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TR-800 GSM/GPRS Module
Development Starter Kit
User Guide

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CONFIDENTIAL

Document Information

Revision	Date	Document History	Associated Hardware Version
0.0	23 Aug 2004	▪ Initial release version 0.0	
1.0	20 Apr 2005	▪ Evaluation Board was modified according to the final phase (P3) of TR-800 module hardware.	DSK P3
1.1	15 Aug 2006	▪ Evaluation Board was changed to phase 4 (P4). ▪ Module Evaluation Board renamed to Development Starter Kit. ▪ Updated Board Schematics	DSK P4
1.2	1 Aug 2007	▪ Updated on Recommended Fax Settings ▪ Updated Section 4 (P5) ▪ Added Mechanical Drawing ▪ Updated Board Schematic ▪ Changes made to board include Audio & Microphone Path	DSK P5

For enquiries, please contact:

iWOW Connections Pte Ltd
1 Lorong 2 Toa Payoh #04-01
Yellow Pages Building
Singapore 319637
Office: (65) 6748 8123
Fax : (65) 6748 2668
http://www.iwow.com.sg

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TABLE OF CONTENT

1 MODULE DEVELOPMENT STARTER KIT

The Development Starter Kit (DSK) includes:

- A Module Development Starter Kit Board, including all the interface electronics
- A TR-800 GSM/GPRS module, which is mounted on the board
- Universal power supply:
  Input: 100~240VAC 50/60Hz
  Output: 5.0VDC @ 1.0A
- An external tri-band GSM antenna with magnetic base (SMA-ended)
- A RF cable connector for module to board RF connection
- 4-pole audio headset
- A RS-232 cable
- User Guide CD

2 FEATURES

- Antenna interface: SMA jack for GSM antenna
- RF receptacle for board to module RF connection (Hirose Part No. U.FL-R-SMT)
- 80-pin general-purpose module connector (Harwin Part No. M402M1-8005)
- Power supply interface with 2 input source possibility:
  - Hosiden's HEC3350 dc power jack, 3.5~6.5VDC @ 500mA input
  - Twin headers for connection to external power supply/battery, 3.3~5.5VDC @ 500mA input
- 2 serial interfaces using D-SUB9 female connectors
- Standard RS-232 cable, can be used for connecting to
  - Modem Port: Main AT command interface
  - Debug Port: Debugging interface or utility communication port
- SIM card holder
- Power ON/OFF push button
- RESET signal push button
- "CALL" and "1" push buttons
- LED indicators, to show:
  - Status of supply to DSK Board
  - Status of the module that is mounted on the DSK Board
- Phone Audio jack
- Auxiliary Audio jack
- Test points to the rest of the pins of the 80-pin connector. They are used for connecting to external peripherals and general troubleshooting purposes

3 INSTALLATION

Procedure:

1. Connect the serial cable from host PC to Port 1 (for AT commands interface) and to Port 2 (for programming or debugging purposes).
2. Connect the magnetic GSM antenna to the SMA antenna connector of the DSK Board
3. Ensure that the RF receptacle of module is connected to the RF receptacle of DSK Board using the mating cable provided.
4. Ensure that the module is properly mounted and the legs properly soldered.
5. Connect the power supply to the DSK Board.
6. The power supply LED should be light-on when the DSK Board supply is turned on.
7. Follow the instructions in the next section and do module connection setups.

4 QUICK SETUPS

4.1 Hyperterminal Configuration

1. Open **HyperTerminal**
   (Start > Programs > Accessories > Communications > HyperTerminal)

2. Enter **TR800**. Click **OK**.

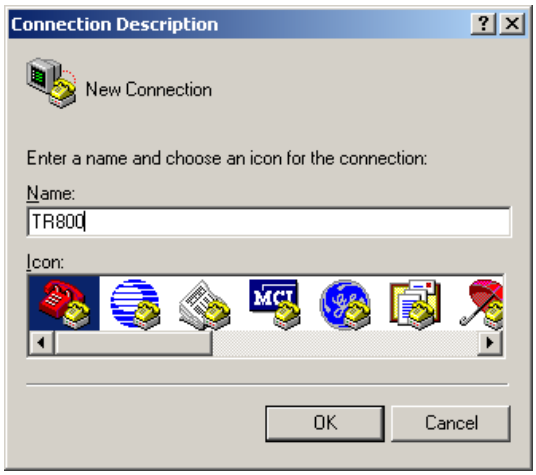


Figure 1

3. Select the **COM1** for Connect using.

4. Click OK.

Figure 2

5. Please make sure:
   - Bits per second: **115200**
   - Data bits: **8**
   - Parity: **None**
   - Stop bits: **1**
   - Flow control: **Hardware**

6. Click OK.

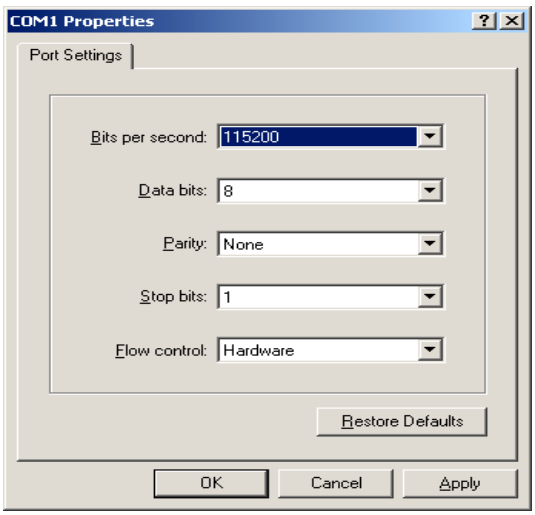


Figure 3

7. Press Reset button on the DSK Board. Now you can communicate with the modem using AT-commands.

8. To test the communication, type **AT+CGMR<ENTER>.** You should get "**AB_02_00_30N_DEF001**" or a similar response if the setup is correct.

9. To check SIM card status: **AT+CPIN?<ENTER>**

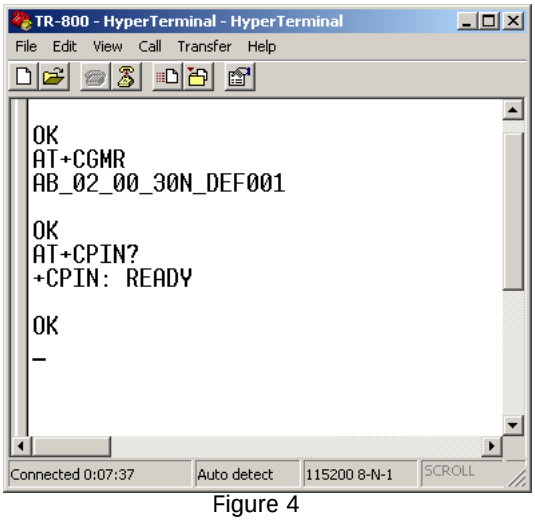


Figure 4

10. To query the Network registration status and Operator Name:

    AT+CREG?<ENTER>
    AT+COPS?<ENTER>

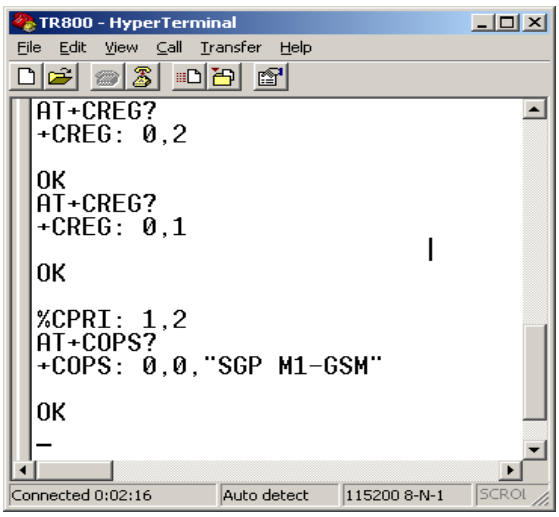


Figure 5

4.2 Testing On Short Message

4.2.1 Send SMS

1. Set the short message format as text mode:
   AT+CMGF=1<ENTER>

2. Check if SMS service center (SMSC) number is set to SIM card:
   AT+CSCA?<ENTER>

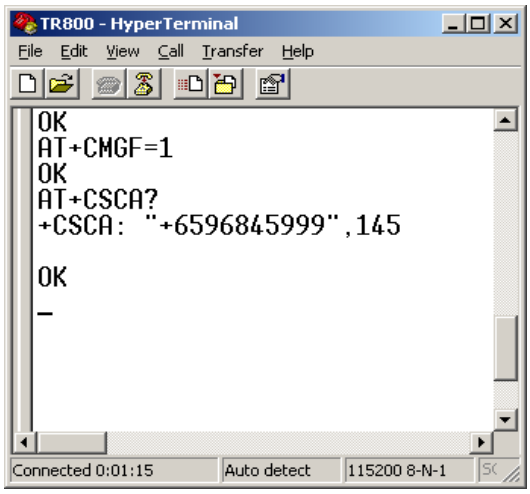


Figure 6

3. Set the new incoming SMS to be displayed immediately:
   AT+CNMI=2,2,0,0,0<ENTER>

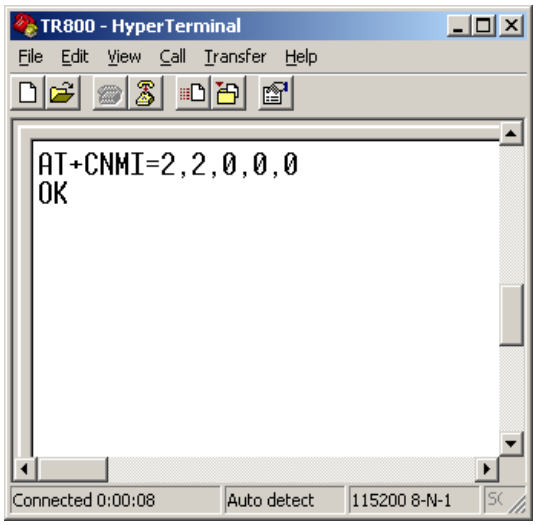


Figure 7

4. Send a message using this command:
   AT+CMGS= "Phone number" <ENTER>Message<Ctrl-Z>

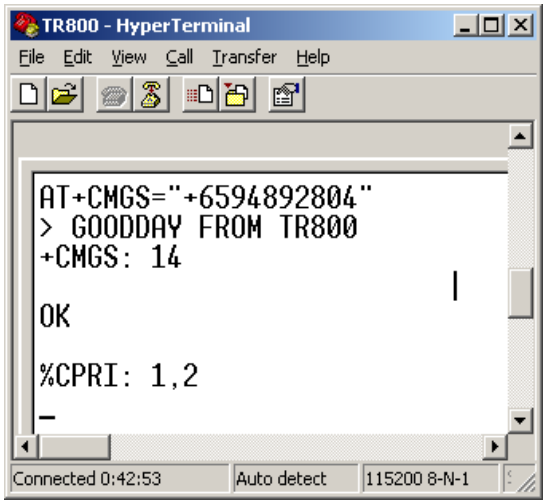


Figure 8

4.2.2 Receive SMS

1. Set the message format by typing **AT+CMGF=1**

2. Set the new incoming SMS to be displayed immediately: **AT+CNMI=2,2,0,0,0<ENTER>**

3. Upon receiving new SMS, it will be displayed immediately on TA.

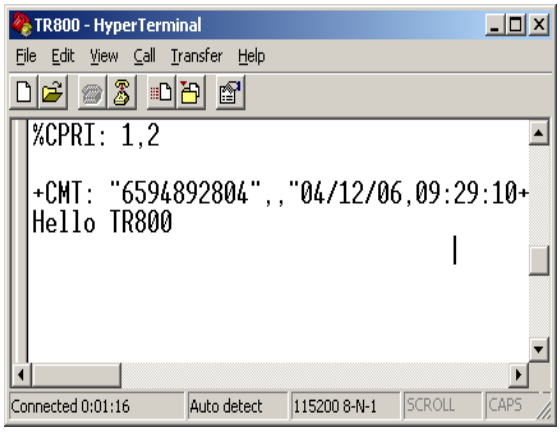


Figure 9

4. To Enable new SMS indication instead of displaying it directly on TA: **AT+CNMI=2,1,0,0,0<ENTER>**

5. Upon receiving new SMS, **+CMTI: "SM"**, 2 indication will be given. This means the new SMS is stored at location index 7 of the SIM card.

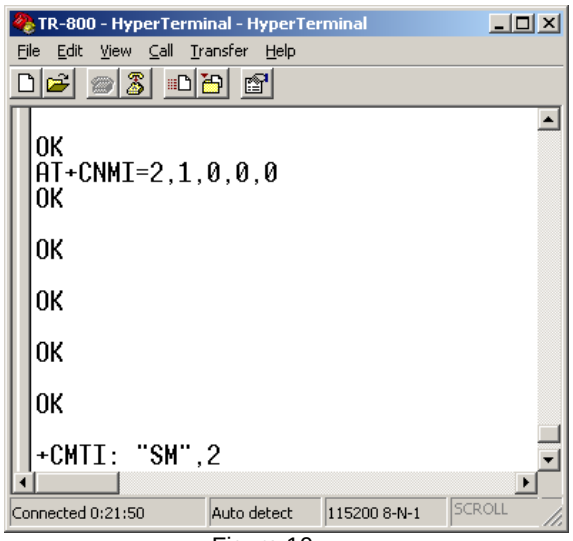


Figure 10

6. To access SIM card storage for SMS: **AT+CPMS="SM"<ENTER>**

7. To read SMS at location 2: **AT+CMGR=2<ENTER>**

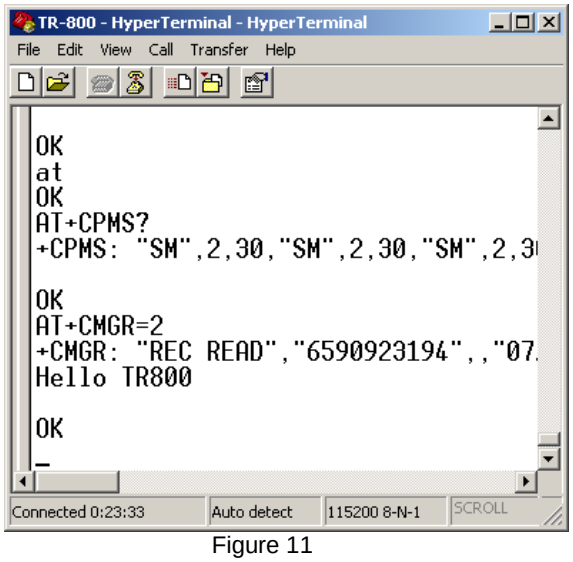


Figure 11

4.3 Set up TR-800 as a serial modem

To use the serial modem for Internet connection, either via GSM CSD or GPRS, you must first set it up as a modem on COM1 on your PC. Otherwise, it will only be recognized as a device on COM1. This section will detail how this can be done in the Win2000 environment. For other Windows OS, similar steps apply.

1. Go to **Control Panels > Phone And Modem Options**.
   Select the **Modems** tab.
   Click on **Add…** for the next screen.

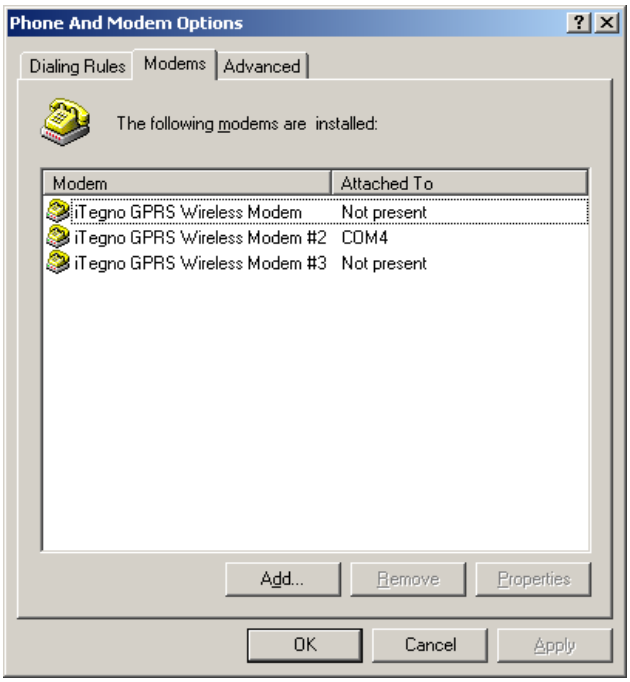


Figure 12

2. Please ensure that the option "**Don't detect my modem. I will select it from a list"** is checked.
   Click on **Next** for the next screen.

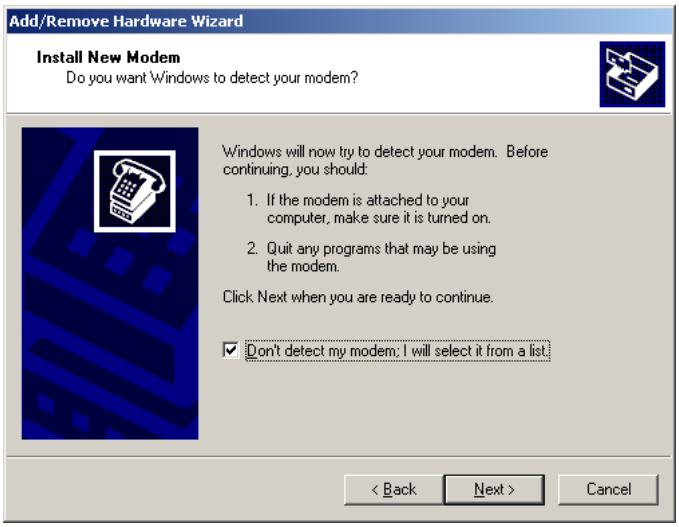


Figure 13

3. Select **Standard 33600 bps modem** for Models.
   Click on **Next** for the next screen.

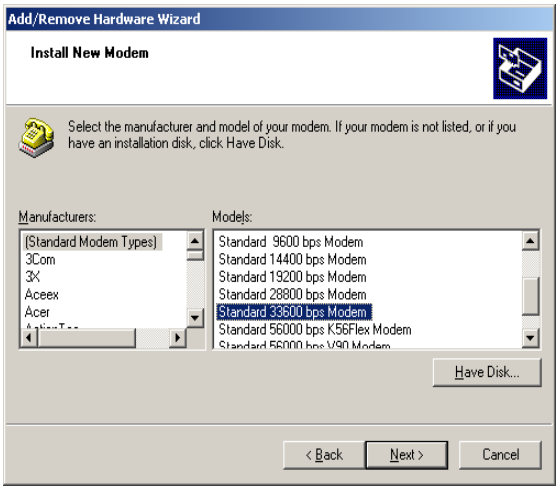


Figure 14

4. Select **COM1** before clicking on **Next** for the next screen. Please ensure that COM1 is the correct communication port for the serial port of your PC.

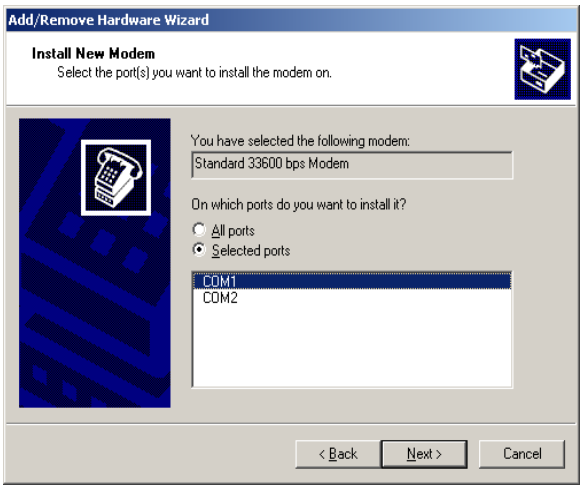


Figure 15

5. On the last screen, click Finish to complete setting up your serial modem on your PC.

6. You should be able to see the recently created modem in your **Phone And Modem Options** screen.

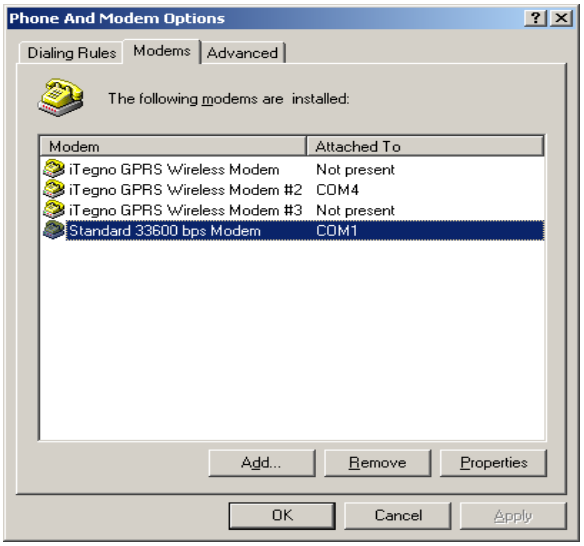


Figure 16

7. To ensure that the correct communication parameter has been set-up, click on its Properties. Ensure the parameters below are correct:

   - Port Speed/Baud Rate: **115200**
   - Data Bits: **8**
   - Parity: **None**
   - Stop Bit: **1**
   - Flow Control: **Hardware**

4.4 Establish a GSM Dial-up Connection

After TR800 is set up as a Serial Modem as shown in previous section, you can then create a GSM dial-up connection by the following steps:

1. Go to Control Panel>Network **Connections**.
   Run **New Connection Wizard**.
   Click **Next**.

Figure 17

2. Select **Connect to the Internet**.
   Click **Next**.

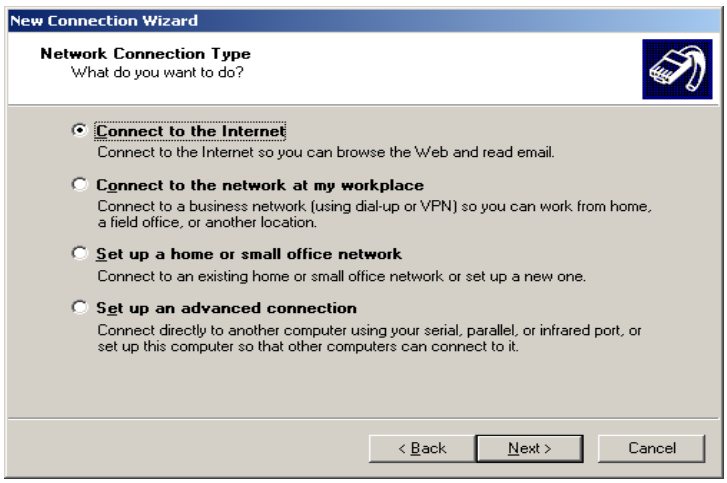


Figure 18

3. Select **Set up my connection manually**. Click **Next**.

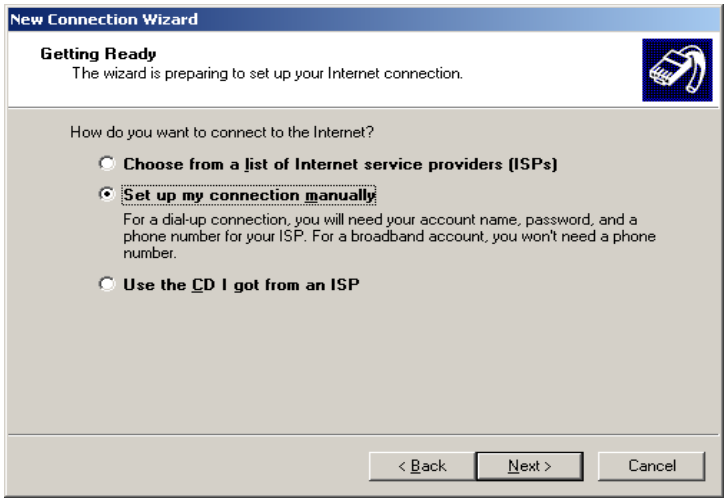


Figure 19

4. Select **Connect using a dial-up modem**. Click **Next**.

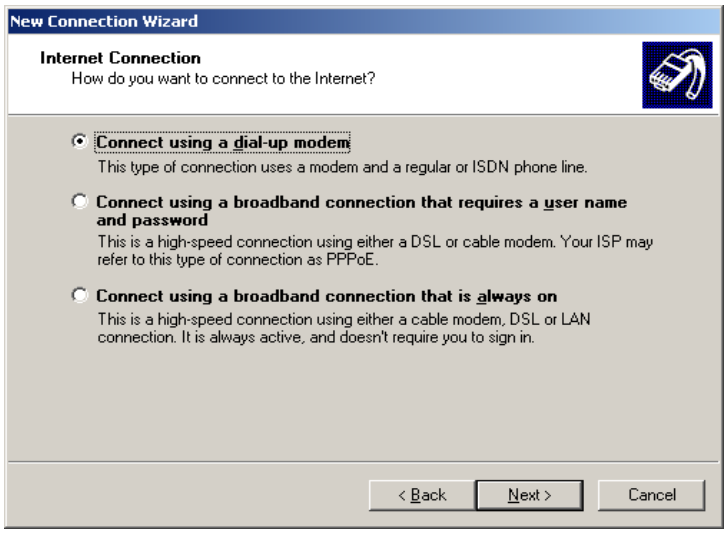


Figure 20

5. Select Modem – **Standard 33600 bps Modem (COM1)** for dialing device.
Click **Next.**

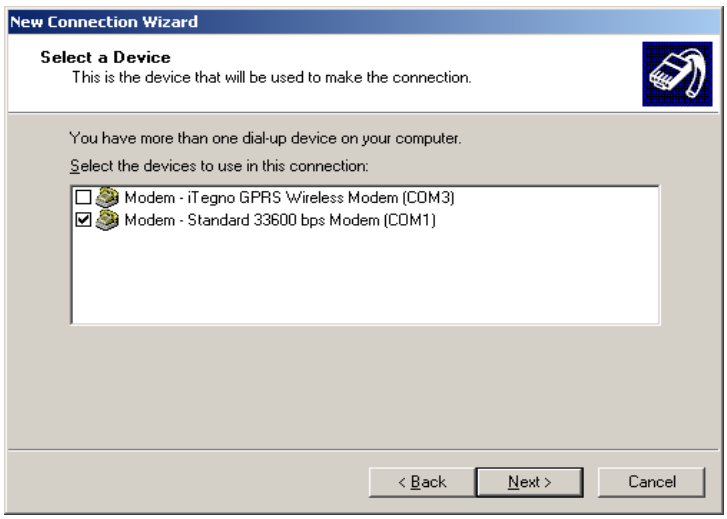


Figure 21

6. Enter a Connection Name. Click **Next**.

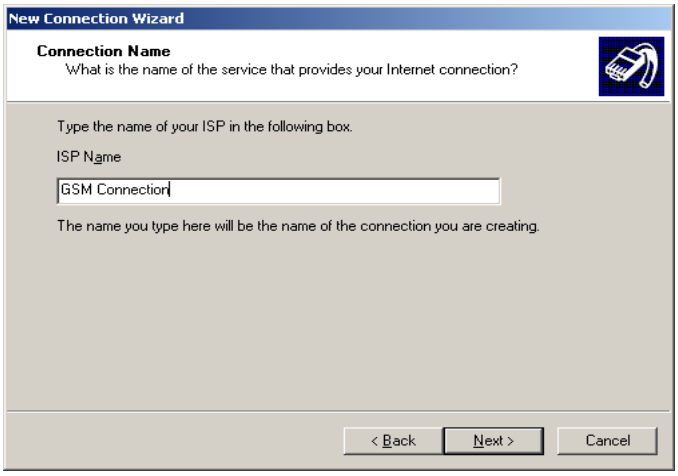


Figure 22

5. Enter the Phone number. Click **Next**.

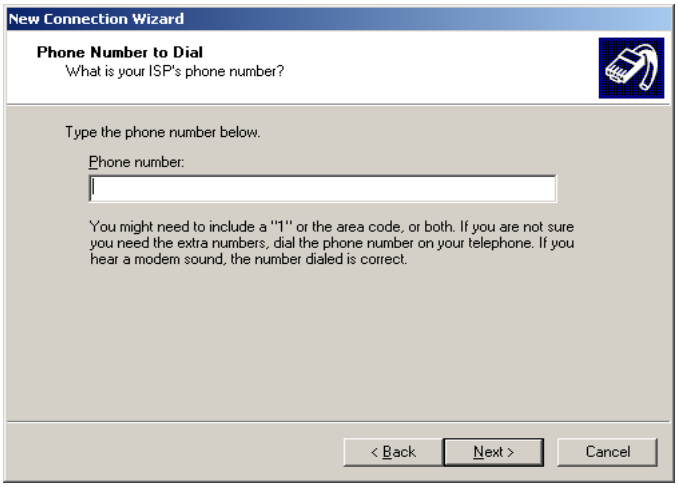


Figure 23

6. Enter User name and Password if applicable. Uncheck on all three options. **Click Next**.

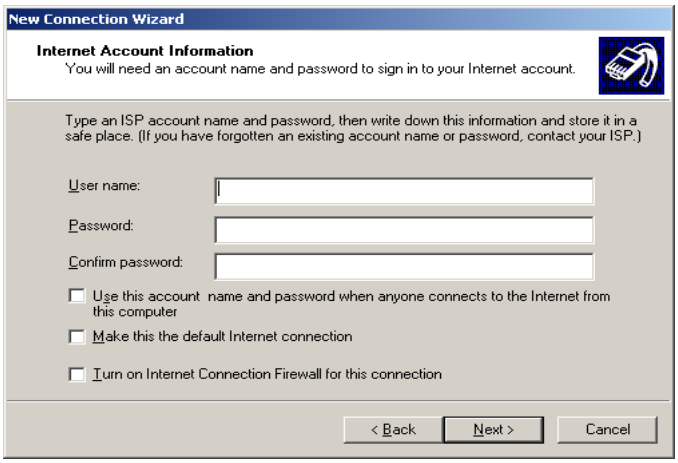


Figure 24

7. Click Finish to complete the New Connection Wizard.

4.5 Establish a GPRS Dial-up Connection

After TR800 is set up as a Serial Modem as shown in Section **6.1.3**, you can then create a GPRS dial-up connection by the following steps:

1. Go to **Control Panel>Network Connections.**
   Run New Connection Wizard.
   Click **Next**.

Figure 25

2. Select **Connect to the internet**.
   Click **Next**.

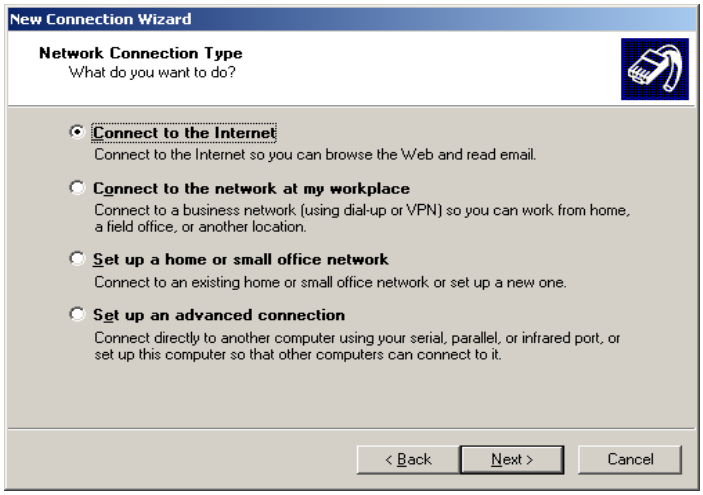


Figure 26

3. Select **Set up my connection manually**. Click **Next**.

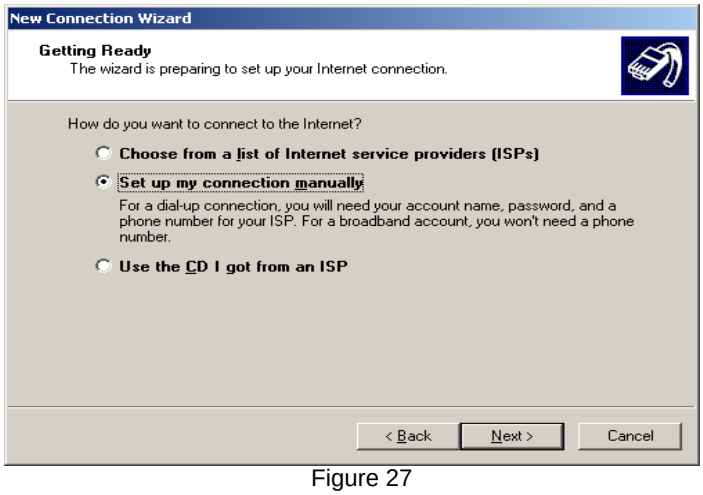


Figure 27

4. Select **Connect using a dial-up** modem. Click Next.

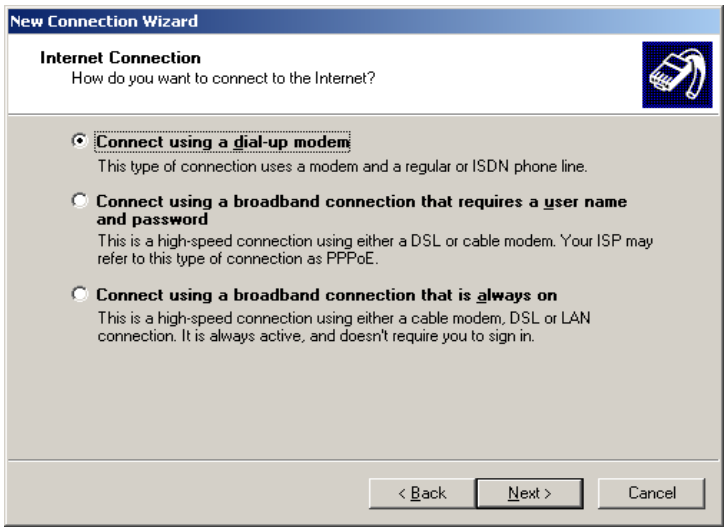


Figure 28

5. Enter a Connection Name. Click **Next**.

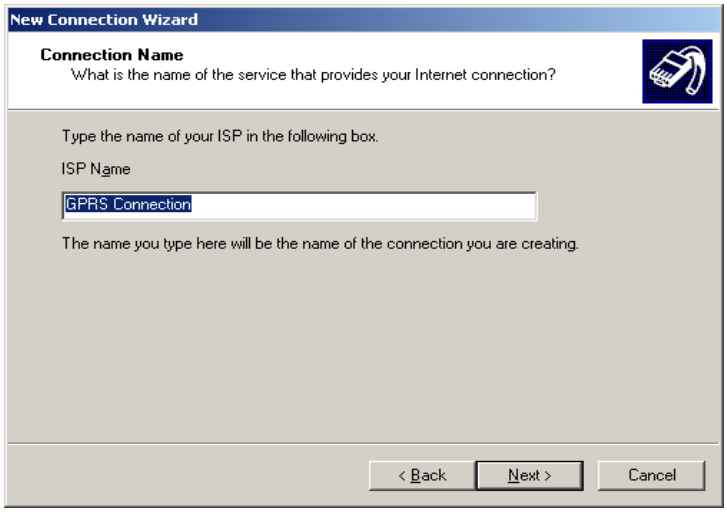


Figure 29

6. Enter "*99***1#" for the Phone number. This is a fixed GPRS connection dialing number for the module.
Click **Next**.

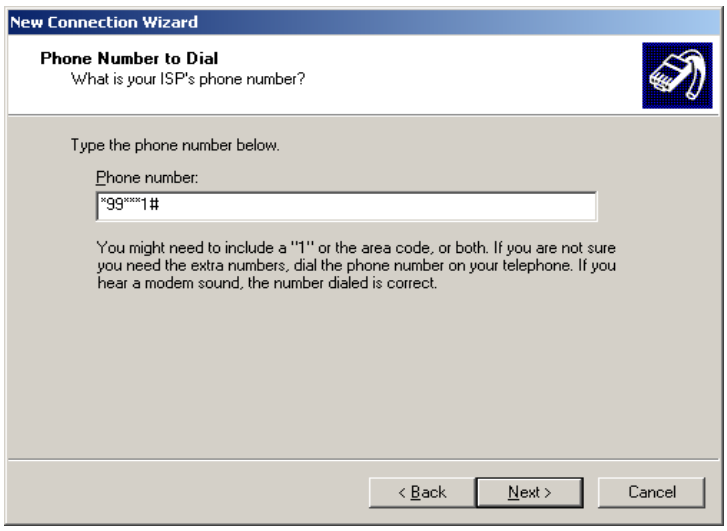


Figure 30

7. Enter User name and Password if applicable. Uncheck on all three options. Click **Next**.

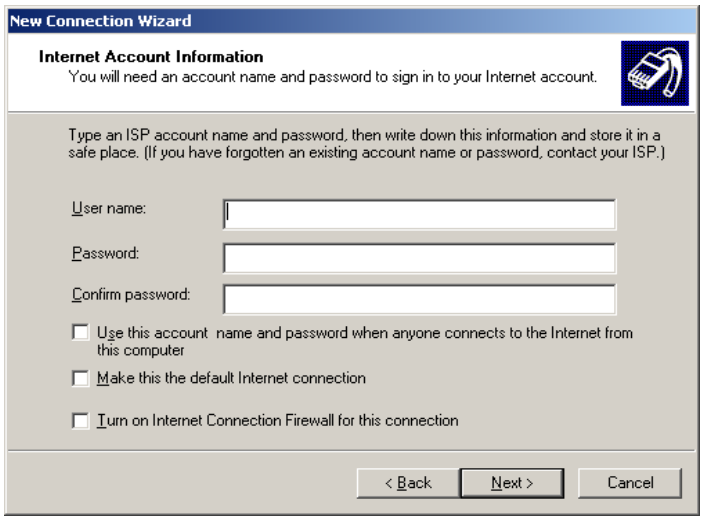


Figure 31

8. Click Finish to complete the New Connection Wizard.

Figure 32

9. From HyperTerminal, enter the network's APN (Access Point Name) into the TR800 module: **AT+CGDCONT=1,"IP","APN"** and **ENTER**.
   The APN can be obtained from your network operator.

10. After this, use the following AT-command to attach to the GPRS network: **AT+CGATT=1**.

11. You can now connect to the GPRS network using Windows Dial-up connection created.

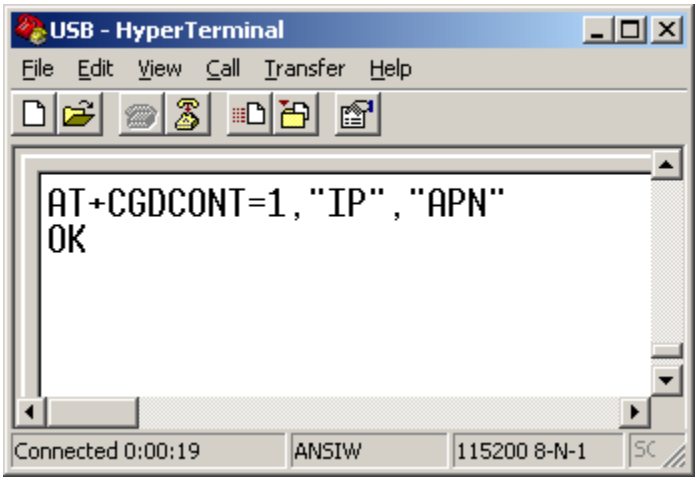


Figure 33

4.6 Set up TR-800 for Fax

1. Install TR-800 as a **Standard 19200 bps modem**; refer to **Section 4.3**

2. Go to Control Panel > System > Device Manager > Modem > Open Standard 19200bps Modem > Modem tab > **Set the Maximum Port Speed to 19200**

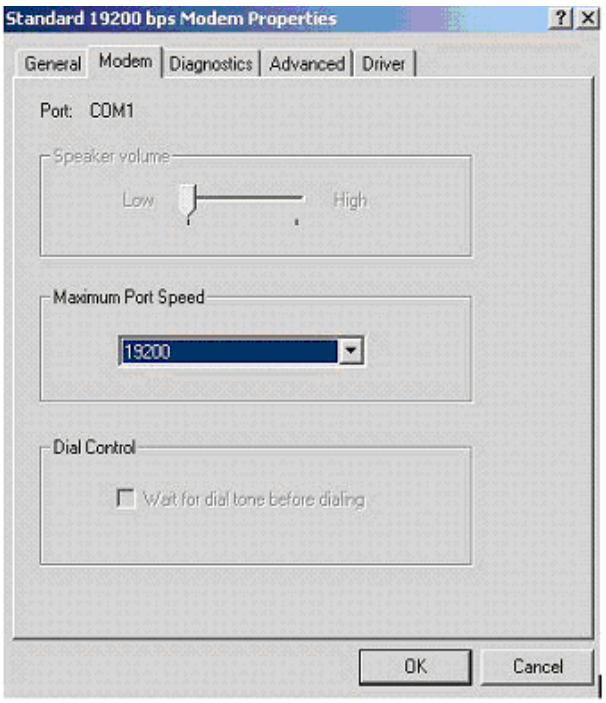


Figure 34

3. On Hyper Terminal > **Set AT+IPR=19200 (NOTE: Do this step every time before running Symantec WinFax)**

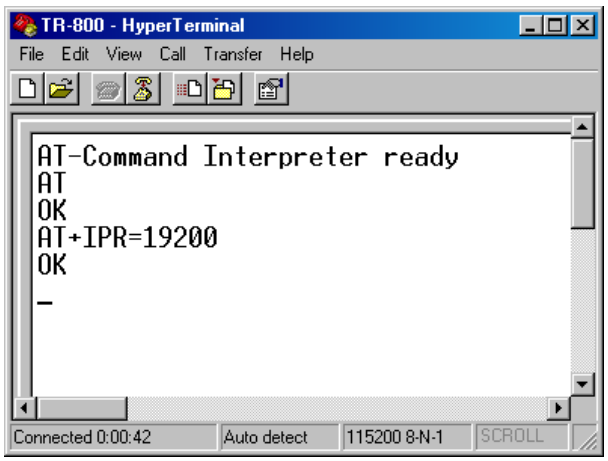


Figure 35

4.6.1 Settings for WinFax Pro

1. Launch **WinFax PRO Message Manager**

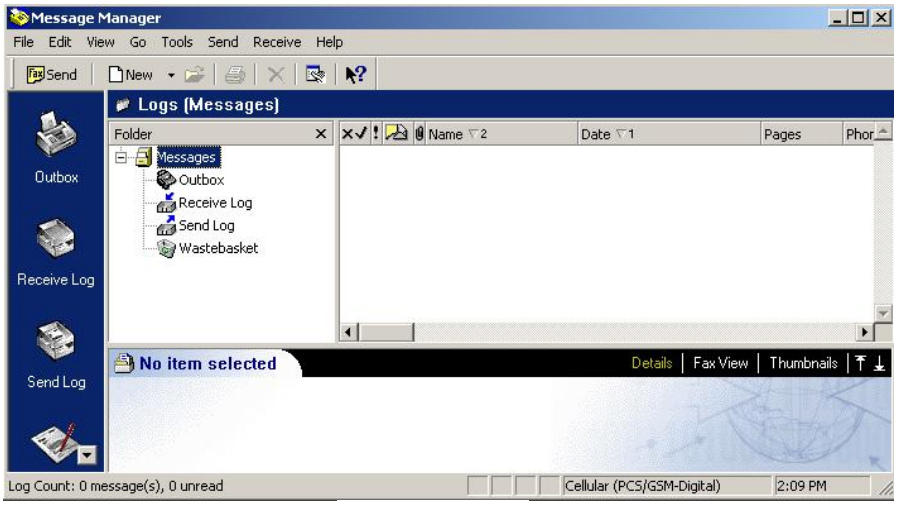


Figure 36

2. Go to Tools > Program Setup > **Modems and Communications Devices**

3. Select "**Active**" devices for location at **Cellular (PCS/GSM-Digital)**

4. Select Active modem **Standard 19200 bps Modem**

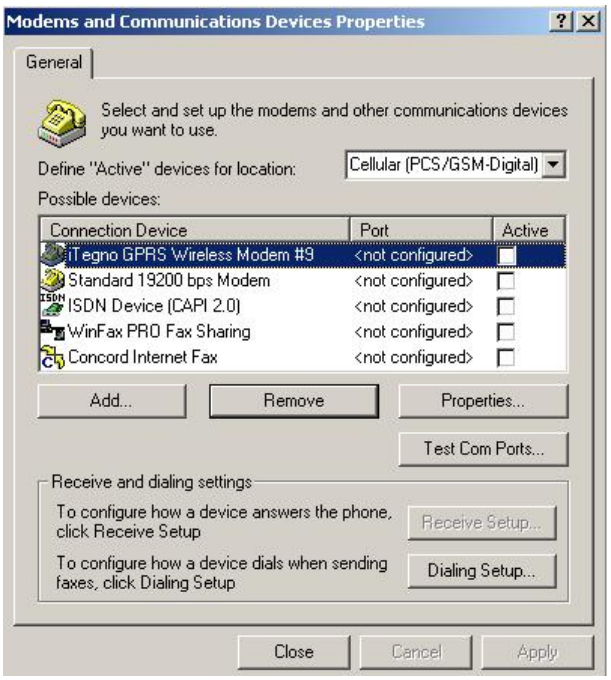


Figure 37

5. Click yes

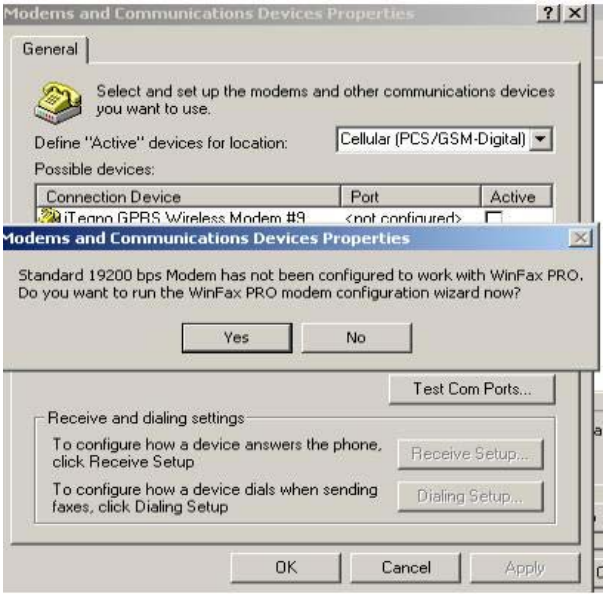


Figure 38

6. Click Next

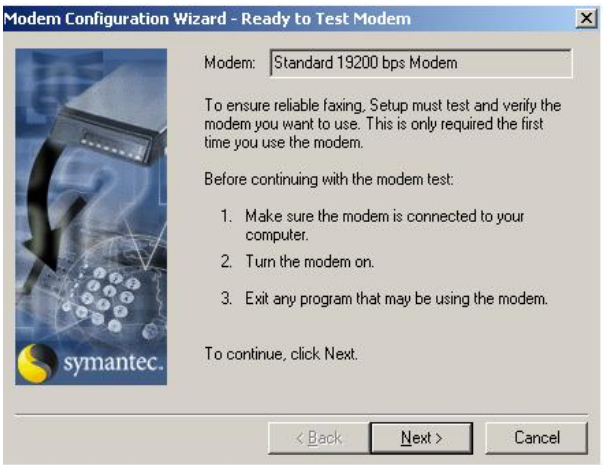


Figure 39

7. Query **Modem Results**
8. Click Next
9. Click Finish

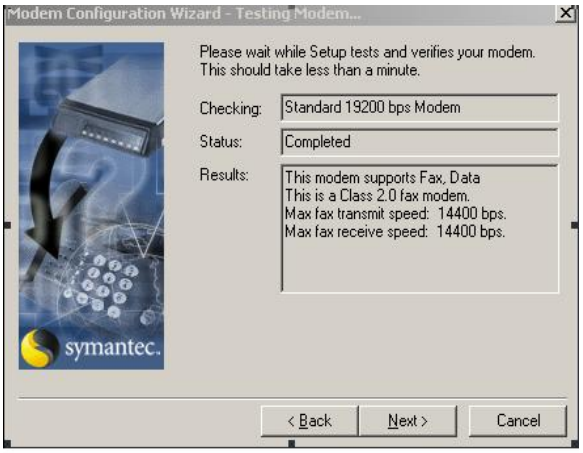


Figure 40

10. Check only **Cellular (PCS/GSM-Digital)**
11. Click OK

Figure 41

12. Click Properties
13. Select General Tab
14. Select **COM 1** initialize at **19200bps**
15. Select Modem type to be **Class 2.0**

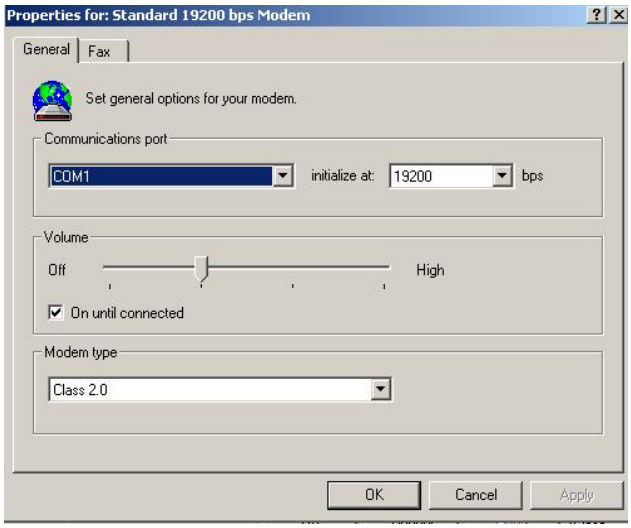


Figure 42

16. Select Fax Tab
17. Transmission speed to be **9600bps**
18. Add **AT&F&D0&C1&K3S7=90S10=200** to the Initialization string sequence
19. Flow control to be **AT+FCLASS=2.0**
20. Check **Use Hardware flow control**

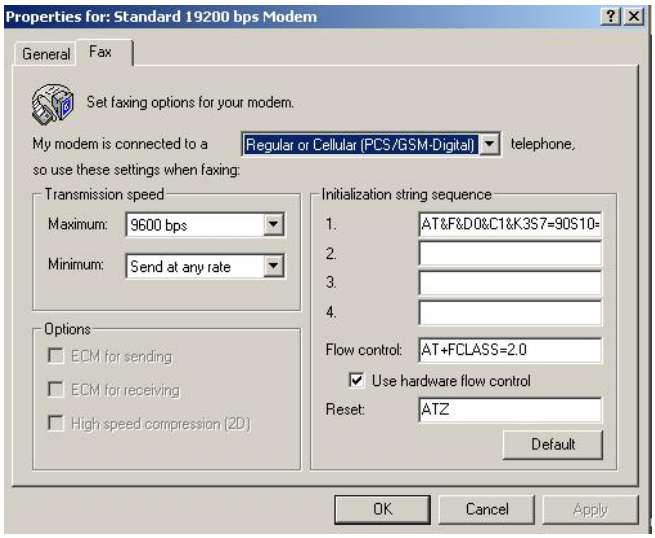


Figure 43

21. Click Receiving Setup
22. Select **Automatically answer incoming calls after 2 rings**
23. Click OK

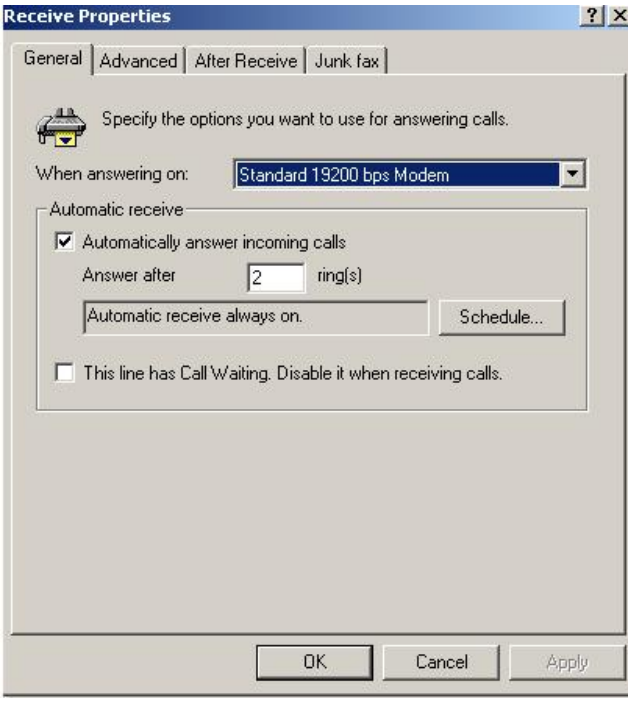


Figure 44

24. Click Dialing Setup
25. Make sure **Standard 19200bps Modem** is **selected**
26. Click OK and Exit

Figure 45

4.6.1.1 Sending via Mobile Fax

1. Open the document to be faxed.
2. Print the document with **WinFax Printer**
3. Click Print

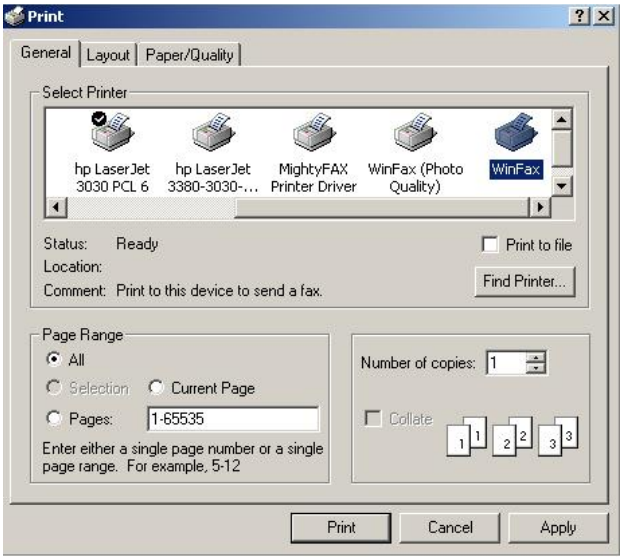


Figure 46

4. WinFax PRO Send will initialize. Kindly follow the guided steps
5. Click **Send** button to send the fax

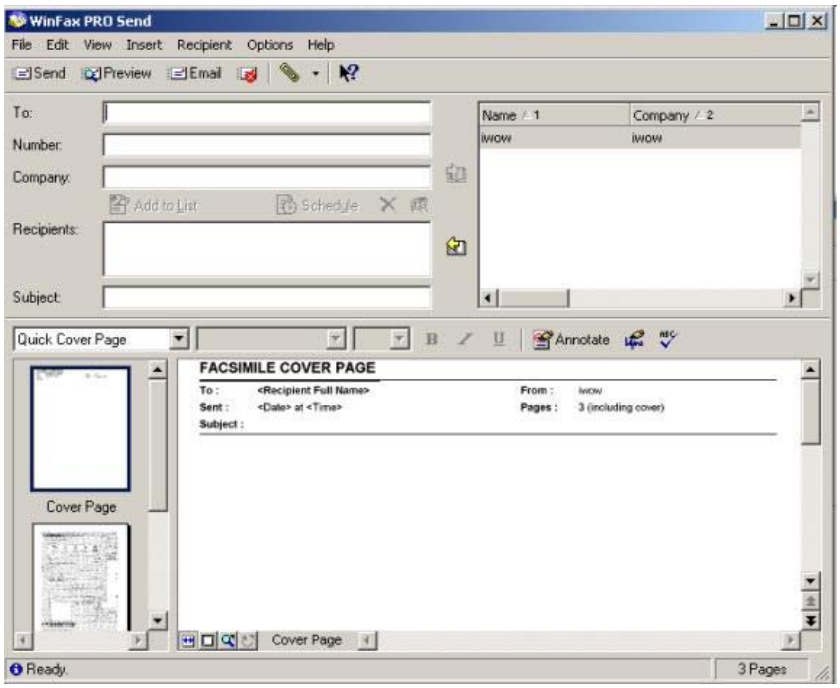


Figure 47

6. Sending Fax in progress

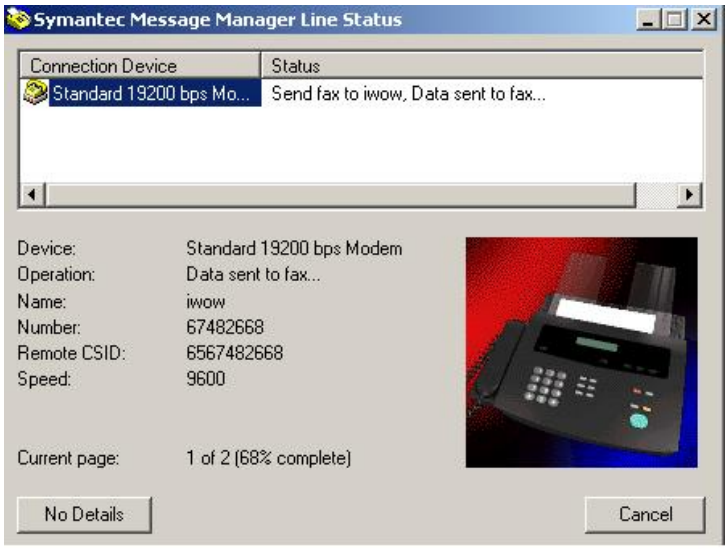


Figure 48

7. Fax Sent.

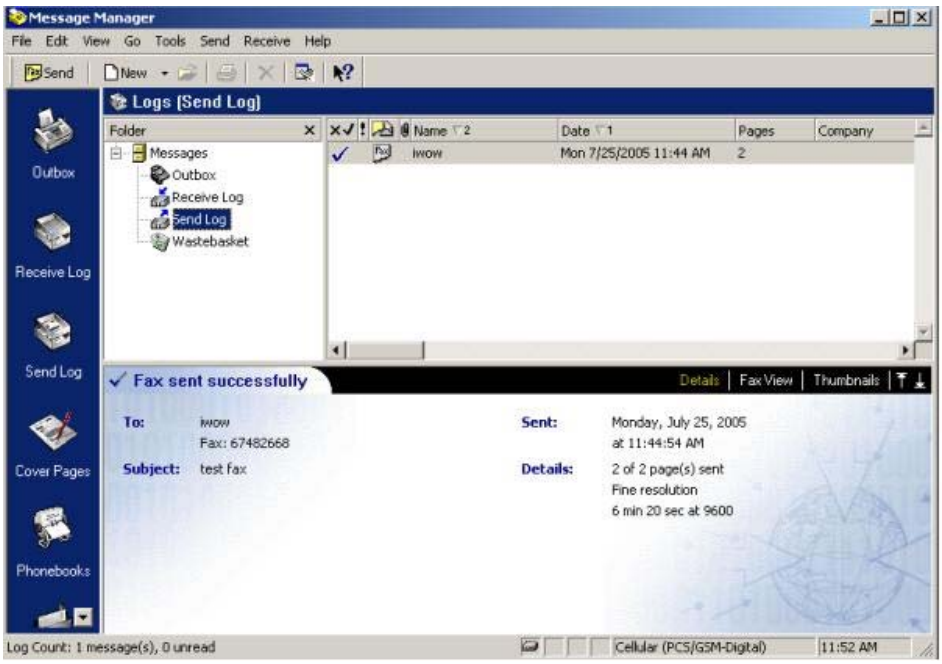


Figure 49

4.6.1.2 Receive via Mobile Fax

1. Receiving Fax in progress

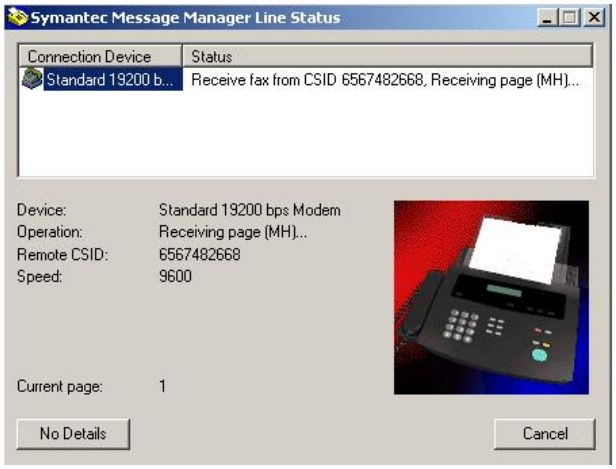


Figure 50

2. Fax Received

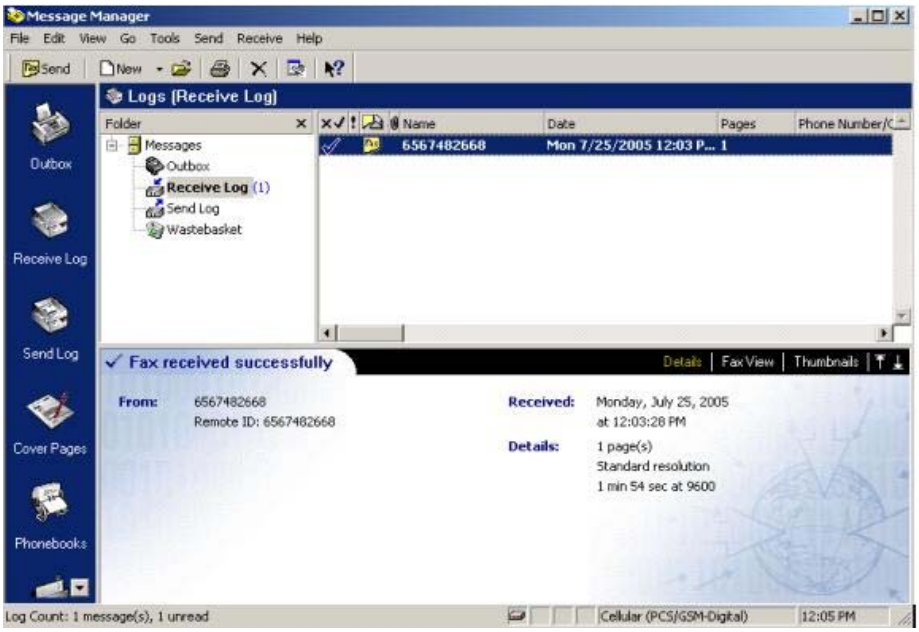


Figure 51

Important! At the end of the mobile fax session, close Message Manager. Right click Symantec WinFax PRO icon on the system task tray located at the bottom right corner of the computer screen (near to system Time/Date display). Select Exit to end the fax session.

4.6.2 Settings for Mighty Fax

1. Launch Mighty FAX > **Preferences**
2. Click **Modem** on the left. Select the communication port the modem is attached to.

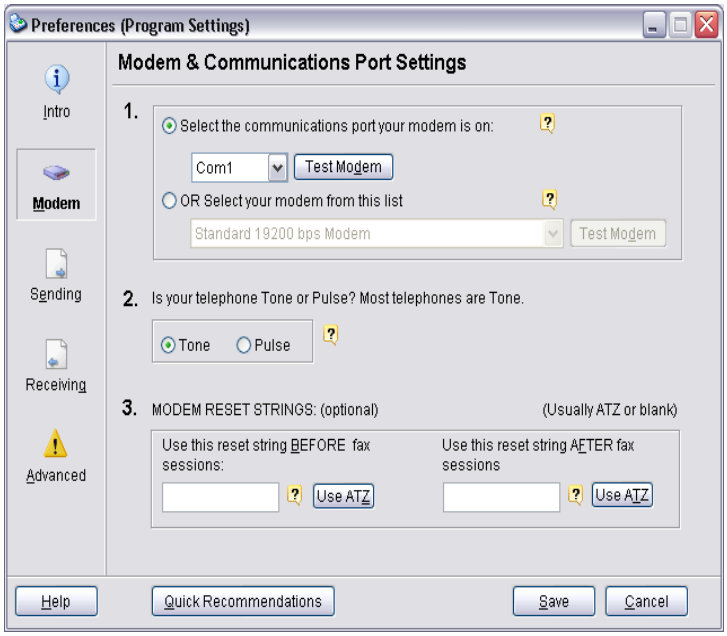


Figure 52

3. Click **Sending** on the left
4. Select **class 2.0** as the fax class for sending faxes
5. Select **9600** as the transfer rate (bps) for sending faxes

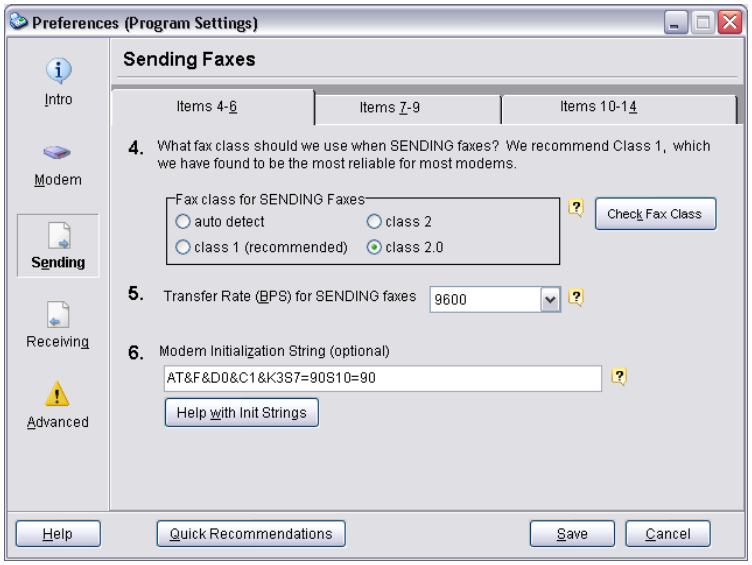


Figure 53

6. Enter **AT&F&D0&C1&K3S7=90S10=90** as the modem initialization string

7. Click **Receiving** on the left.
8. Select **class 2.0** as the fax class for receiving faxes
9. Select **9600** as the transfer rate (bps) for receiving faxes.

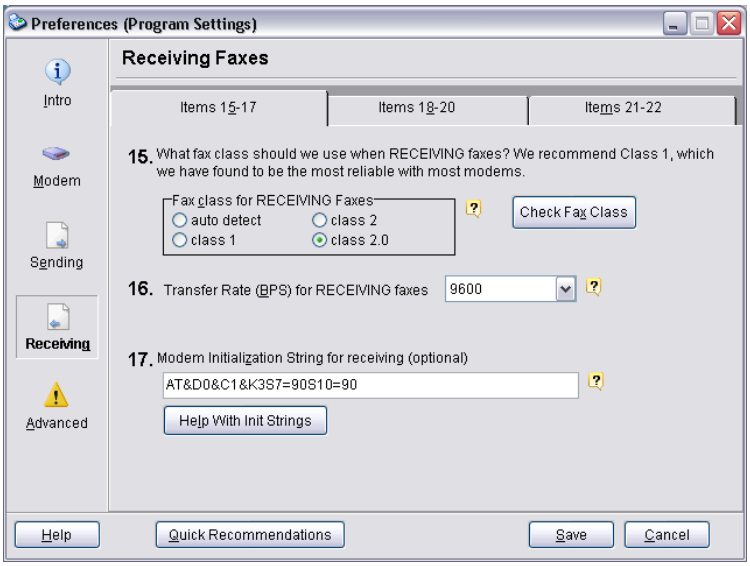


Figure 54

10. Enter **AT&F&D0&C1&K3S7=90S10=200** as the modem initialization string.
11. Click **Advanced** on the left
12. Select **Use larger send buffer** and **Use larger receive buffer**
13. Click **Save**

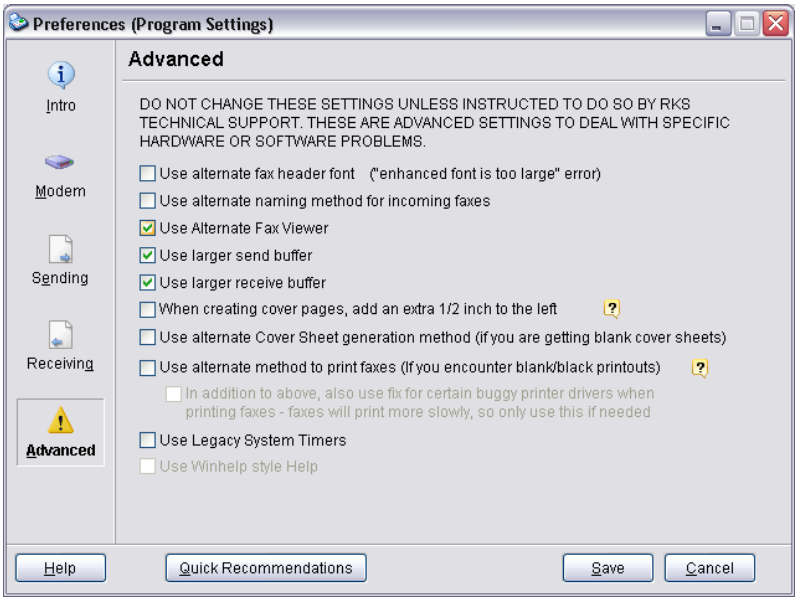


Figure 55

4.6.2.1 Sending via Mobile Fax

1. Open the document to be faxed.
2. Print the document with **MightyFax Printer Driver.**
3. Click OK

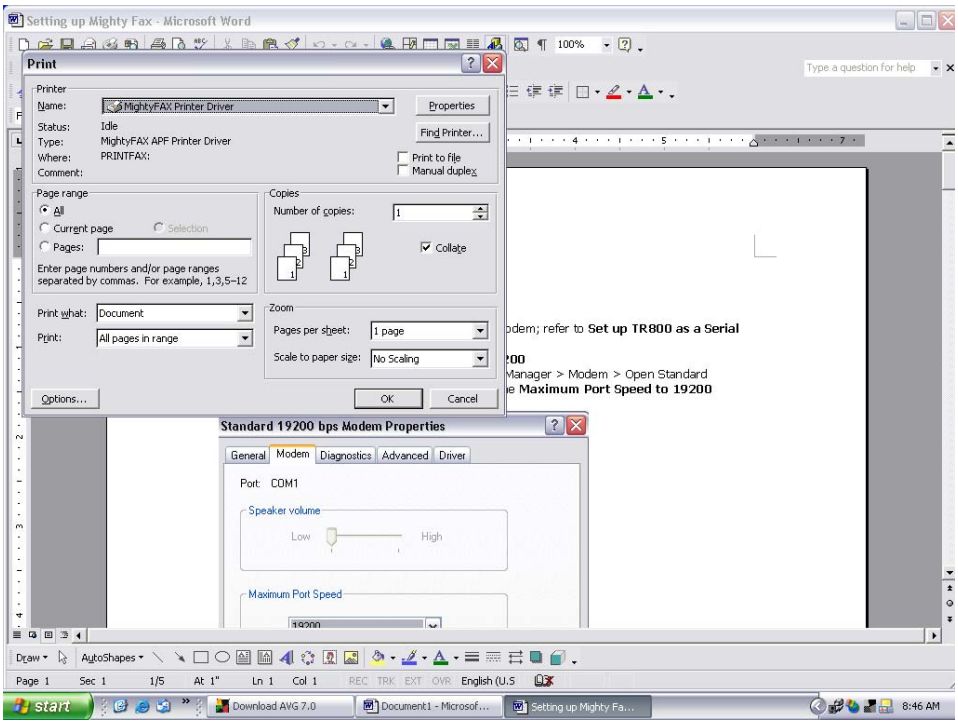


Figure 56

4 Mighty Fax Print to Fax will initialize. Kindly follow the guided steps to **enter phone number, recipient** and **fax subject.**

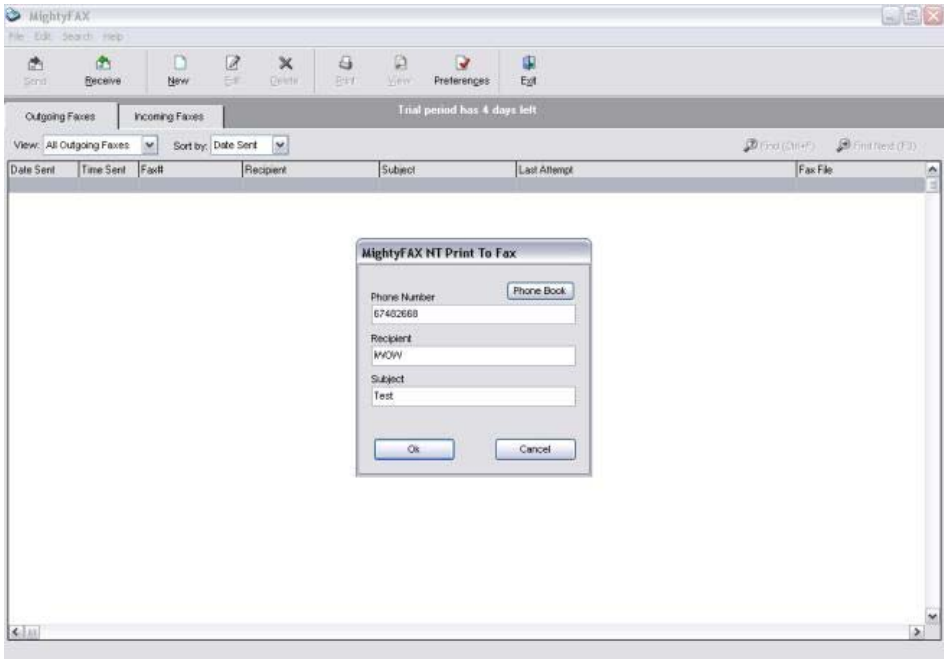


Figure 57

5 A screen will prompt you to start sending when ready.

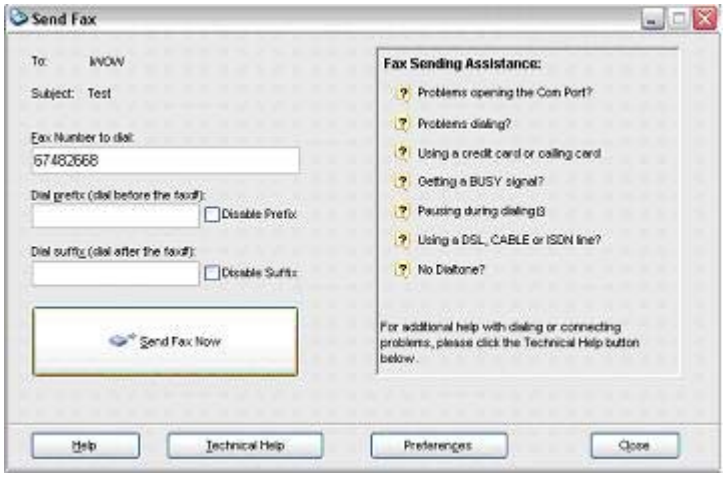


Figure 58

6 Status for sending fax screen will show the page progress and status of the sending process.

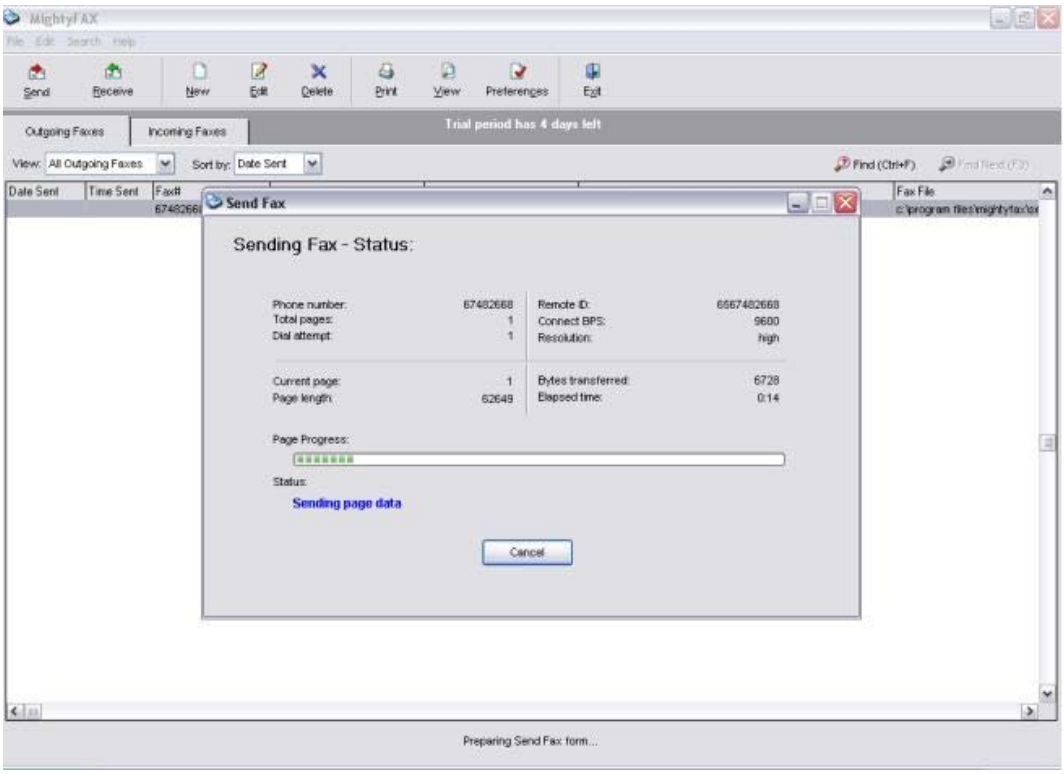


Figure 59

7 Status for sending fax screen will prompt you upon completion of the transmission.

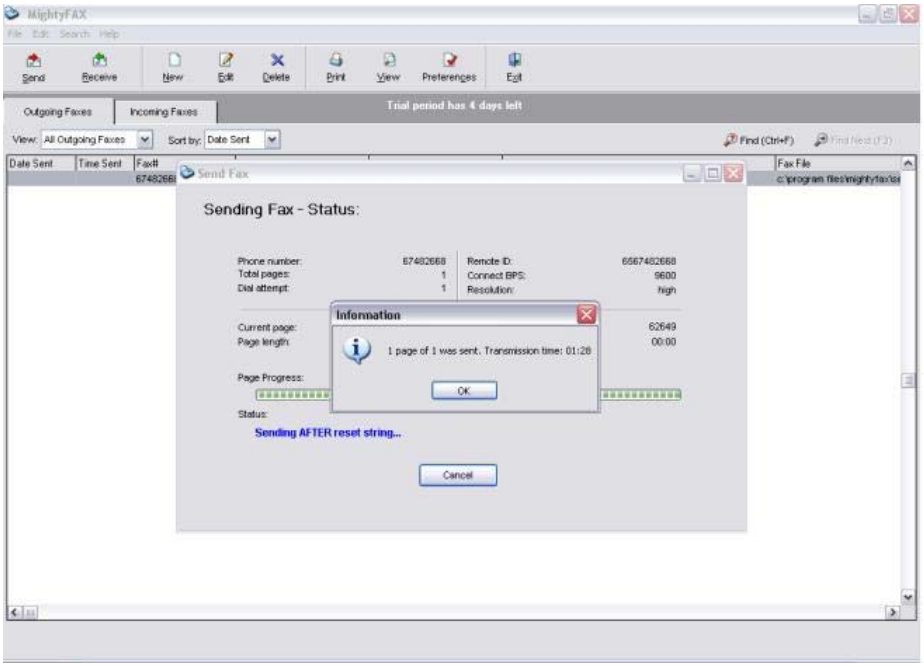


Figure 60

4.6.2.2 Receiving via Mobile Fax

1. When receiving fax, click **Incoming Faxes**
2. At the bottom of the screen, it should show **Waiting for incoming call**

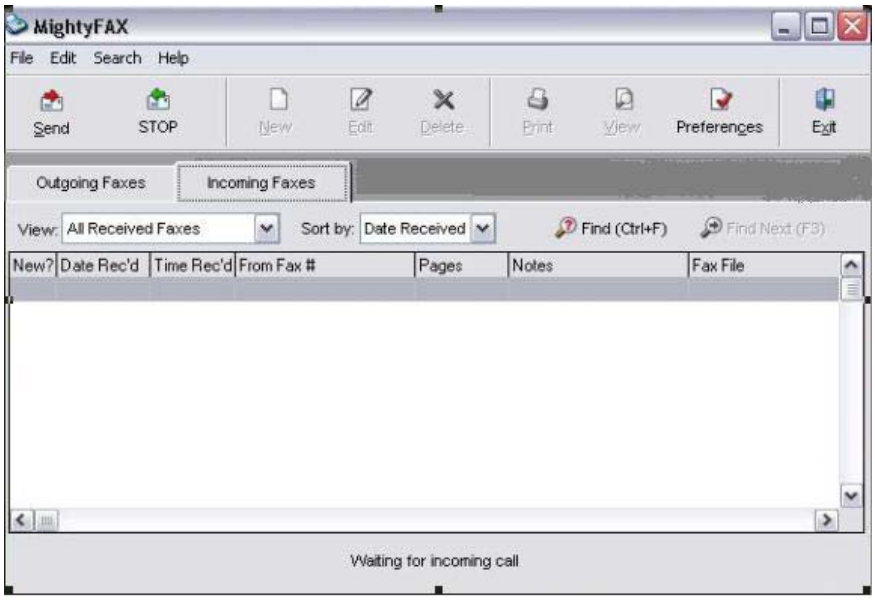
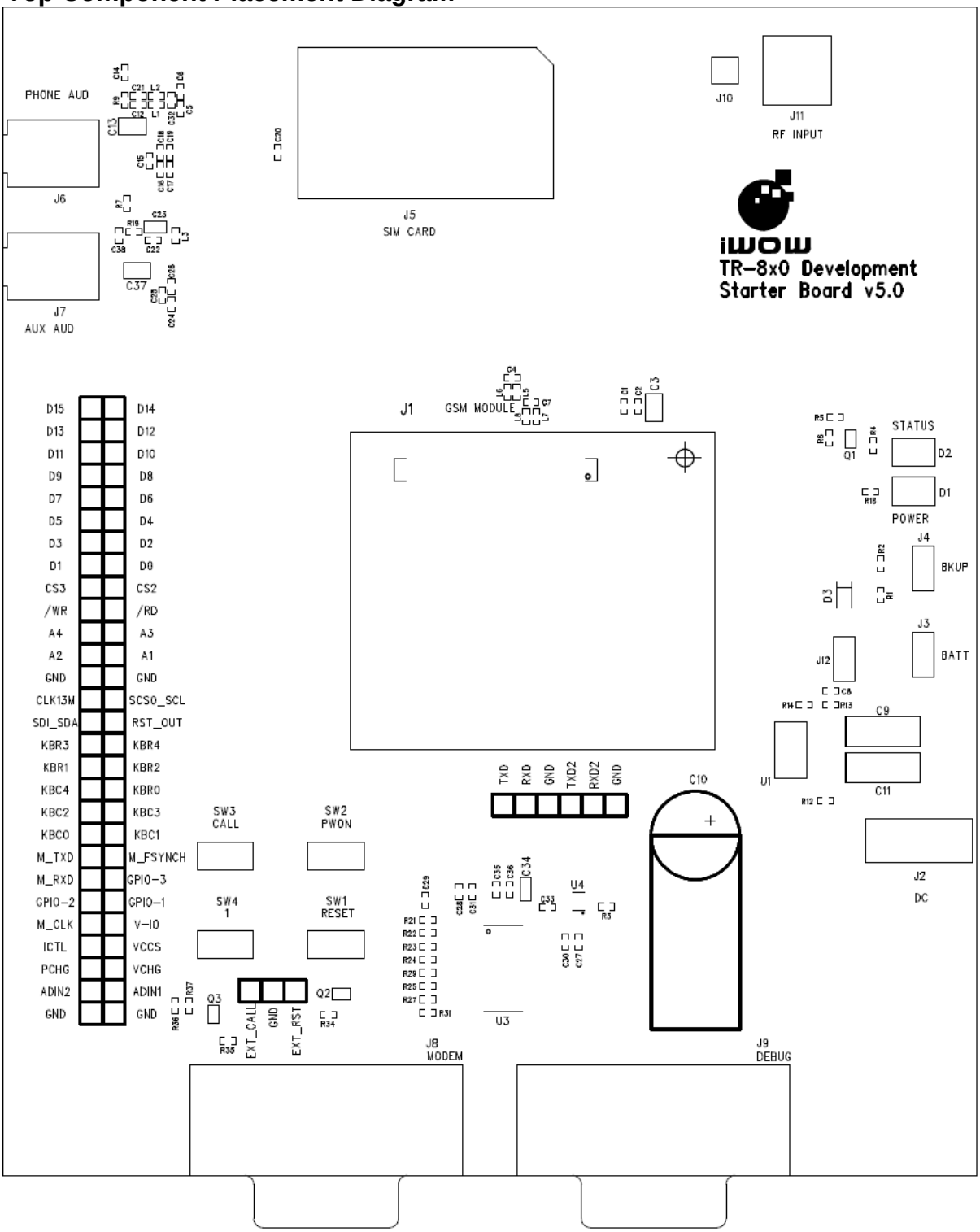


Figure 61

3. When there is incoming fax, bottom of screen will show **Receiving Fax**

4. COMPONENT PLACEMENT INFORMATION

a. Top Component Placement Diagram



b. Component List

Reference	Description
J1	80-pin connector – GSM/GPRS module
J2	DC supply jack
J3	External supply/battery input test points
J4	Backup battery connector
J5	SIM card holder
J6	Phone audio jack
J7	Auxiliary audio jack
J8	Modem Serial UART port
J9	Debug Serial UART port
J10	RF receptacle – for connection to module's RF receptacle
J11	SMA jack – for RF connection to an external antenna or test equipment
SW1	RESET pushbutton
SW2	Power ON/OFF pushbutton
SW3	"CALL" function pushbutton
SW4	"1" function pushbutton
D1	LED indicator – Development Starter Kit Board power supply
D2	LED indicator – Module status indicator

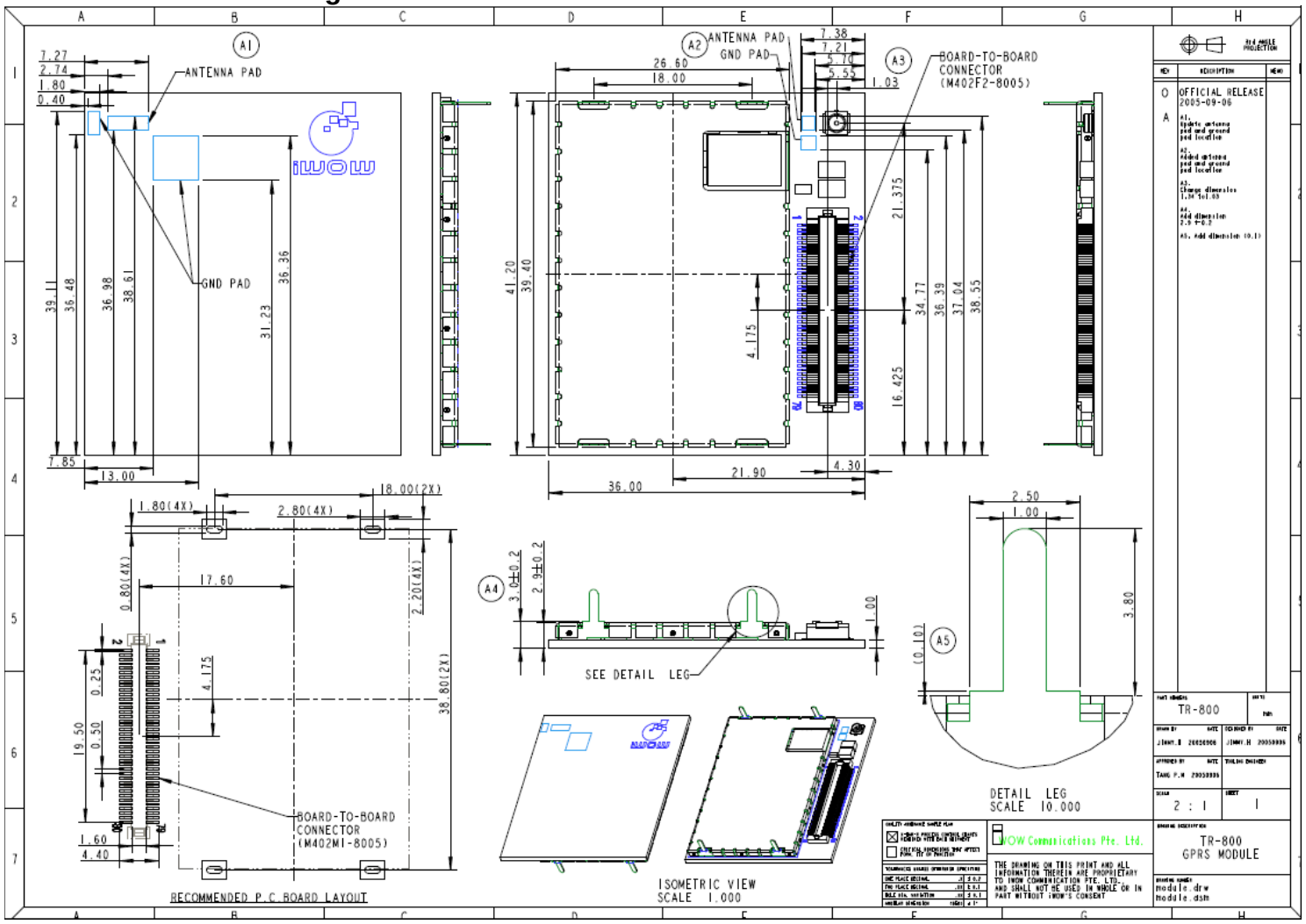
c. Test Point List

The test-points provided on the Development Starter Kit Board allows access to module pins or features that are not implemented or used on the DSK Board itself, e.g. parallel bus, rest of keypad pins, battery charging interface etc.

Test Point	Function	Test Point	Function
TP86	D15	TP85	D14
TP84	D13	TP83	D12
TP82	D11	TP81	D10
TP80	D9	TP79	D8
TP78	D7	TP77	D6
TP76	D5	TP75	D4
TP74	D3	TP73	D2
TP72	D1	TP71	D0
TP70	CS3	TP69	CS2
TP68	/WR	TP67	/RD
TP66	A4	TP65	A3
TP64	A2	TP63	A1
TP62	GND	TP61	GND
TP60	CLK13M	TP59	SCS0_SCL
TP58	SDI_SDA	TP57	RST_OUT
TP56	KBR3	TP55	KBR4
TP54	KBR1	TP53	KBR2
TP52	KBC4	TP51	KBR0

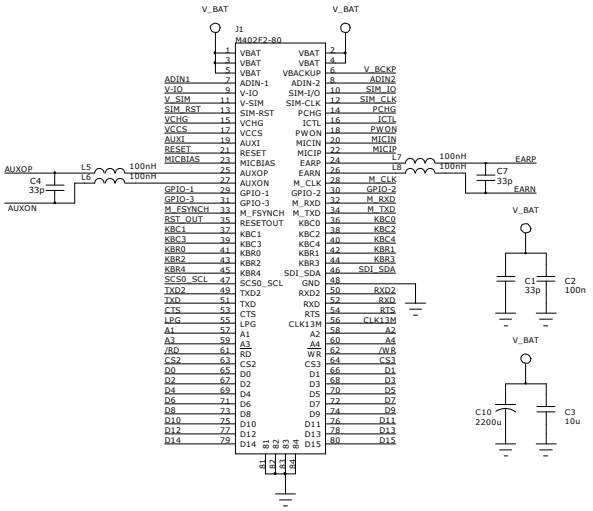
Test Point	Function	Test Point	Function
TP50	KBC2	TP49	KBC3
TP48	KBC0	TP47	KBC1
TP46	M_TXD	TP45	M_FSYNCH
TP44	M_RXD	TP43	GPIO-3
TP42	GPIO-2	TP41	GPIO-1
TP40	M_CLK	TP39	V_IO
TP38	ICTL	TP37	VCCS
TP36	PCHG	TP35	VCHG
TP34	ADIN2	TP33	ADIN1
TP32	GND	TP31	GND
TP30	RXD2	TP29	TXD2
TP28	RXD	TP27	TXD
TP26	GND	TP25	GND

d. Mechanical Drawing of TR-800

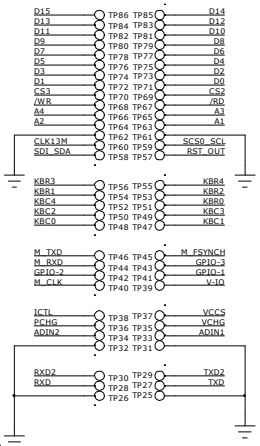


Appendix: DSK Board Schematic

MODULE CONNECTOR

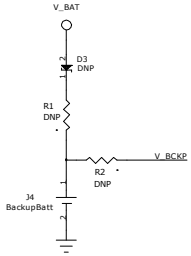


Testpoints



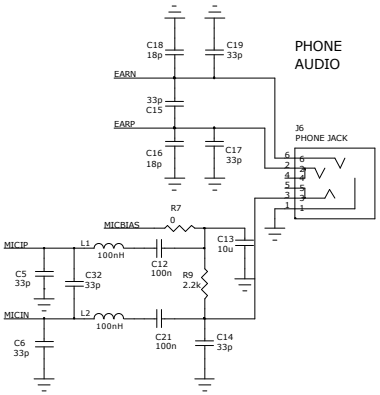
PCB Support/ Mounting Holes

Backup Battery

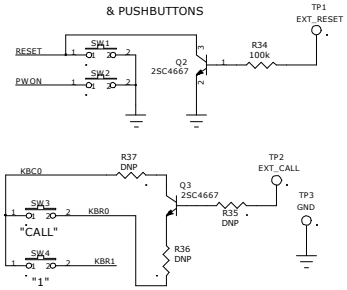


NOTE (using a backup battery):
V_BACKUP max: 3.6V
V_BACKUP nom: 3.0V
R1 must be removed if using external backup battery

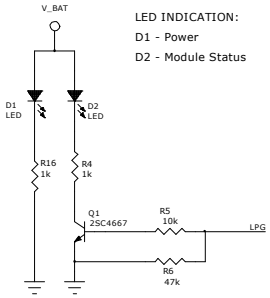
PHONE AUDIO



RESET, ON SWITCHES & PUSHBUTTONS

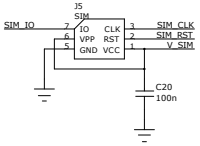


LED INDICATOR

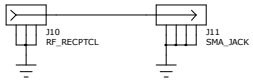


LED INDICATION:
D1 - Power
D2 - Module Status

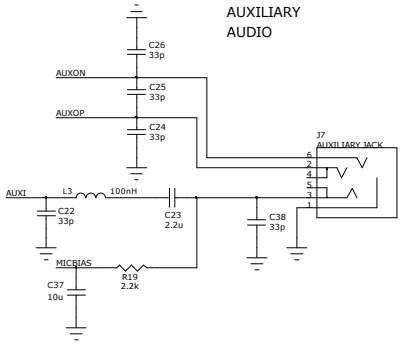
SIM CARD INTERFACE



RF & ANTENNA CONNECTOR

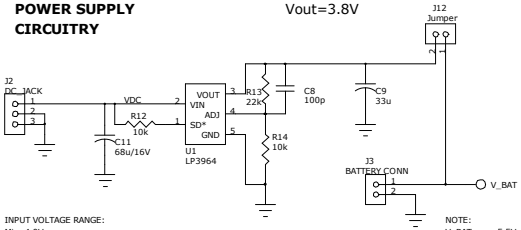


AUXILIARY AUDIO



POWER SUPPLY CIRCUITRY

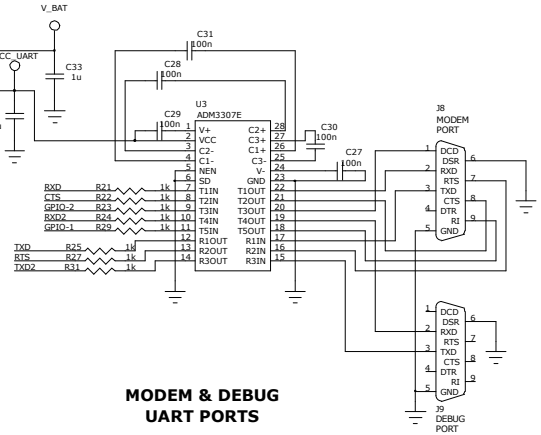
Vout=3.8V



INPUT VOLTAGE RANGE:
Min: 4.0V
Nom: 5.0V
Max: 6.0V

NOTE:
V_BAT max: 5.5V
V_BAT nom: 3.6V
V_BAT min: 3.4V

MODEM & DEBUG UART PORTS



IWOW CONNECTIONS PTE LTD
1 Lorong 2 Toa Payoh #04-01
Yellow Pages Building Singapore 319637