PMA(Power Measurement Adapter) Operation Description

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1. PMA DC +5V power can be supplied by using AC220V to DC adapter. Using DC-DC convert on PMA, +5V is converted to +3.3V to supply power for all the devices on PMA including MSP430.

2. DC +5V is supplied to PS-PMA-PS206 module which ZigBee module is installed on it. PMA communicated with PCAP(Power Control Access Point, WiFi/Ethernet to ZigBee protocol converter) through ZigBee wireless protocol and might controller by remote registered user to block or unblock AC 220V electricity. It also can be used for the user to monitor AC input voltage and power consumption.

   In addition, the power consumption of electrical appliances plugged into the outlet by measuring the PS-PMA-ZBB-206 board ZigBee modules through the collection device, PCAP (Power Control Access Point: Power control wireless AP) using the ZigBee (2.4 GHz) communication protocol

3. Using a dedicated chip, MG2455 RadioPulse's ZigBee controller is designed to communicate with PCAP. The ZigBee It requires external Power 3.3V and on-chip voltage regulator converts 3.3V to 1.5V to supply power for 2.4GHz frequency circuit inside of MG2455 and external impedance matching circuit. The MG2455 use operational clock 16MHz and also use 32.768Kz for the real time clock. Radio signal which carries user information output in the air through impedance matching circuit and chip type antena on ZBM(ZigBee Module).

4. BLUEBIRD-XP206 board supply DC +5V power to ZBM carrier, SPS-PMA-ZBB-PS206 and gathers real-time data (RTC), Human detection sensor (PIR,) data, AC input voltage and current consumption and stores gathered data into Storage device (Serial EEPROM). The stored data is polled by PCAP using ZigBee (2.4 GHz) protocol.

   Firmware for SPS-PMA-ZBB-PS206 board can be updated by using debugger port.

5. The main control unit (Main Control Unit: MSP430) accepts +3.3 V power supply and connected with both 16Mhz and 32.768KHz for internal circuits and real time operation. To measure AC voltage and current, AC voltage measurement circuit input to MSP430 through pin 6 and 7 and AC current measurement circuit Is input to pin 2 and 3. It is also connected to ZigBee commnication module using UART(Univeral Asynchronous Receiver and Transmitter) serial interface through pin 59 and 60. The module is used for the communication with PCAP through ZigBee 2.4GHz protocol.

6. Using the measured AC power voltage and current, power consumption can be calculated. The measured data is stored in the storage device through

SPI(Serial Peripheral Interface) through pin 6 and 5. Pin 6 is clock and pin 5 is data to be stored or retrieved from storage device.