Program Memory Configuration Status Power Programmer to go	
Power target circuit from PICkit 3	
Voltage	
3.299	
OK Abbrechen Übernehmen	lilfe

Step 7: The programmer is connected to MPLAB IDE successfully, when it shows the Device ID Revision in MPLAB IDE.



Step 8: To upload the hex file to your target, please click "Program" icon to upload the hex file to BE635.



3.2 Connecting the device

Below image illustrates how to connect BE635.



- Step 1: Connect the test board connectors (GPIO, Serial port, I2C & SPI connector) if you want to test or use these functions.
- Step 2: Connect the test board with the cable configuration as shown below. Connect the test board to +5V DC



BOLYMIN

Test board



Step 3: To control the device in terminal mode or send / receive data using the 2nd UART, please connect the serial port (1st UART, 2nd UART) cable. The 1st UART serial cable with 3 wires controls the device using a terminal emulator such as HyperTerminal. In order to send and receive data via the RS232/RS422/RS485/USB, connect 2nd UART according to below image (cable with 5 wires).



Step 4: Next, decompress files (BE635_DTP_XXXXXXXX_vXXX.rar) that Bolymin provides and copies the content of demo_pic folder to the micro SD card's main folder and insert the card into BE635.



3.3 How to operate the demo program

BE635 supports touch panel. Bolymin will calibrate the touch panel before shipping out. User can click the screen of BE635 to operate the demo program, if touch panel couldn't work, you can use hyper terminal for terminal emulation and recalibration. The PC keyboard can emulate as an input device to BE635. Here is the step-by-step guide.

BOLYMIN

Running Hyper Terminal

Step 1: Make sure you have at least one RS-232 serial port available. The following example shows COM3 is available.

Re	System Properties		?×	📇 Device Manager	- U ×
	System Restore	Automatic Updates	Remote	File Action View Help	
	General Comp	uter Name Hardware	Advanced		
PIC MPL	Device Manager The Device M on your comp properties of a	anager lists all the hardware devi uter. Use the Device Manager to ny device. Device h	ces installed change the flanager	→ AP-EN → → Batteries → → Computer ⊕ → Disk drives ⊕ → Display adapters ⊕ → DVD/CD-ROM drives ⊕ → DLA TA/ATAPI controllers	
м	Drivers Driver Signing compatible wit how Windows Driver 1	lets you make sure that installed h Windows. Windows Update let connects to Windows Update fo Signing Windows	wre that installed drivers are drows Update lets you set up ndows Update for drivers. Windows Update Windows Update		
	Hardware Profiles Hardware prof different hardv	iles provide a way for you to set u vare configurations. Hardware	ip and store a Profiles	 ⊕ Frocessors ⊕ Sound, video and game controllers ⊕ Sound, video and game controllers ⊕ € System devices ⊕ € Universal Serial Bus controllers ⊕ ⊕ € Universal Serial Bus controllers 	
		OK Cance	Apply	p , , ,	

Step 2: On Windows XP PC: Start → All programs → Accessories → Communication → HyperTerminal (or Windows key +R, enter " hypertrm ")





BOLYMIN

Step 3: Click No if you do not use hyper terminal to telnet to default host.

Default Telnet Program?					
⚠	We recommend that you make HyperTerminal your default telnet program. Do you want to do this?				
	Don't ask me this question again				
	Yes <u>N</u> o				

Step 4: Enter the file name to store the hyper terminal settings. System will auto add a .ht extension name.



Step 5: Select **COM** port as appropriate. Hyper terminal will pull down only valid COM ports.

	nect To	
EI C A P	635 hter details for the phone number that you want to dial: ountry/region: Taiwan (886) rea code: 02 hone number:	
	OK Cancel	Choose a suitable COM port, and click Ok to continue.
Disconnected Auto detect	Auto detect SCROLL CAPS NUM Capture	Print echo



Step 6: It is required to set the serial communication as follows – 115200 bps, / 8/ None/ 1/ None

Bits per second: 115200		
Data bits: 8		
Parity: None		
Stop bits: 1	Ì	Key in COM port setting:
Elow control: None	.	115200/ 8/ No/ 1/ No, and click
	Restore Defaults	

Step 7: Now you plug in the power connector into the unit. The main screen on the device lets you choose the operations. Available operations are showed in Hyper Terminal Screen as depicted below. On your keyboard, hit the respective number to execute the operation.

🎨 635 - Hyper Terminal 📃 🗖 🔀	BE635 Demo Test V1 06
Elle Edit View Cull Ineaster Help D 🚅 📾 🕱 40 79 197	
BE635 Deno Test V1.06 1. 2nd UBRT 2. EEFK0M	
4. SPI 5. ADC	2nd UART EEPROM 12C SPI ADC GPIO
6. GP10 7. SD CARD 8. BUZZER 9. TP 9. TP A. LCD 8. SYSTEM SETTING	
	SD card Buzzer TP Draw LCD System
Connected 00:02:21 Auto detect. 115200 8-W-1 SCROLL CAPS NUM Contrast Practicelo	

(Hyper Terminal Screen)

(BE635 Screen)

Name	Description
2 nd UART	Test of 2 nd UART sending/receiving functionality at different baud rates
EEPROM	Test of EEPROM reading/writing functionality
I2C	I2C EEPROM; test of EEPROM reading/writing functionality
SPI	SPI FLASH; test of FLASH reading/writing functionality
ADC	Oscilloscope display of ADC values versus time
GPIO	General purpose I/O testing. Setting output pins, reading input pins
SD Card	Create File/Read/Write/Delete functionality testing
Buzzer	Application example: Piano
TP Draw	Application example: Touchpad drawing program
LCD	Screen filling examples, displaying images examples
System	Backlight Intensity setting, product information, T/P calibration

2nd UART Test



BOLYMIN

This screen lets you test the 2nd UART functionality

- Step 1: First, connect the 2nd UART to your PC in the same way as you connected the 1st UART as described in section 3.2 connecting the device.
- Step 2: Set a baud rate in HyperTerminal. On BE635, set the same baud rate in the GUI. Available baud rates are 9600, 19200, 38400, 57600, 115200.
- Step 3: On BE635, tap on one of the send buttons (0x55, 0xAA, 0x 00, 0xFF, ABC) to send the characters to the 2nd UART's Hyper Terminal. For example that to send the characters with internal fonts from 1st UART, the Hyper Terminal of 2nd UART will show the characters with internal fonts.

1 st UAF	RT 2 nd UART	
🗞 UART1 - HyperTerminal 🥖	🗞 UART2 - HyperTerminal	X
Eile Edit View Call Iransfer Help 다 ☞ 종 후 다 꿈 닯	Eile Edit Yiew Call Iransfer Help D 😅 🍘 🕉 🖶 🎦 🛱	
2nd UART Test 0. EXIT 1. BaudRate 9600 2. BaudRate 19200 3. BaudRate 38400 4. BaudRate 57600 5. BaudRate 115200 6. Send 0x55 7. Send 0xAR 8. Send 0xAR 8. Send 0xFF A. Send characters with internal fonts Send characters	!"#\$%&`()*+,/0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_'abcdefghijklmno parstuvwxyz[]}~	
Connected 00:04:57 Auto det	Connected UU3U1:30 Auto detect 11520U 8-N-1 SCROLL CAPS NUM Capture Frint ecno	



Step 4: Type in the 2nd UART's HyperTerminal "Hello World". The sent string now shows in the receive area on the device.

2 nd UART Te	est .
0x55 0xAA 0x00 0xFF ABC Image: Constraint of the second s	Baudrate 9600 57600 9600 115200 19200 115200 38400

Step 5: Once the receive area is full, you can delete the contents with the broom

Step 6: In Terminal mode, the screen shows as depicted below. Please hit the respective number to execute the operation on your keyboard,.

ð

🎭 635 - Hyper Terminal	
Eile Edit Yiew Call Transfer Help	
D 📽 🛯 🕉 🚥 💾 🗳	
2nd UART Test	^
0 FXTT	
1 B	
2. BaudRate 9600	
3. BaudRate 38400	
5. BaudRate 115200	
6. Send 0x55	
7. Send 0×AA	
9. Send 0xFF	
H. Send characters with internal fonts	
Current BaudPate: 115200	
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Connected 00:06:47 Anto detect 11:5200 8-M-1 SCROLL   CAPS	NIL Capture Print etho

#### **EEPROM Test**

This screen lets you test the EEPROM's functionality



- Step 2: With the LO/HI page button , address are switched to current address + 8 and back.
- Step 3: Select a value (0x55, 0xAA, 0x 00, 0xFF) with which you would like to fill the current memory page (fills low and high page).
- Step 4: In Terminal mode, the screen shows as depicted below, on your keyboard, please hit the respective number to execute the operation.

File Edit Viete Call Transfer Help	الأسار الأسار
Die Ster Des Zur Denter Heb.	
D 📽 🚳 🐉 40 🗃 🖼	
EEPROM Test	^
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	
1 - 55 2 - AA 3 - 00 4 - FF	
	v
C III	> >

#### **I2C Test**

This screen lets you test the I2C EEPROM's functionality¹. Please make sure the test board is connected to BE635 and 5V power supply is connected to the test board.



- Step 1: Select a value with which you would like to fill the current memory high and low memory page: 0x55, 0xAA, 0x 00 or 0xFF.
- Step 2: With the LO/HI page button *(in address are switched to current address + 8 and back.*
- Step 3: In Terminal mode, the screen shows as depicted below, on your keyboard, please hit the respective number to execute the operation.

G35 - HyperTerminal	- 🗆 🗡
File Edit View Call Transfer Help	
	1.5
T2C Tast	
120 Test	
0000 - FE	
1 0010 - FF F	
0020 - FF F	
0030 - FF F	
0040 - FF F	
0050 - FF F	
1 0060 - FE	
AABA - FE	
1 00CO – FF F	
00D0 - FF F	
00E0 - FF F	
00F0 - FF F	
1 - JJ 2 - HH J - 00 4 - FF	
- J.	
Connected 00:04:31 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	

¹ The I2C EEPROM is an application example by Bolymin. Any kind of I2C device can be connected to BE635

#### **SPI Test**

This screen lets you test the SPI FLASH's functionality². Please make sure the test board is connected to BE635 and a 5V power supply is connected to the test board.



- Step 1: Select a value with which you would like to fill the current memory high and low memory page: 0x55, 0xAA, 0x00 or 0xFF.
- Step 2: With the LO/HI page button —, address are switched to current address + 8 and back.
- Step 3: In Terminal mode, the screen shows as depicted below, on your keyboard, please hit the respective number to execute the operation.

🖪 635 - HyperTerminal	
File Edit View Call Transfer Help	
SPI Test0000- FF	
Connected 00:04:54 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	11.

² The SPI FLASH is an application example by Bolymin. Any kind of SPI device can be connected to BE635



This screen lets you test the ADC's functionality. Please make sure the test board is connected to BE635 and a 5V power supply is connected to the test board.



BOLYMIN

Step 1: Vary the potentiometer on the test board and observe the values being drawn on the screen.



Step 2: In Terminal mode, the screen shows as depicted below, on your keyboard, please hit 0 to exit the test.

2 <u>93</u> 08 2	
ADC Test	
0. EXIT	
Value: 1.4 V	

#### **GPIO Test**

This screen lets you test the general purpose I/O functionality, please make sure the test board is connected to BE635 and a 5V power supply is connected to the test board.

BOLYMIN



Step 1: The GUI lets you see the state of the GPIO pins. In the demo test program, GPIO_1 ~ GPIO_6 are set as input pins and GPIO_7 ~ GPIO_12 are output pins. Whenever the value of the input pins change, the value of related output pins will change accordingly. Here is the mapping table of demo test program. You can change the I/O mode of each pin in your program. Detailed information about GPIO control can be found in section 2.8 of the programming guide.

Input pin	GPIO_1	GPIO_2	GPIO_3	GPIO_4	GPIO_5	GPIO_6
Output pin	GPIO_7	GPIO_8	GPIO_9	GPIO_10	GPIO_11	GPIO_12

For above setting of the output pins (8, 9, 11, 12 high level), the results can be seen in the image below.





Step 2: In Terminal mode, this screen shows as depicted below. On your keyboard, please hit 1-6 to toggle the state of the output pins. In the MODE line, the mode of the GPIO pins are shown with GPIO pin 1 on the left and pin12 on the right (I=Input, O=Output). The VALUE line displays the state of the pin. Press 0 to return to the main screen.

635 - HyperTerminal     Els Eds View Call Transfer Hele	×
GPIO Test         0. EXIT         1. Switch GPI0_7         2. Switch GPI0_8         3. Switch GPI0_10         5. Switch GPI0_11         6. Switch GPI0_11         6. Switch GPI0_12         MODE       : I I I I I I 0 0 0 0 0 0         VALUE       : 0 0 0 0 0 0 1 1 1 1 1	
Connected 00:10:14 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	

#### **SD Card Test**



BOLYMIN

This screen lets you test the SD Card's read/write/delete functionality.

Step 1: From the operations on the right hand side, choose "Create", "Read", "Write" or "Delete". The contents of the file on the device are shown in the contents area.

ICON	Description
C S	Create new txt file on SD card
	Read txt file contents of SD card and display on BE635
	Write the string to txt file on SD card
	Delete the txt file of SD Card

Step 2: The different operations performed on the device will show the results as depicted in below images.

SD Card Test Test file name : Test File . txt File content	SD Card Test Testfilename: TestFile.txt Filecontent This is a test string.	SD Card Test Test file name : Test File.txt		
Create new test file OK.	Write string to file OK.	Test file is deleted.		
Create	Write	Delete		



🖪 635 - HyperTerminal	
File Edit View Call Transfer Help	
SD Card Test	
0. EXIT 1. Create/Empty test file. 2. Read test file Content 3. Write a test string to test file. 4. Delete test file. -	
Connected 00:17:03 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	

BOLYMIN

Step 4: On your keyboard, please hit the respective number to execute the operation.

II 635 - HyperTerminal File Edit View Call Transfer Help D 2 3 0 3 10 12 12 12	II 635 - HyperTerminal File Edit View Call Transfer Help DE 图 图 图 图 图	I 635 - HyperTerminal File Edit View Call Transfer Help 교환 중 III 가 III
SD Card Test	SD Card Test	SD Card Test
0. EXIT	0. EXIT	0. EXIT
<ol> <li>Create/Empty test file.</li> <li>Read test file Content</li> <li>Write a test string to test file.</li> <li>Delete test test file.</li> </ol>	1. Create/Empty test file. 2. Read test file Content 3. Write a test string to test file. 4. Delete test file.	<ol> <li>Create/Empty test file.</li> <li>Read test file Content</li> <li>Write a test string to test file.</li> <li>Delete test test file.</li> </ol>
Create/Empty test file successfully.	>> Read data from test file: This is a test string.	Test file is deleted.
Connected 00: 17:52 Create	Connected 00: 19:05 Au Read	Connected 00: 19:48 Delete





BOLYMIN

This screen lets you test the Buzzer functionality.

- Step 1: Hit the black or white keys on the piano. The respective note will be played through the buzzer.
- Step 2: In Terminal mode, the screen shows as depicted below, on your keyboard, please hit the respective number to play a certain tone. Press 0 to return to the main screen.

🔣 635 - HyperTerminal						 ×
File Edit View Call Transfer Help						
De 🧟 🕒 🖻 👘						
BUZZER Test 0. EXIT 1. DO 2. RE 3. MI 4. FA 5. SO 6. LA 7. SI 8. DO -						
Connected 00:20:19 Auto detect	115200 8-N-1	SCROLL CAP	anture	Print echo	1	1.5

## **Touch panel Draw Test**

Hello World Back to main screen

BOLYMIN

This screen lets you test the touchpad functionality using a simple drawing program.

Step 1: Write text or hit certain coordinates and check in the terminal window, if the coordinates is not match the coordinates of the touched point. A calibration might be necessary before using the drawing program.

BE635- HyperTermi	nal ranofar Hala								
Touch Panel Ø. EXIT (338, 239) (337, 239) (337, 239) (337, 239) (337, 239) (337, 238) (337, 23	Test			I					
Connected 00:24:33	Auto detect	115200 8-N-1	SCROLL	CAPS	NUM	Capture	Print echo		11.

#### **LCD Test**

This screen lets you test the image and built in font functionalities.

186335-hyperforminal         _CX           File Edit Veer Cell Transfer Help		L	CD Tes	s t	
Connected 00.52-45 Auto detect 11.5200 84-1 [CCOLL CAPE NUM Capture Peritadio	Red PIC A	Green FIC B	Blue FIC C	White A Font	Black Back
(Hyper Terminal Screen)		(B	E635 Sc	reen)	

BOLYMIN

Step 1: Operations that can be performed are filling the screen with red, green, blue, white, and black as well as showing images and fonts.



#### **System Setting**

This screen lets you set the system's backlight intensity, display the product information and calibrate the touch panel.

BE555*HyperFerminal     EDSS*HyperFerminal     EDS     Figure 7 Figur	System setting
System setting 0. EXIT 1. Racklight adjustment	
2. Product information 3. Calibration	Backlight Product Info Calibration Back
Connected 00:00:33 Auto detect 115500 84-1 (501:01. (2495 NLM Conture Print esto A	

(Hyper Terminal Screen)

(BE635 Screen)

ICON	Description
Backlight	The backlight can be adjusted from 10% to 100% in steps.
Product Info	The product information displays the product information stored in memory.
Calibration	Calibration is performed by using 5-points calibration where each of the 5 points is being touched successively.







