Bluetooth 1.2 USB module (BM-GP-CS-08)

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Introduction

The Bluetooth Class 2 Module (model number BM-GP-CS-08) is a small module with 10-way connector that provides a complete 2.4GHz Bluetooth system. This ready-to-use Class2 Bluetooth module provides a fully compliant Bluetooth system V1.2 for data and audio communications.

This module also provides the coexistence solution that is critical for Notebook implementation. The coexistence solution includes AFH, and WCS (Wireless Coexistence Solution). Activity Signaling is an option.

Feature

- Fully Qualified Bluetooth v1.2 system
- Enhanced Data Rate(EDR) compliant with v0.9 of specification for both 2Mbps & 3Mbps modulation modes
- Scatternet Support
- With small size suitable for compact system integration. Low power consumption, extend the battery life.
- 2.402 – 2.4835 GHz frequency band.
- Support for 802.11b/g Coexistence including Intel WCS (Wireless Coexistence System).
- Integrated Printed Antenna
- Easy for integration into mobile and handheld device with flexible system configuration and antenna design.
- On board 8 Mbits flash memory for firmware upgrade

Bluetooth USB Module (BM-GP-CS-08)

General Description

Features	Description
Standards	Fully compliant with Bluetooth™ 1.2 Standard
Frequency Band	2.402GHz ~ 2.4835GHz
Sensitivity	-82 dBm
Output Power	4 dBm max with power control (Maximum Power measurement is from chip set)
Integrated Antenna	Peak Gain @ 2.45GHz: 0.5dBi
Coverage	10m ~20m (Varies depending on operating environment)
Temperature	Operating temperature: 0 °C to +70 °C Storage temperature: -40 °C to +85 °C
Operating Voltage	3.3V DC +/- 10%
Power Consumption	Peak RF current during TX burst: 65 mA Peak RF current during RX burst: 47 mA
Data Rate	Asynchronous:723.2kbps/57.6kbps Synchronous:433.9kbps/433.9kbps
Interface	JST SM10B-SRSS-TB connector
Dimensions	Length: 36.0 mm, Width: 13.8 mm, Height: 3.8 mm
Weight	2.0 grams +/- 15%
Operating systems	Windows 98SE/ME/2000/XP

Electrical Connector Pinout

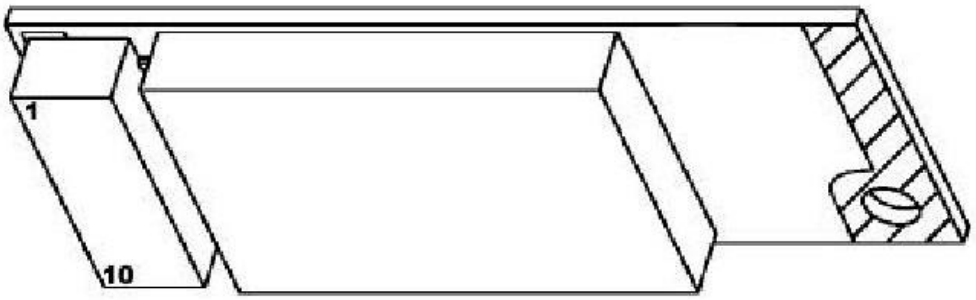


Figure 1: Connector pin assignment

Pin Number	Pin Name	Description
1	GND	Ground
2	USB_D+	USB D+
3	USB_D-	USB D-
4	RSVD	Reserved for BT_Active output to 802.11b for Co-Existence. This is optional if you need Activity Signalling scheme.
5	BT_Priority / Ch_Clk (PIO4)	BT Priority and Channel Clock for WCS.
6	HW_RADIO_DIS# (Optional)	Disable radio transmissions when low
7	Ch_Data (PIO6)	Channel Data for WCS (Standard). Or, WLAN_Active input from 802.11b for Activity Signalling which is optional.
8	+3.3V	3.3V power input
9	LED	LED indicator for radio activity
10	GND	Ground

Table 2: Connector pin assignment

Block Diagram

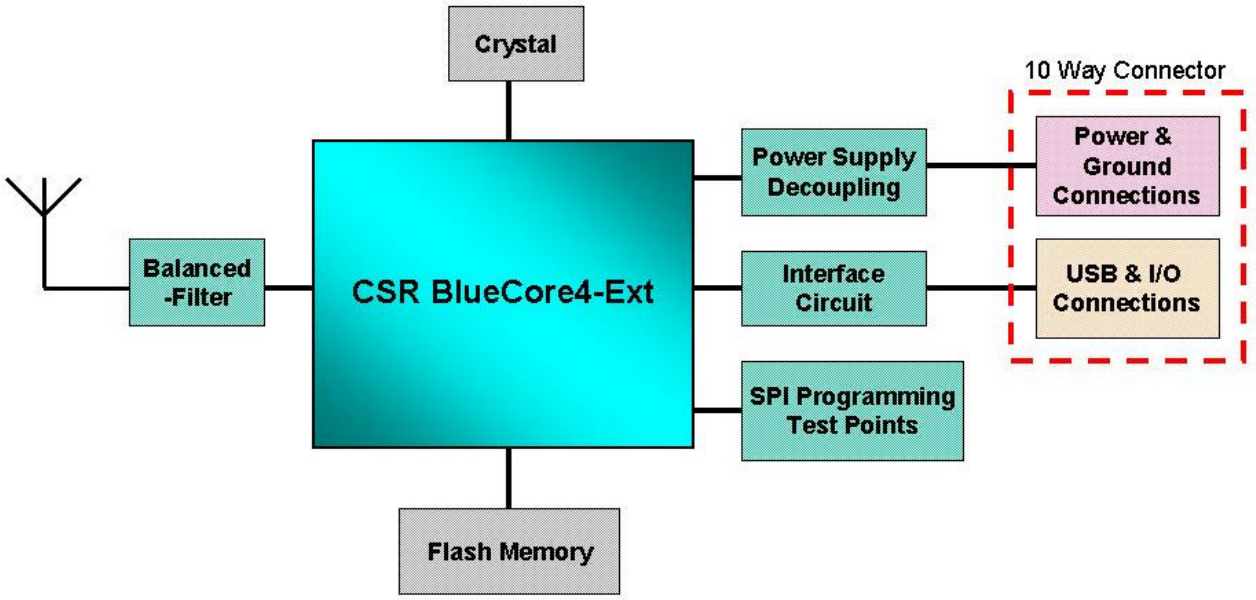


Figure 2: Module Block Diagram

Electrical Characteristics

Absolute Maximum Ratings		
Rating	**Min**	**Max**
Storage Temperature	-40 °C	+85 °C
Supply Voltage: VDD	-0.40V	+3.60V

Recommended Operating Conditions		
Operating Condition	**Min**	**Max**
Operating Temperature Range*	0 °C	+70 °C
Supply Voltage: VDD	+3.0V	+3.60V

Input/Output Terminal Characteristics				
Digital Terminals	Min	Typ	Max	Unit
Input Voltage				
VIL input logic level low (VDD=3.0V)	-0.4		+0.8	V
VIH input logic level high	0.7VDD	-	VDD+0.4	V
Output Voltage				
VOL output logic level low, (I_O = 4.0mA), VDD=3.0V	-	-	0.2	V
VOH output logic level high, (I_O = -4.0mA), VDD=3.0V	VDD-0.2	-	-	V
USB Terminals	Min	Typ	Max	Unit
Input threshold				
VIL input logic level low	-	-	0.3VDD	V
VIH input logic level high	0.7VDD	-	-	V
Input leakage current				
VSS < VIN< VDD	-1	1	5	µA
CI Input capacitance	2.5	-	10	pF
Output levels to correctly terminated USB Cable				
VOL output logic level low	0	-	0.2	V
VOH output logic level high	2.8	-	VDD	V

Average Current Consumption		
VDD=3.3V Temperature = 20°C		
Mode	**Typ**	**Unit**
ACL data transfer 1Mbps USB (Slave)	50	mA
ACL data transfer 1Mbps USB (Master)	58	mA
Standby Mode (Connected to host, no RF activity)	10	mA
Deep Sleep	380	uA

Peak Current Consumption		
VDD=3.3V Temperature = 20°C		
Mode	**Typ**	**Unit**
Peak RF current during TX burst (+4 dBm , CW mode)	55.0	mA
Peak RF current during TX burst (0 dBm , CW mode)	52.0	mA
Peak RF current during RX burst (-82 dBm)	44.0	mA

Radio Characteristics

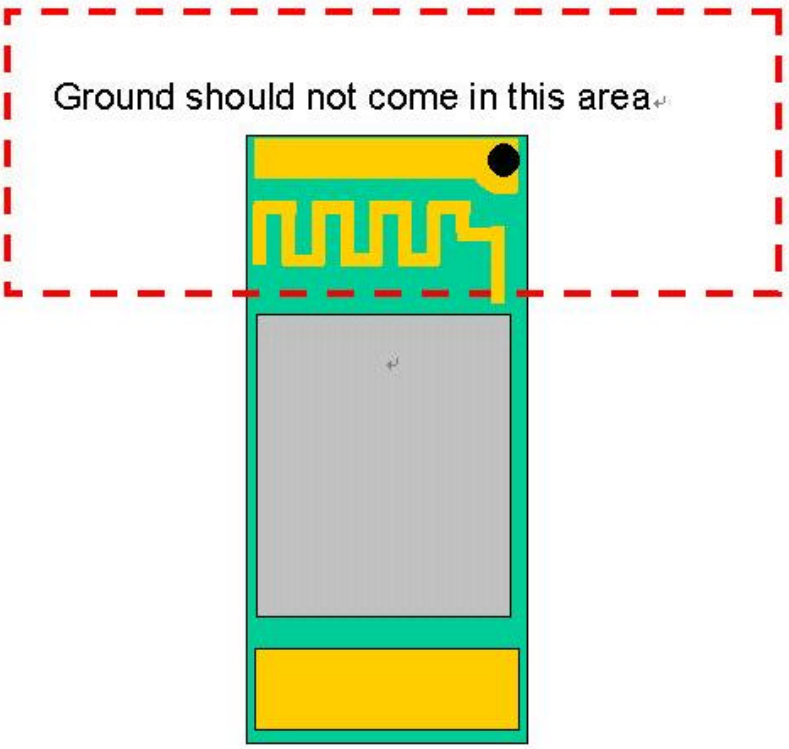
Radio Characteristics, VDD = 3.3V Temperature = +20°C						
Receiver	**Frequency (GHz)**	**Min**	**Typ**	**Max**	**Bluetooth Specification**	**Unit**
Sensitivity at 0.1% BER	2.402	-	-82	-78	≤–70	dBm
	2.441	-	-84	-80		dBm
	2.480	-	-84	-80		dBm
Maximum received signal at 0.1% BER	2.402	0	-	-	≥-20	dBm
	2.441	0	-	-		dBm
	2.480	0	-	-		dBm
Transmitter	**Frequency (GHz)**	**Min**	**Typ**	**Max**	**Bluetooth Specification**	**Unit**
RF transmit power	2.402	-3	4	-	-6 to +4[4]	dBm
	2.441	-3	4	-		dBm
	2.480	-3	4	-		dBm
Initial carrier frequency tolerance	2.402	-	10	35	75	kHz
	2.441	-	10	35		kHz
	2.480	-	10	35		kHz
RF power control range		25	35	-	≥16	dB
20dB bandwidth for modulated carrier		-	820	1000	≤1000	kHz
Drift (five slot packet)		-	±15	±25	±25	kHz
Drift Rate		-	±250	±400	±400	Hz/µs
	Frequency (GHz)	**Min**	**Typ**	**Max**	**Bluetooth Specification**	**Unit**
?f1avg " Maximum Modulation"	2.402	140	165	175	140≤f1avg≤175	kHz
	2.441	140	165	175		kHz
	2.480	140	165	175		kHz
?f2max " Minimum Modulation"	2.402	115	140	-	≥115	kHz
	2.441	115	140	-		kHz
	2.480	115	140	-		kHz

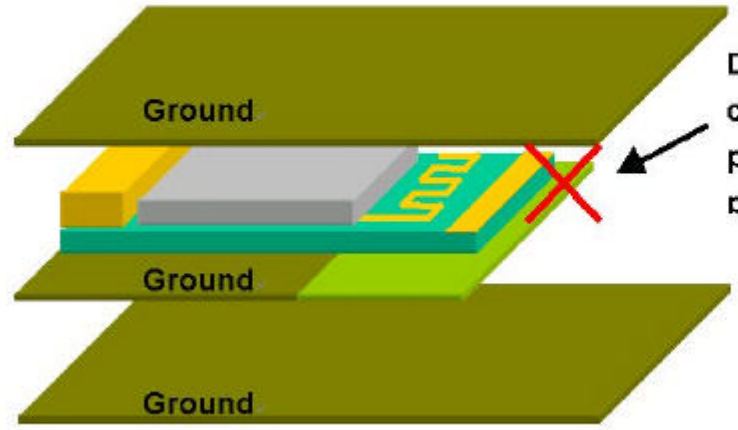
Notes:
Results shown are referenced to input of the RF Balanced-Filter.

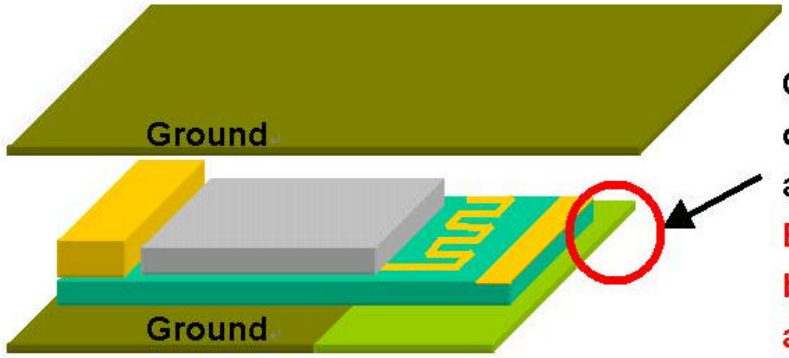
Radio Characteristics, C/I and Adjacent Channel Power VDD = 3.3V Temperature = +20° C Frequency = 2441 MHz					
Receiver	**Min**	**Typ**	**Max**	**Bluetooth Specification**	**Unit**
C/I co-channel	-	9	11	≤11	dB
Adjacent channel selectivity C/I F=F_0+1MHz	-	-4	0	≤0	dB
Adjacent channel selectivity C/I F=F_0-1MHz	-	-4	0	≤0	dB
Adjacent channel selectivity C/I F=F_0+2MHz	-	-35	-30	≤-30	dB
Adjacent channel selectivity C/I F=F_0-2MHz	-	-21	-20	≤-20	dB
Adjacent channel selectivity C/I F=F_0+3MHz	-	-45	-40	≤-40	dB
Adjacent channel selectivity C/I F=F_{Image}	-	-18	-9	≤-9	dB
Adjacent channel selectivity C/I F=F_0-4MHz	-	-25	-20	≤-20	dB
Transmitter	**Min**	**Typ**	**Max**	**Bluetooth Specification**	**Unit**
Adjacent channel transmit power F=F_0±2MHz	-	-35	-20	≤-20	dBm
Adjacent channel transmit power F=F_0±3MHz	-	-45	-40	≤-40	dBm

Mounting Guide for Antenna Radiation

In order to achieve longest communication range, please keep the area surrounding antenna free of grounding or metal housing.



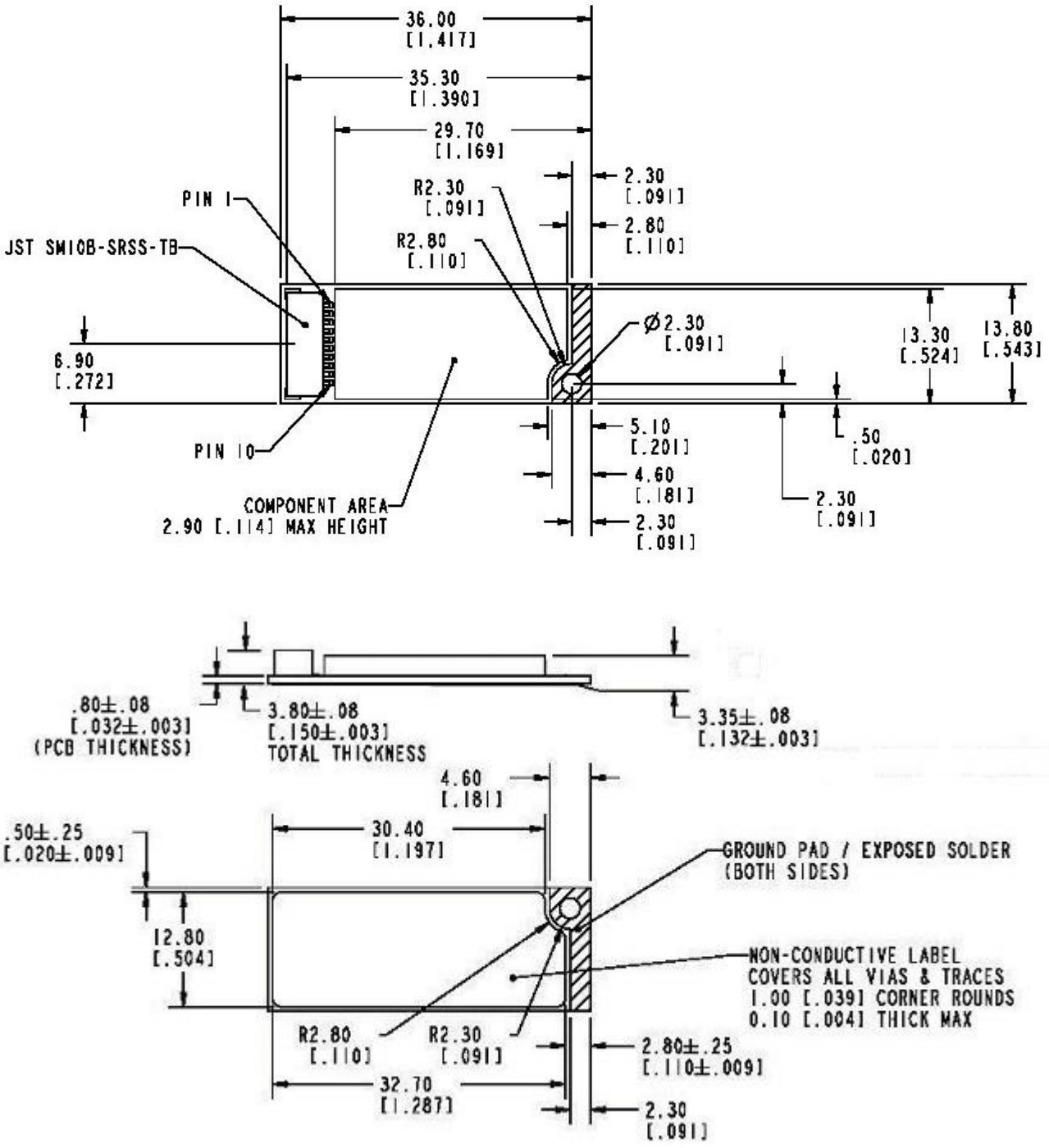




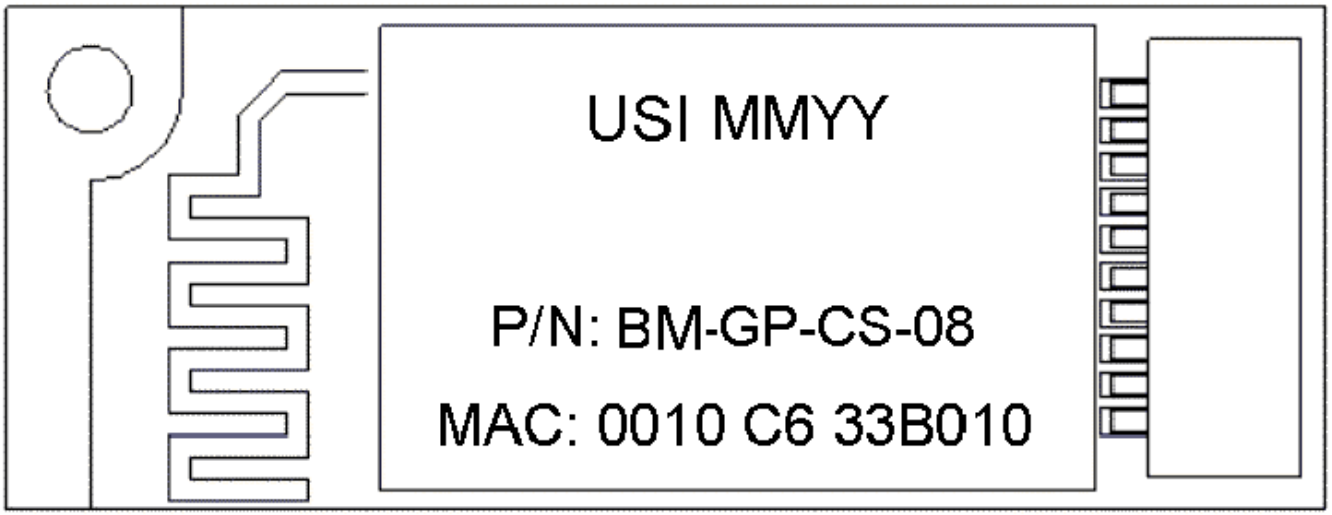
Impedance Matching of Antenna

BM-GP-CS-08 utilizes a meander line printed antenna for radiate communication. Application environments, such as notebooks, PDAs, headsets or other handheld devices, both have plastic housings, different motherboards and other mechanism structures. These factors will cause the deviation of antenna resonant frequency. Therefore, impedance matching of antenna should be optimized for various applications to achieve longest communication range. Please consult USI for further information.

Mechanical Drawing



Laser Marking

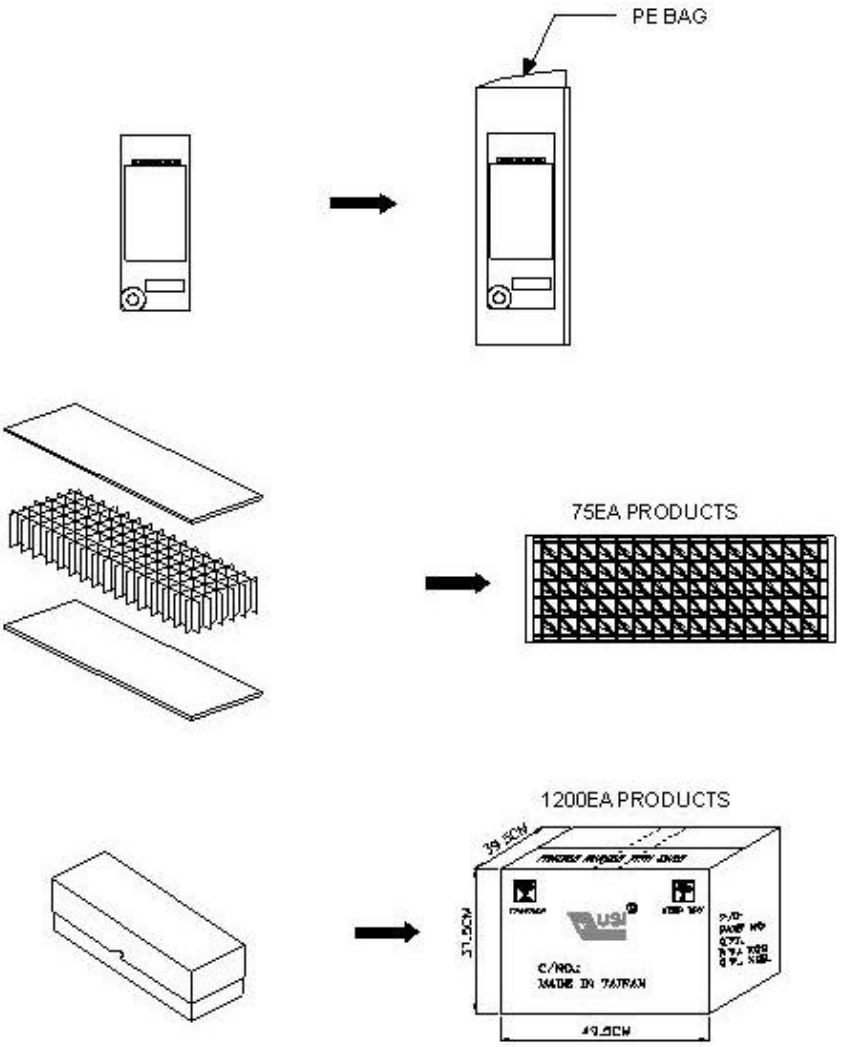


Legend:
1. USI MMYY: MMYY is the date code. MM stands for month while YY stands for the last 2 digits of the year.

2. P/N: BM-GP-CS-08 is the the standard USI model number. This part number can be customize to your specific part number.

3. MAC: MAC address.

Packaging



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