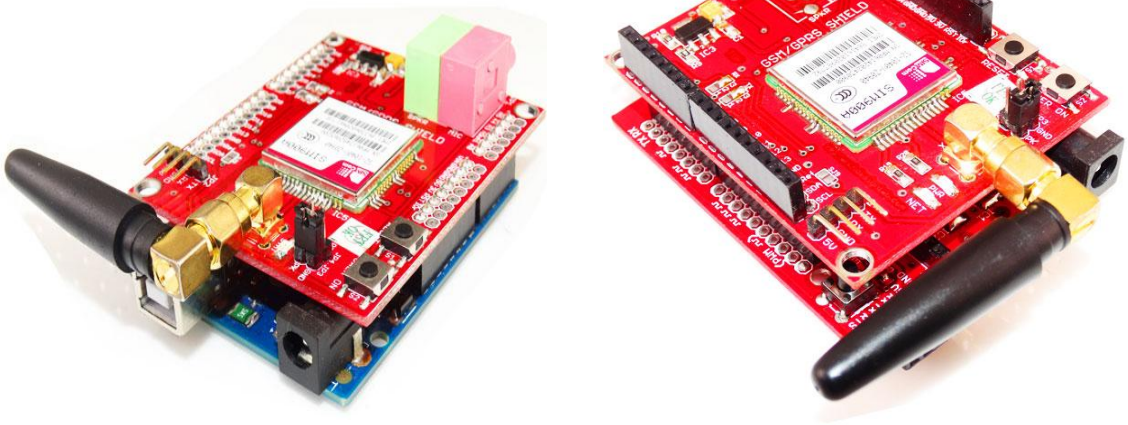


GPRS /GSM SIM900A MODEM WITH ARDUINO COMPATIBLE

USER MANUAL

Contents

Overview

GPRS /GSM SIM900A MODEM WITH ARDUINO COMPATIBLE

This is a very low cost and simple Arduino GSM and GPRS shield. We use the module SIMCom SIM900A.

The Shield connects your Arduino to the internet using the GPRS wireless network. Just plug this module onto your Arduino board, plug in a SIM card from an operator offering GPRS coverage and follow a few simple instructions to start controlling your world through the internet. You can also make/receive voice calls (you will need an external speaker and microphone circuit) and send/receive SMS messages

There are two modules

1. GSM SHIELD WITH STACKABLE UNO HEADERS ON BOTH SIDES(WITH NOMIC AND SPEAKER)
2. GSM SHIELD WITH SINGLE UNO HEADERS WITH MIC AND SPEAKER

Features

- Dual-Band GSM/GPRS 900/ 1800 MHz.
- RS232 interface for direct communication with computer or MCU kit.
- Configurable baud rate.
- Power controlled using 29302WU IC.
- ESD Compliance.
- Enable with MIC and SPeaker socket.
- With slid in SIM card tray.
- With Stub antenna .
- Stackable UNO headers
- optional power on through microcontroller.
- External serial pins.

Datasheets

- AT Commands datasheet
  https://drive.google.com/a/researchdesignlab.com/file/d/0BzrGD4zr88GnTkJwSll3dnhKbTg/edit?usp=sharing
- FTP Commands datasheet
  https://drive.google.com/a/researchdesignlab.com/file/d/0BzrGD4zr88GnVkhacjUtY2tIU2c/edit?usp=sharing
- TCP/IP Commands datasheet
  https://drive.google.com/a/researchdesignlab.com/file/d/0BzrGD4zr88GnUHRCQlJwUjdWTVU/edit?usp=sharing

Basic AT Commands for Testing

GSM AT Commands:

- TO CHECK THE MODEM:
  AT ↲
  OK
- TO CHANGE SMS SENDING MODE:
  AT+CMGF=1 ↲
  OK
- TO SEND NEW SMS:
  AT+CMGS=”MOBILE NO.” ↲
  <MESSAGE
  {CTRL+Z}
- TO RECEIVE SMS
  AT+CMGD=1 ↲ {to delete the message in buffer}
  AT+CMGR=1 ↲ {to receive first message AT+CMGR=1}
  {to receive second message AT+CMGR=2 and so on}
  +CMGL: 1,"REC READ","+85291234567",,"07/05/01,08:00:15+32",145,37
  <MESSAGE
- PREFERRED SMS MESSAGE STORAGE:
  AT+CPMS=? ↲
  +CPMS: (“SM”),(“SM”),(“SM”)
  OK
  AT+CPMS? ↲
  +CPMS: “SM”,19,30,”SM”,19,30,”SM”,19,30
- TO MAKE A VOICE CALL:
  ATD9876543210; ↲
- TO REDIAL LAST NO:
  ATDL ↲
- TO RECEIVE INCOMING CALL:
  ATA ↲
- TO HANGUP OR DISCONNECT A CALL:
  ATH ↲
- TO SET A PARTICULAR BAUDRATE:
  AT+IPR=? ↲ {To view the baud rate values}
  AT+IPR=0 ↲ {To set the modem to autobauding mode}
- OPERATOR SELECTION:
  AT+COPS=? ↲
  OK
  AT+COPS? ↲
  +COPS: 0,0,”AirTel”
  OK

- AT+CRC SET CELLULAR RESULT CODES FOR INCOMING CALL INDICATION:

  AT+CRC=? ↲
  +CRC: (0-1)
  OK
  AT+CRC? ↲
  +CRC: 0
  OK
  AT+CRC=1 ↲
  OK
  +CRING: VOICE

- READ OPERATOR NAMES.

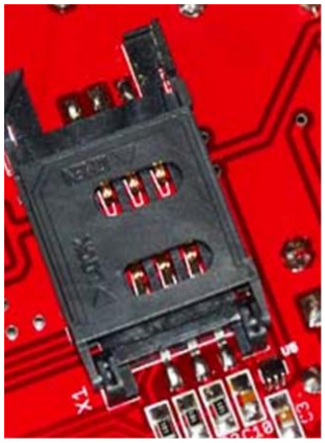
  AT+COPN=? ↲
  OK
  AT+COPN ↲
  +COPN: “472001″,”DHIMOBILE”
  +COPN: “60500
  +COPN: “502012″,”maxis mobile”
  +COPN:
  +COPN: “502013″,”TMTOUCH”
  +COPN
  +COPN: “502016″,”DiGi”
  +COPN: “502017″,”TIMECel”"
  +COPN: “502019″,”CELCOM GSM”

GPRS Commands:

Command	Description
AT+CGATT ↲	ATTACH/DETACH FROM GPRS SERVICE
AT+CGDCONT ↲	DEFINE PDP CONTEXT
AT+CGQMIN ↲	QUALITY OF SERVICE PROFILE (MINIMUM ACCEPTABLE)
AT+CGQREQ ↲	QUALITY OF SERVICE PROFILE (REQUESTED)
AT+CGACT ↲	PDP CONTEXT ACTIVATE OR DEACTIVATE
AT+CGDATA ↲	ENTER DATA STATE
AT+CGPADDR ↲	SHOW PDP ADDRESS
AT+CGCLASS ↲	GPRS MOBILE STATION CLASS
AT+CGEREP ↲	CONTROL UNSOLICITED GPRS EVENT REPORTING
AT+CGREG ↲	NETWORK REGISTRATION STATUS
AT+CGSMS ↲	SELECT SERVICE FOR MO SMS MESSAGES
AT+CGCOUNT ↲	GPRS PACKET COUNTERS

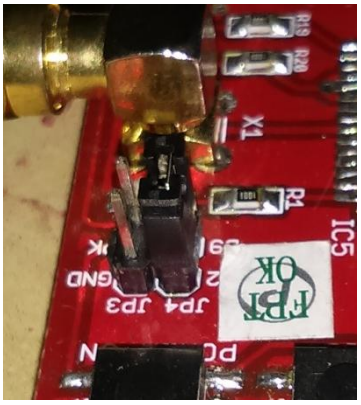
MODULE SETUP

step 1 : Insert SIMcard into the SIM slot.



SIM CARD SLOT

step 2 : power ON through Controller (Place Jumper on JP4 of GSM shield)



step 3 : power ON automatically (Place Jumper on JP3 of GSM shield)

step 4 : Press and hold power button (To turn on manually without jumper)

step 5 :compile and burn the sample code given below to UNO board and then mount the GSM Shield.

SAMPLE CODE:

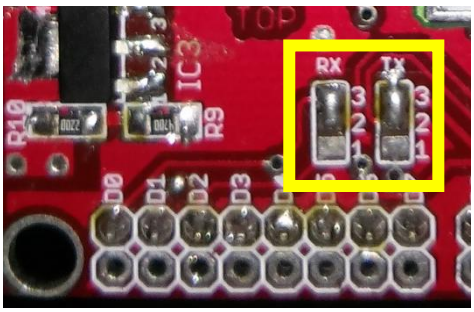
```
void setup()
{
Serial.begin(9600);
delay(5000);
}
void loop()
{
Serial.println("AT");
delay(1000);
Serial.println("AT+CMGF=1");
delay(1000);
Serial.println("AT+CMGS=\"1234567890\""); //CHANGE TO DESTINATION NUMBER
delay(1000);
Serial.print("hi");
Serial.write(26);
delay(1000);
}
```

Step 6 : Padding configuration

Short 3 and 2 by manual soldering to select hardware RX and TX(D0 and D1)

Or

Short 1 and 2 by manual soldering to select Software RX and TX (D2 and D3)



*default padding is set D0 and D1

POWER MODES

Power down mode

SIM900A is set power down mode by "AT+CPOWD=0"

There are two methods for the module to enter into low current consumption status

Minimum Functionality Mode

Minimum functionality mode reduces the functionality of the module to a minimum and thus minimizes the current consumption to the lowest level.
If SIM900A has been set to minimum functionality by "AT+CFUN=0"
If SIM900A has been set to full functionality by "AT+CFUN=1"
If SIM900A is set "AT+CFUN=4" to disable both the above functionality.

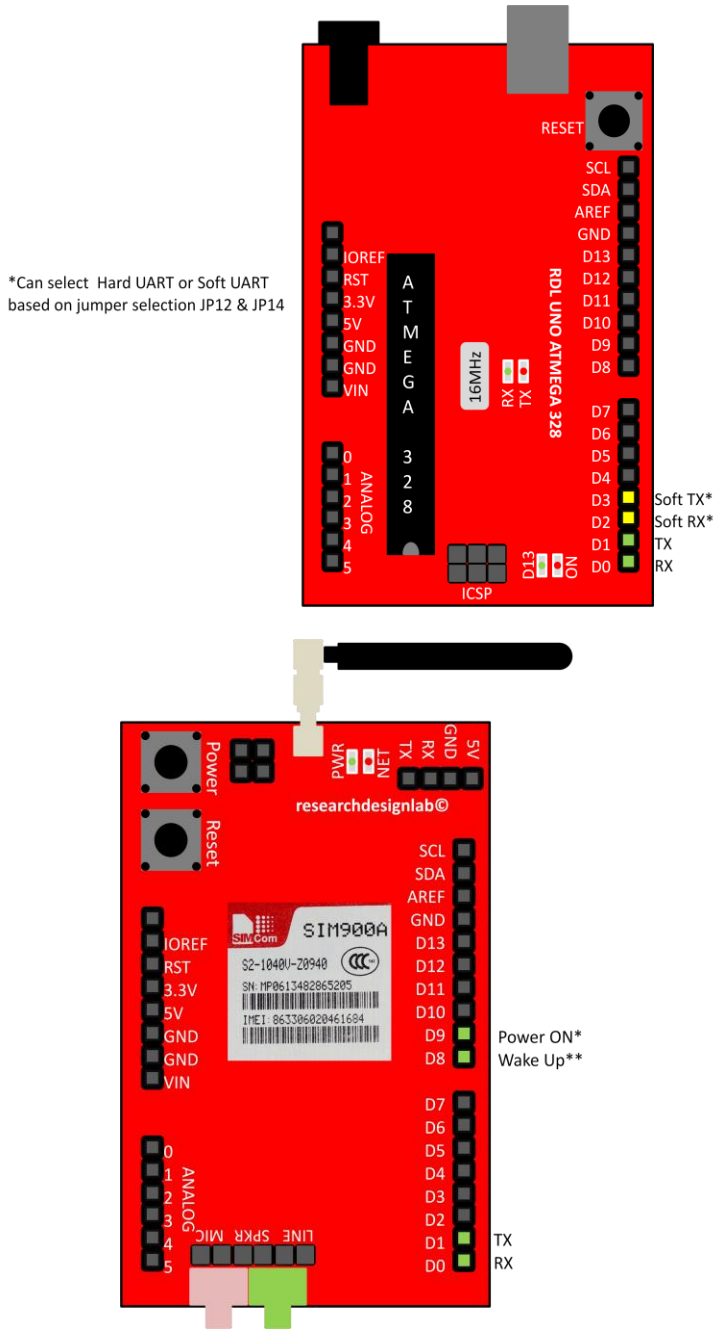
Sleep mode

We can control SIM900A module to enter or exit the SLEEP mode in customer applications through DTR signal. When DTR is in high level and there is no on air and hardware interrupt (such as GPIO interrupt or data on serial port), SIM900A will enter SLEEP mode automatically. In this mode, SIM900A can still receive paging or SMS from network but the serial port is not accessible.

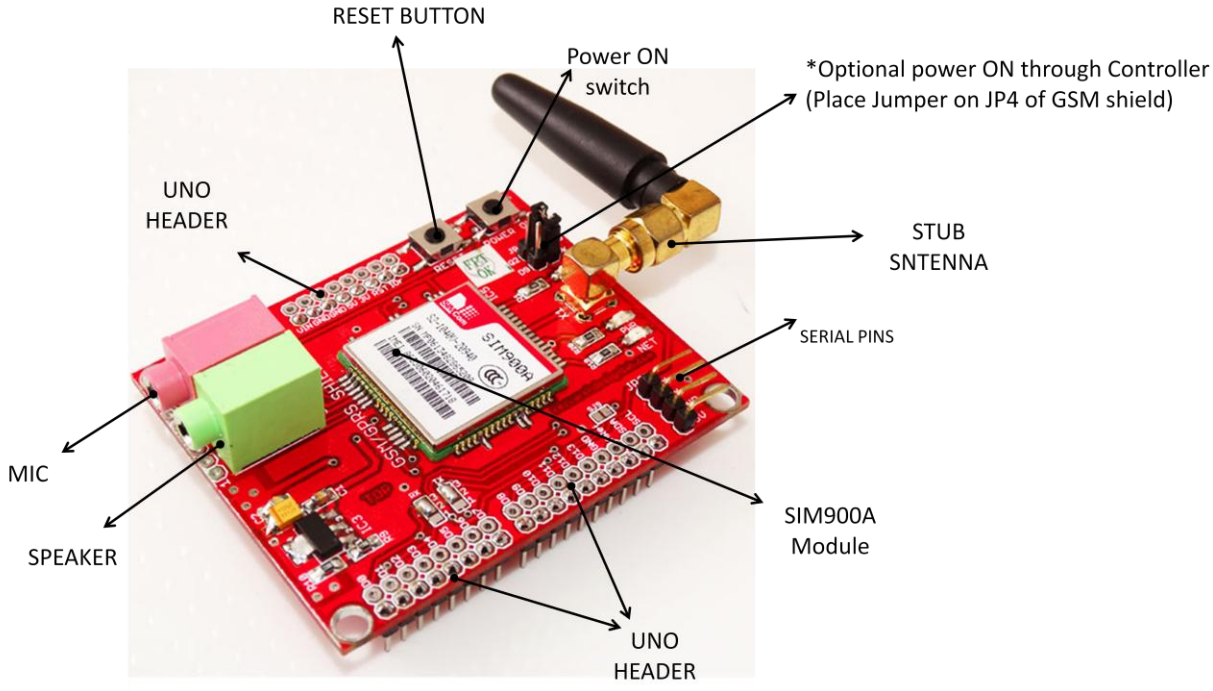
Wake up SIM900A from sleep mode

- Enable DTR pin to wake up SIM900A. If DTR pin is pulled down to a low level
- This signal will wake up SIM900A from power saving mode. The serial port will be active after DTR changed to low level for about 50ms.
- Receiving a voice or data call from network to wake up SIM900A.
- Receiving a SMS from network to wake up SIM900A.

PINS OF GPRS /GSM SIM900A MODEM WITH ARDUINO COMPATIBLE

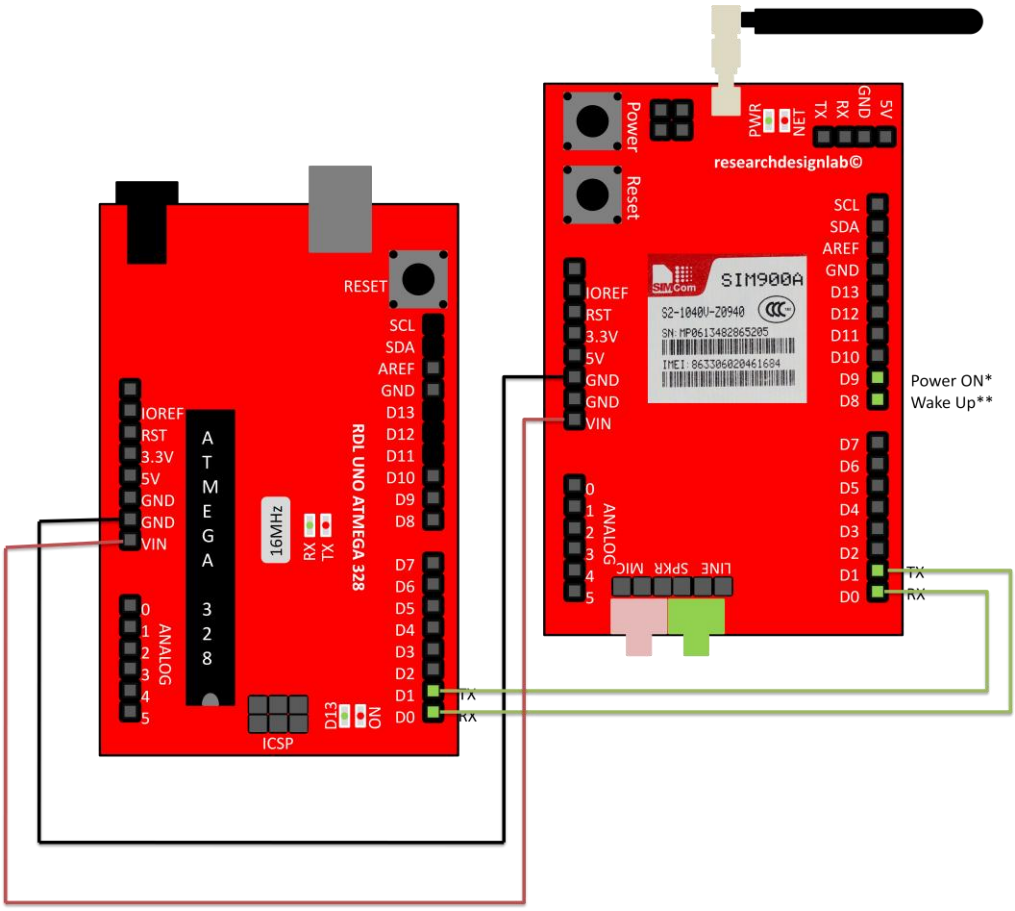


NARATION OF GPRS /GSM SIM900A MODEM WITH ARDUINO COMPATIBLE



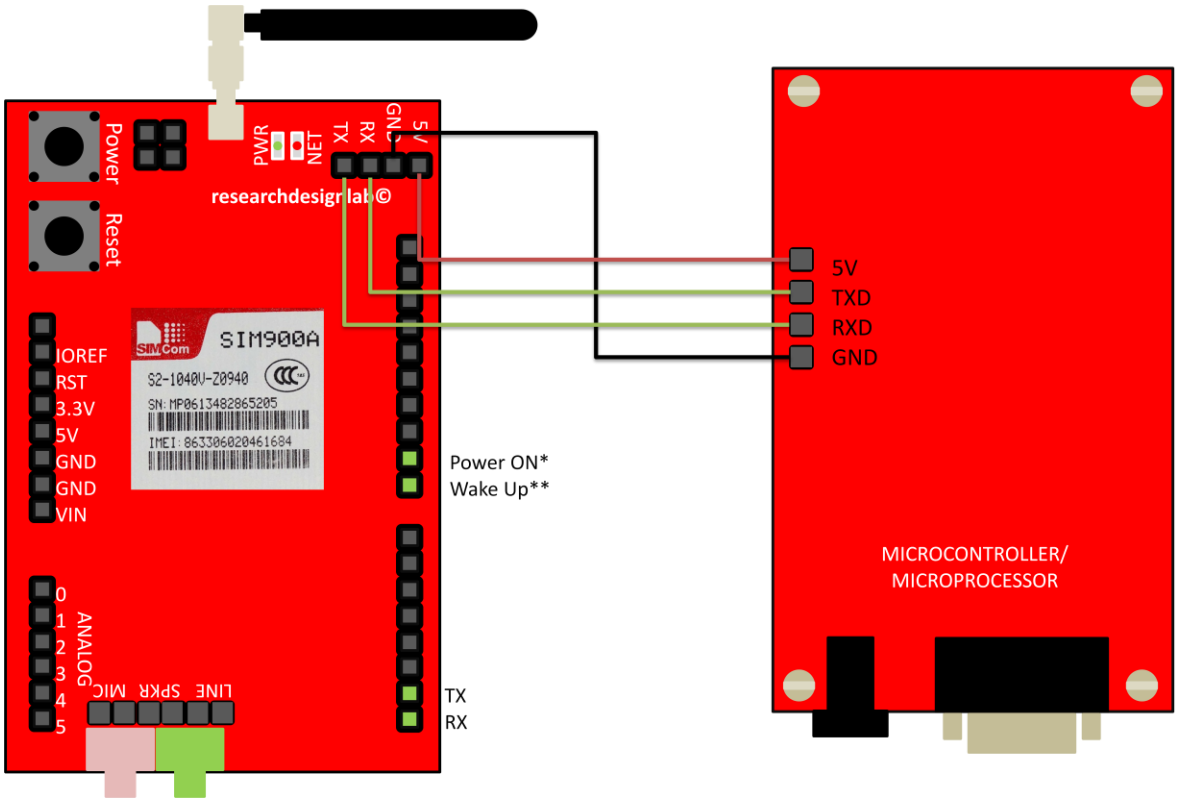
BLOCK DIAGRAMS

INTERFACING UNO AND GSM SHIELD



*Atmega 328 must be powered with DC 12v 2A.

INTERFACING MICROCONTROLLER WITH GSM SHIELD EXTERNAL SERIAL PINS



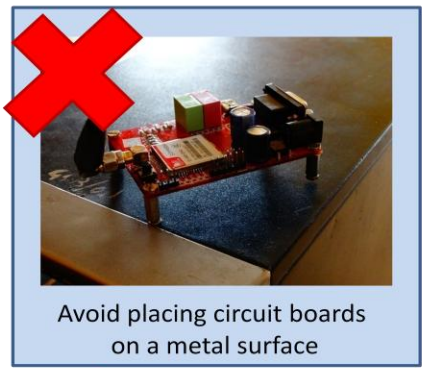
CODE

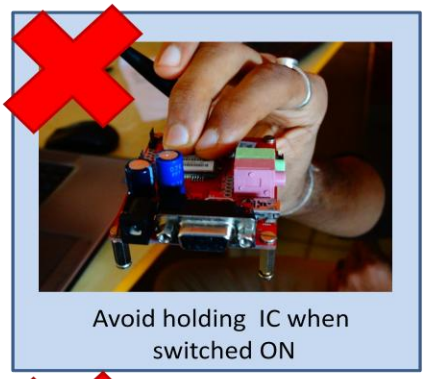
GSM POWER SAVING PIC CODE

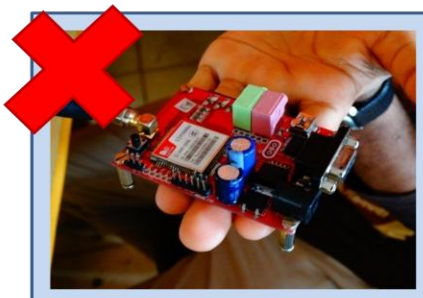
http://researchdesignlab.com/gsm-power-pic-code.html

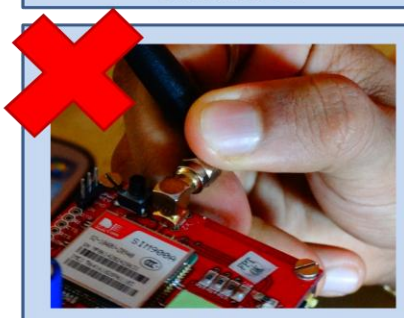
MODULE HANDLING

DO'S AND DONT'S


Avoid placing circuit boards on a metal surface


Avoid holding IC when switched ON


Avoid placing circuit boards n your palm


Avoid holding circuit with component


Hold edges while handling the circuit boards


If possible use anti static glovse