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TR-800 MODULE EVALUATION KIT

USER GUIDE

Date of Release:20 April 2005Document Version:1.0Our Reference:02000C01

Document Information

Revision	Date	Document History
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.

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APPENDIX: MEB SCHEMATIC

1. MODULE EVALUATION KIT

The Evaluation Kit includes:

- A Module Evaluation Board (MEB), including all the interface electronics
- A TR-800 GSM/GPRS module, which is mounted on the MEB
- 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 MEB RF connection
- 4-pole audio headset
- User Guide CD

2. MEB FEATURES

- Antenna interface: SMA jack for GSM antenna
- RF receptacle for MEB 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 MEB
 - Status of the module that is mounted on the MEB
- 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 MEB.
- 3. Ensure that the RF receptacle of module is connected to the RF receptacle of MEB 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 MEB.
- 6. The power supply LED should be light-on when the MEB 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.

Connection Description				? ×
New Connection				
Enter a name and choose an	icon for	the conn	ection:	
<u>N</u> ame: TR800				
<u>l</u> con:				
	MC	8		%
		OK	Car	ncel

Figure 1

- 3. Select the **COM1** for Connect using.
- 4. Click OK.

Connect To	<u>? ×</u>
🌯 тя800	
Enter details for t	he phone number that you want to dial:
Country/region:	United States (1)
Ar <u>e</u> a code:	0
Phone number:	
Connect using:	COM1
	OK Cancel

Figure 2

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

COM	11 Properties	? ×
Po	ort Settings	
	-	
	Bits per second: 115200	
	Data bits: 8	_
	Parity: None	•
	Stop bits: 1	-
	Elow control: Hardware	-
		Restore Defaults
	OK Can	cel <u>Apply</u>

Figure 3

- 6. Click OK.
- 7. Press Reset button on the MEB. Now you can communicate with the modem using AT commands.
- To test the communication, type AT+HVER and press enter. You should get an "HVER: AMB20" or similar response if the setup is correct.
- 9. To check SIM card status: AT+CPIN?<ENTER>

TR800 - HyperTermin File Edit View Call Ir	nal ansfer <u>H</u> elp	
	9 🖻	
AT-Command I AT+HVER HVER: AMB20	nterpret	er ready
ок		
%CPRI: 1,2 AT+CPIN? +CPIN: READY	,	
ок		
		•
Connected 0:01:19	Auto detect	115200 8-N-1

Figure 4

餋 TR800 - HyperTerminal	
<u>File Edit View Call Transfer H</u> elp	
AT+CREG? +CREG: 0,2	
OK AT+CREG? +CREG: 0,1	
ок	
%CPRI: 1,2 AT+COPS? +COPS: 0,0,"SGP M1-GSM"	
ок	
-	-
Connected 0:02:16 Auto detect 115200 8-N-:	I JSCROL

Figure 5

the communication, type **ER** and press **enter**.

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

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

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4.2 Testing On Short Message

4.2.1 Send SMS

- Set the short message format as text mode: AT+CMGF=1<ENTER>
- Check if SMS service center (SMSC) number is set to SIM card: AT+CSCA?<ENTER>

3. Set the new incoming SMS to be

AT+CNMI=2,2,0,0,0<ENTER>

displayed immediately:

🍓 TR800 - HyperTerminal 📃				
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> r	ansfer <u>H</u> elp			
	5			
OK AT+CMGF=1 OK AT+CSCA? +CSCA: "+659	6845999"	,145		
Ток				
			•	
Connected 0:01:15	Auto detect	115200 8-N-1	5	
,	1	,	- 10	

Figure 6



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

🍓 TR800 - HyperTerm	inal	_ [IX				
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u>	<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> ransfer <u>H</u> elp						
	8						
AT+CMGS="+6 > GOODDAY FI +CMGS: 14	594892804 ROM TR800) [-				
ок		I					
%CPRI: 1,2							
Connected 0:42:53	Auto detect	115200 8-N-1	· //				

Figure 8

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4.2.2 Receive SMS

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

🇞 TR800 - HyperTerminal 📃 🗆 🗙
<u>File Edit View Call Iransfer H</u> elp
%CPRI: 1,2
+CMT: "6594892804",,"04/12/06,09:29:10+
Connected 0:01:16 Auto detect 115200 8-N-1 SCROLL CAPS

Figure 9

- To Enable new SMS indication instead of display it directly on TA: AT+CNMI=2,0,0,0,0<ENTER>
- Upon receiving new SMS, +CMTI: "SM", 7 indication will be given. This means the new SMS is stored at location index 7 of the SIM card.

🏀 TR800 - HyperTerminal								
<u>Eile E</u> dit <u>V</u> iew <u>C</u> all <u>T</u>	File Edit View Call Iransfer Help							
02 28 0	12 S 07 5							
AT+CNMI=2,0, ok	,0,0,0							
%CPRI: 1,2								
+CMTI: "SM",	+CMTI: "SM",7							
				▼ 				
Connected 0:02:36	Auto detect	115200 8-N-1	SCROLL	CAPS				

Figure 10

- 6. To access SIM card storage for SMS: AT+CPMS="SM"<ENTER>
- 7. To read SMS at location 7: AT+CMGR=7<ENTER>

🍓 TR800 - HyperTermi	nal				- II X		
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u> i	ransfer <u>H</u> elp						
	<u>b</u>						
AT+CPMS="SM +CPMS: 7,35,	7,35,7,3	5			_		
OK AT+CMGR=7 +CMGR: "REC UNREAD","6594892804",,"04/12/0 145,11 Hello there							
ок							
					▼		
Connected 0:03:24	Auto detect	115200 8-N-1	SCROLL	CAPS	NUM //		
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.

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

hone And Modem Options		? ×
Dialing Rules Modems Advanced		
The following modems are in	stalled:	
Modem	Attached To	וב
😂 iTegno GPRS Wireless Modem	Not present	
🛛 🧼 iTegno GPRS Wireless Modem #2	COM4	
💦 🍣 iTegno GPRS Wireless Modem #3	Not present	
		- 11
A <u>d</u> d	<u>H</u> emove <u>P</u> roperties	
OK	Cancel <u>Appl</u>	,

Figure 12

 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

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

Add/Remove Hardware Wizard	
Install Ne w Modem	
Select the manufacturer ar have an installation disk, cl	nd model of your modern. If your modern is not listed, or if you lick Have Disk.
Manufacturers:	Models:
(Standard Modern Types)	Standard 9600 bps Modem
3Com -	Standard 14400 bps Modern
Aceex	Standard 28800 bps Modern
Acer	Standard 33600 bps Modem
A glico T a a	Standard 56000 bps K56Flex Modem
	I Standard billill bos V90 Modem
	<u>H</u> ave Disk
	< Back Next > Cancel

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.

5. On the last screen, click Finish to

Modem Options screen.

on your PC.

complete setting up your serial modem

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



Figure 15

Phone And Modem Options	<u>? ×</u>
Dialing Rules Modems Advanced	
The following modems are in	stalled:
Modem	Attached To
iTegno GPRS Wireless Modem	Not present
🌔 🔕 iTegno GPRS Wireless Modem #2	COM4
🌔 🔕 iTegno GPRS Wireless Modem #3	Not present
Standard 33600 bps Modem	COM1
Add	Bemove Properties
Aga	
<u>ОК</u>	Cancel Apply

Figure 16

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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.



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

v Conn	ection Wizard
Netwo W	hat do you want to do?
¢	Connect to the Internet
	Connect to the Internet so you can browse the Web and read email.
0	Connect to the network at my workplace
	Connect to a business network (using dial-up or VPN) so you can work from home, a field office, or another location.
© Set up a home or small office network	
	Connect to an existing home or small office network or set up a new one.
O Set up an advanced connection	
	Connect directly to another computer using your serial, parallel, or infrared port, or set up this computer so that other computers can connect to it.
	Canad



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

5. Select Modem – Standard 33600 bps Modem (COM1)

for dialing device. Click Next.

New Connecti	on Wizard
Internet C How de	Connection o you want to connect to the Internet?
• Co Thi	nnect using a <u>d</u> ial-up modem is type of connection uses a modem and a regular or ISDN phone line.
C Co an Thi refe	nnect using a broadband connection that requires a <u>u</u> ser name d password is is a high-speed connection using either a DSL or cable modem. Your ISP may ro this type of connection as PPPoE.
C Co Thi cor	nnect using a broadband connection that is <u>a</u> lways on is is a high-speed connection using either a cable modem, DSL or LAN nnection. It is always active, and doesn't require you to sign in.
	< <u>B</u> ack <u>N</u> ext > Cancel

Figure 20

New Connection Wizard	
Select a Device This is the device that will be used to make the connection.	Í,
You have more than one dial-up device on your computer.	
Select the devices to use in this connection:	
☐ 🥔 Modem - iT egno GPRS Wireless Modem (COM3) ☑ 🏈 Modem - Standard 33600 bps Modem (COM1)	
< <u>B</u> ack <u>N</u> ext >	Cancel

 Kext ≥
 Cancel

 Figure 21

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New Connection Wizard
Connection Name What is the name of the service that provides your Internet connection?
Type the name of your ISP in the following box.
ISF Name
GSM Connection
The name you type here will be the name of the connection you are creating.
< <u>B</u> ack <u>N</u> ext > Cancel

Figure 22

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

w Connection Wizard	
Phone Number to Dial What is your ISP's phone number?	Ð
Type the phone number below. Phone number:	
, You might need to include a "1" or the area code, or b you need the extra numbers, dial the phone number or hear a modem sound, the number dialed is correct.	ooth. If you are not sure n your telephone. If you
< <u>B</u> ack	Next > Cancel



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

You will need an accou	hatton Int name and password to sign in to your Internet account.
Type an ISP account n safe place. (If you have	ame and password, then write down this information and store it in a forgotten an existing account name or password, contact your ISP.)
<u>U</u> ser name:	Γ
<u>P</u> assword:	
Confirm password:	
Use this account r this computer	name and password when anyone connects to the Internet from
	ult Internet connection
Make this the defailed	

9. Click Finish to complete the New Connection Wizard.

Figure 24

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**.

3. Select Set up my connection

manually. Click Next.

~ ~	/hat do you want to do?
	Connect to the Internet
	Connect to the Internet so you can browse the Web and read email.
C	Connect to the network at my workplace
	Connect to a business network (using dial-up or VPN) so you can work from home, a field office, or another location.
C	Set up a home or small office network
	Connect to an existing home or small office network or set up a new one.
C	Set up an advanced connection
	Connect directly to another computer using your serial, parallel, or infrared port, or set up this computer so that other computers can connect to it.

Figure 26



Figure 27

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New Connection Wizard
Internet Connection How do you want to connect to the Internet?
 Connect using a dial-up modem This type of connection uses a modem and a regular or ISDN phone line. Connect using a broadband connection that requires a user name and password This is a high-speed connection using either a DSL or cable modem. Your ISP may refer to this type of connection as PPPoE. Connect using a broadband connection that is <u>a</u>lways on This is a high-speed connection using either a cable modem, DSL or LAN connection. It is always active, and doesn't require you to sign in.
< <u>B</u> ack <u>N</u> ext > Cancel

Figure 28

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

New Connection Wizard
Connection Name What is the name of the service that provides your Internet connection?
Type the name of your ISP in the following box. ISP N <u>a</u> me
GPRS Connection
, The name you type here will be the name of the connection you are creating.
< <u>B</u> ack <u>N</u> ext> Cancel
Firmer 00
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

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New Connection Wizard				
Internet Account Information You will need an account name and password to sign in to your Internet account.				
Type an ISP account name and password, then write down this information and store it in a safe place. [If you have forgotten an existing account name or password, contact your ISP.]				
User name:				
Password:				
Confirm password:				
Use this account name and password when anyone connects to the Internet from this computer				
Make this the default Internet connection				
☐ <u>I</u> urn on Internet Connection Firewall for this connection				



< <u>B</u>ack

<u>N</u>ext >

Cancel

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





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5. COMPONENT PLACEMENT INFORMATION

5.1 TOP COMPONENT PLACEMENT DIAGRAM



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5.2 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 – MEB power supply
D2	LED indicator – Module status indicator

5.3 TEST POINT LIST

The test-points provided on the MEB allows access to module pins or features that are not implemented or used on the MEB 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

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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

