MTD1000/Evaluation Kit

User Guide

Contents

1. System Overview

1.1 MTD1000

The MTD1000 is a small, economical and low cost, high quality multi-purpose GPS/ GSM tracking solution for personal and vehicle tracking. It can also be used as 2-way telemetry to control relays and transmit short messages. With battery embedded, it can remain on standby for at least 24 hours. It transmits the GPS data by using GPRS/SMS.

For efficient data management, it comes with a memory capacity of 6,000 full detail reports that include position, date, time, system and input/output ports status enabling continuous recording of position and time. The data can be downloaded either over-the-air or stored for downloading at a later time.

The MTD1000 is capable of producing it own unique device ID.

Field Applications:

- Vehicle tracking device (GSM or GSM/ GPS)
- Anti-theft (GSM or GSM/ GPS with tilt sensor or equivalent)
- Personal emergency alert with panic button
- 2-way telemetry

1.2 Family of options available for MTD1000 hardware configurations

Model: MTD1000 - IE2N3F

- Embedded GPS antenna.
- External GSM antenna
- Easy in-vehicle mounting flange installation option.

Model: MTD1000 - EIDN3F

- Embedded GSM/GPRS antenna.
- External GPS antenna

Model: MTD1000 - IIDN3F

- Embedded GSM/GPRS antenna
- Embedded GPS antenna
- Easy in-vehicle mounting flange installation option.

Model: MTD1000 - EEDN3F

- External GSM/GPRS antenna
- External GPS antenna
- Easy in-vehicle mounting flange installation option.

Options available for MTD1000

- With/ Without Panic button
- With Power connector DC jack or 2 pin power connector
- With/ Without Mounting Flange (5mm diameter hole each)
- Adaptor Chargers for Europe or USA

1.3 Understanding the product model of your hardware

The hardware product code as follows in your MTD1000

Model No:	MTD1000	-	x	x	x	x	x	x
			1	2	3	4	5	6

Example 1:

Model No:	MTD1000	-	E	I	D	N	3	F
			1	2	3	4	5	6

(1) External GPS,
(2) Internal GSM,
(3) DC Jack Power Connector,
(4) Without Tilt Sensor,
(5) 3 Input
(6) with Flow Control (CTS/RTS), thus 2 Output

Model number	GPS	GSM	DC Jack Power connector	With/ Without Tilt Sensor	No. of Input ports	With/ Without Flow control
MTD 1000 -	E	I	D	N	3	F

GPS
"E" = External GPS Antenna
"I" = Internal GPS Antenna

GSM
"E" = External GSM Antenna
"I" = Internal GSM Antenna

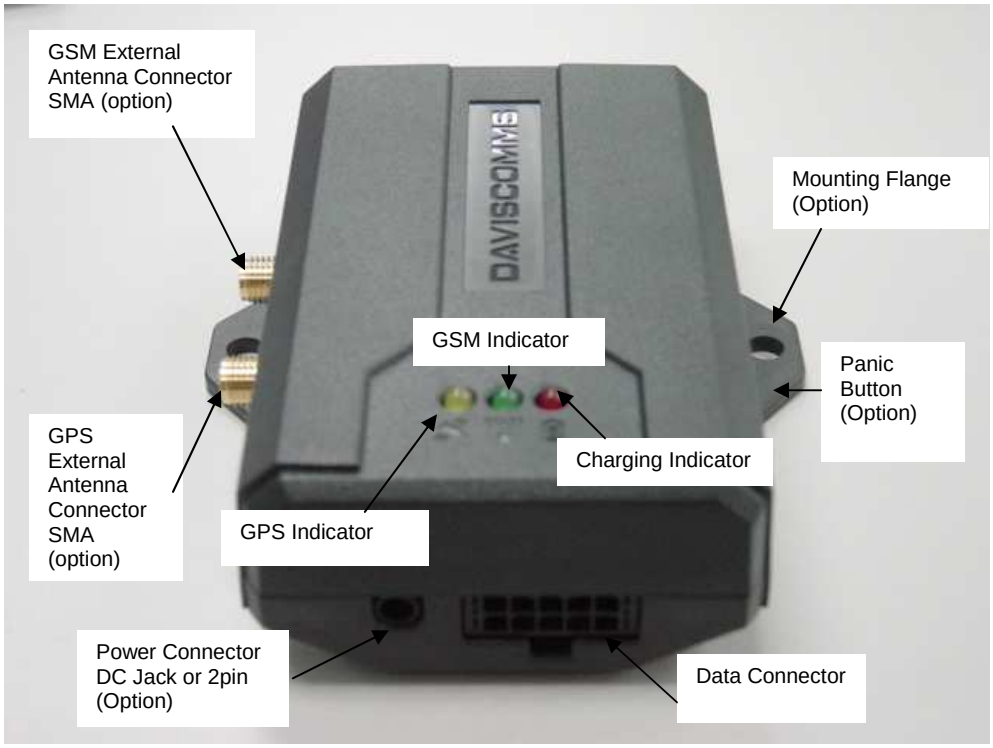
Power Conn
"D" = DC Jack Power Connector
"2" = 2-pin Jack Power Connector

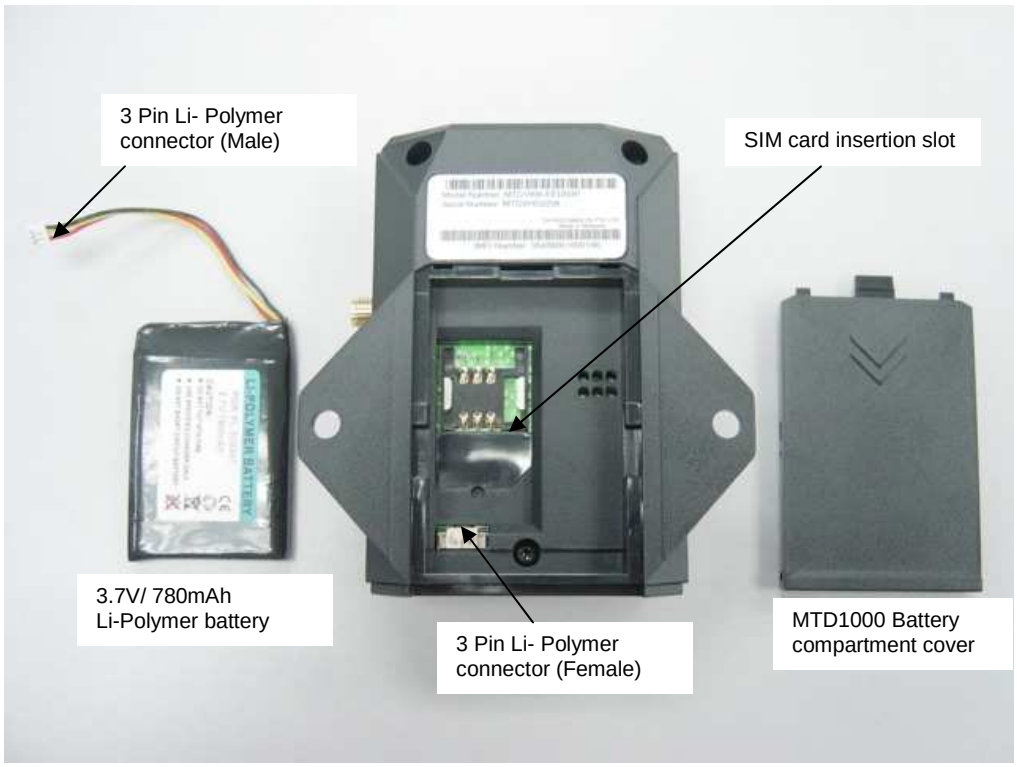
Tilt Sensor
"Y" = With Tilt Sensor
"N" = Without Tilt Sensor

Number of Input Port
(Maximum 7 IO ports with maximum 4 output ports)
e.g. "1" = 1 Input Port
"7" = 7 Input Port

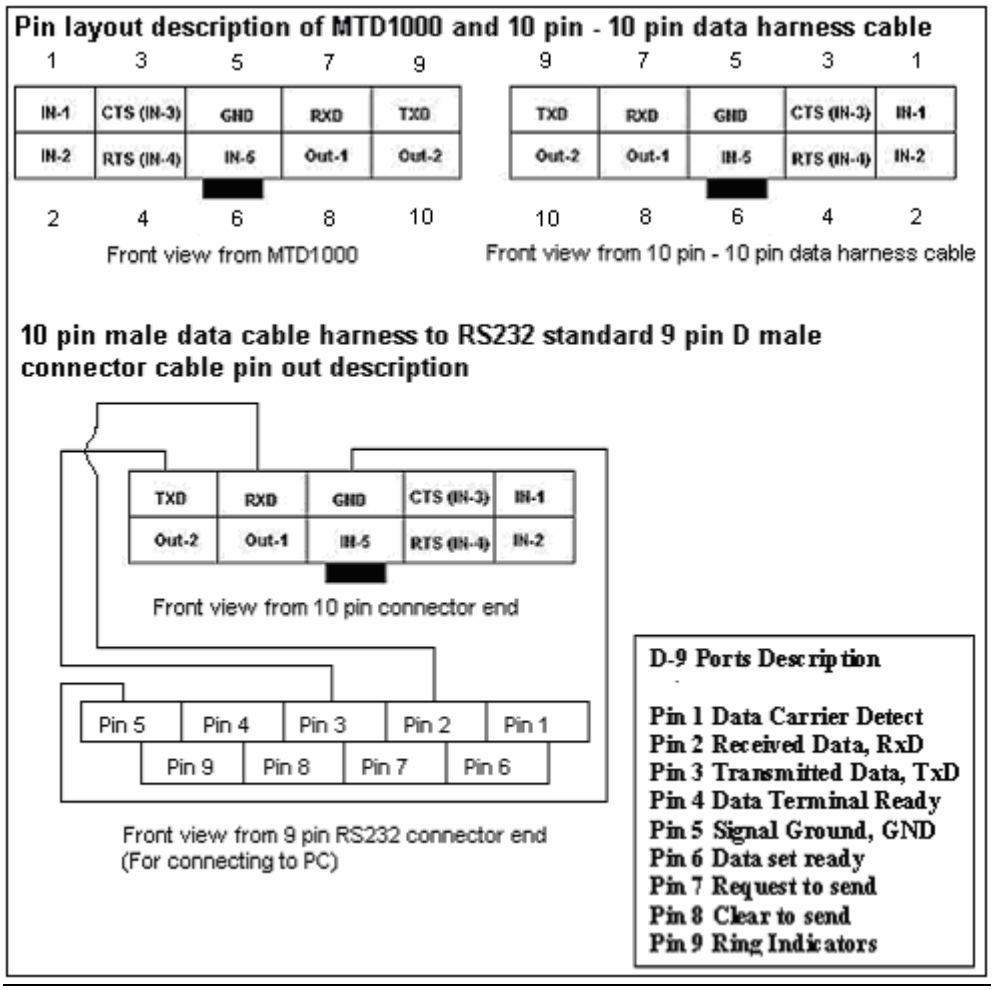
Serial with or without Flow Control
"F" = Serial with Flow Control (CTS/RTS) = 2 Input Port used
"S" = Serial without Flow Control = 0 Input Port used

1.4 Parts Description of MTD1000





1.5 Pin layout description



The factory default 10 port settings of the MTD1000 are 2 outputs (Out-1 and Out-2) and 3 inputs (IN-1, IN-2 and IN-5), 4 RS232 ports for RXD, TXD, CTS, RTS and 1 port for GND

IN-5 can be configured as (Out-3) output port and Out-1, Out-2, CTS, RTS can be configured as input port; upon factory hardware customization.

Color coding of the 10 pin male/male data cable harness

(IN-1) Pin1 = Yellow	(IN-5) Pin 6 = Purple
(IN-2) Pin 2 = White	(RXD) Pin 7 = Brown
(IN-3) Pin 3 = Orange	(Out-1) Pin 8 = Blue
(IN-4) Pin 4 = Grey	(TXD) Pin 9 = Red
(GND) Pin 5 = Black	(Out-2) Pin 10 = Green

2. Product Package Overview

2.1 MTD1000 Evaluation kit package description

In the MTD1000 evaluation kit box, you will receive 10 items as described below.

a. MTD1000 device (GSM/GPRS/ GPS)

The communication device that processes the GSM/GPRS and GPS functions.

b. Power Adapter

1X Power adaptor (100 – 240V~ 50/60Hz 650mA Max) for the MTD1000 device

1X Power adaptor (100 – 240V~ 50/60Hz 650mA Max) for the evaluation kit

Power DC jack dimension: 3.5mm*1.35 mm

c. GPS antenna (SMA connector) for the MTD1000 device

The receiver component required to receive GPS data to the MTD1000 device for a location fix.

d. RS232 standard 9 pin D female/ male connector cable

The interface cable which connect the evaluation kit serial connection (male) to the serial comport (female) of your PC.

e. 10pin male data cable harness to RS232 standard 9 pin D male connector cable

The cable that interfaces from the MTD1000 to a serial comport connection of your PC.

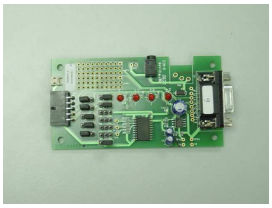
f. GSM/GPRS antenna (SMA right angle)

The receiver component required to receive GSM/GPRS data to the MTD1000 device in a network cell location.

g. Li- Polymer battery for MTD1000

An alternative solution to power up the MTD1000 without a power adaptor up to 24 hours.

Voltage/ current specification: (3.7V/ 780mAh)



h. Evaluation PCB board (For development purposes on the MTD functionalities)

Allows you to enable or disable the input/output of the MTD1000 through this device.

i. 10 pin male/male data cable harness for evaluation kit

For connection from the evaluation board to the MTD1000 device

j. 10 pin male data cable harness (colored cable / open ended)

For connection from the MTD1000 device with open ended wires.

(Accessory option with MTD 1000 only)

k. 2 pin power connector

For connection from the MTD1000 device with open ended wires.

(Accessory option with MTD 1000 only)

2.2 Installation and starting up on the MTD1000

Step 1

- Insert the SIM card (Not included in package)
- Connect the Li-Polymer battery to the into the MTD1000

Note:

If the SIM card is inserted after the power is connected to the MTD1000, the unit will not be able to detect the SIM card and register to the network.
Always unplug the external power supply and battery before removing the SIM card. Removing the SIM card with power supply connected may damage your SIM card and the device.
Do not use the internal Li-Ion battery beyond standard operating temperature of -10C to +50C.
The MTD1000 can function directly from DC power supply adaptor without the internal Li-Ion battery.

Step 2

Adjust the battery cover into the catch and slide it into the back cover latch fully.

Step 3

Connect the GSM/GPRS antenna to the GSM External Antenna Connector.
Screw in the SMA connector firmly.

Step 4

Connect the GPS antenna to the GPS External Antenna Connector.
Screw in the SMA connector firmly.

Step 5

An example of the MTD1000 hardware setup with the 10 pin data harness cable/ RS232 for AT command communications and firmware flashing. (Recommended)

2.3 LED indicators

2.3.1) RED LED (Charging Indicator)

- Red LED constant on: Li-ion battery is charging
- Red LED off: Charging completed

Charge the battery by plugging in power adapter connector into the power connector of the unit. Use power adapter with similar or better ratings to prevent damage to the power adapter. If not sure, use only power adapter provided in the package.

2.3.2) GREEN LED (GSM Indicator)

- Green LED constant on: Invalid SIM Card or SIM Card not detected
- Slow blink (200ms on & 2s off). Device has found GSM network & registered.

Green LED Blinking:

- Fast blink (200ms on & 600ms off). The device has voice or data line connected.

2.3.3) Yellow LED (GPS Indicator)

- Yellow LED constant on: GPS data valid.
- Yellow LED off: GPS data invalid.

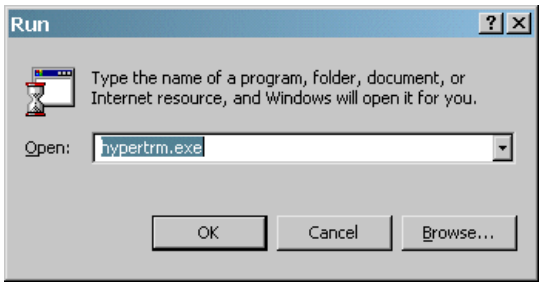
3. Interfacing the MTD1000 / Evaluation kit for AT commands communication

3.1 Hyper-terminal settings

How to create a hyper-terminal connection from your PC to your device

Step 1 On the Windows Start menu, select Run.... The Run dialog appears.

The Windows Run Dialog



Step 2 In the Open: field, type hypertrm.exe, and click OK. The HyperTerminal splash screen appears while HyperTerminal loads.

HyperTerminal Splash Screen

HyperTerminal then appears; open to the Connection Description dialog.

Step 3 On the Connection Description screen, for Name type "Daviscomms" or any name you would prefer and select an icon for the definition, and click OK. The Connect to dialog appears.

HyperTerminal Connection Description dialog

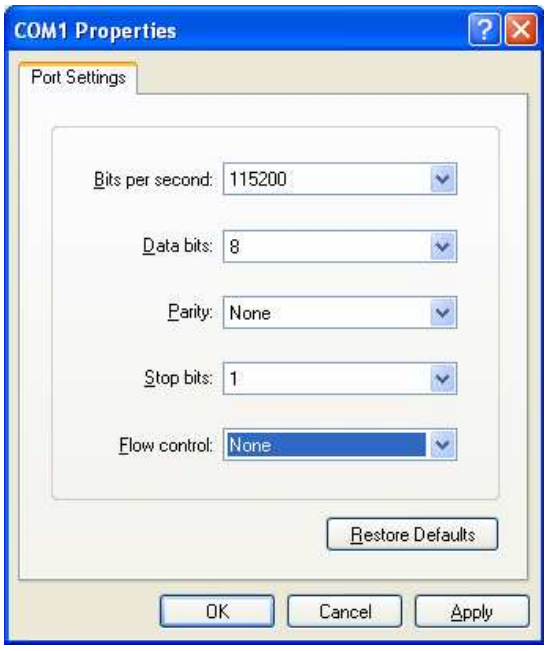
Step 4 On the Connect To dialog, select your primary COM port (COM1 e.g. the example above) for the Connect using: field, and click OK. (The Country/region:, Area code: and Phone number: fields are not used.) The COM 1 Properties dialog appears.

HyperTerminal Connect to dialog

Step 5 At the COM 1 Properties dialog, make the following selections, and then click OK:

- Bits per sec: 115200
- Data bits: 8
- Parity: none
- Stop bits: 1
- Flow control: none

HyperTerminal COM 1 Properties dialog



Note The settings in the Hyper Terminal need to be set correctly; otherwise, strange-looking or garbage characters may show up on the screen. If you are experiencing problems, make sure the router or modem is powered on, you are attached to the proper Com Port and verify your cabling is working.

Without these correct settings, the device may display information, but does not accept any keystrokes, making it appear as if it is hung, or has crashed. If the default settings do not produce better results, your router may have been configured to use non-standard settings. To verify, try to connect at different speeds until you get a valid prompt.

Step 6 To prove you have a valid connection to a modem, type "AT" and you should receive "OK" back from the MTD1000 device.

You should now be communicating with the MTD1000 device at com-port 1.

***Note: Please refer to section 6 for application examples to use the MTD1000.**

3.2 Evaluation Kit

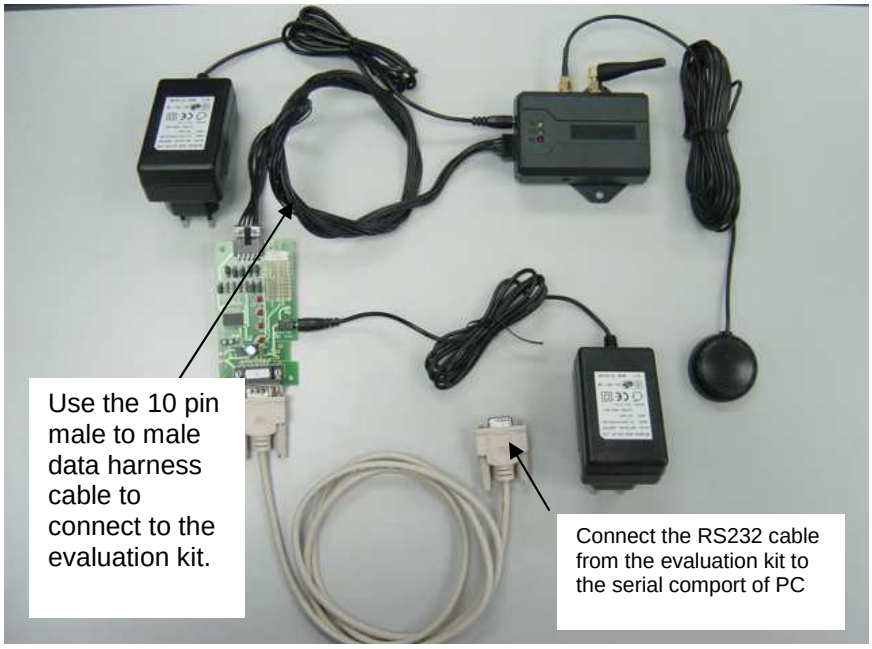
3.2.1 Evaluation kit usage description

The evaluation kit is used for development purposes to test the MTD1000 unit on its functionalities on GSM/GPRS/GPS applications.

You will not require to power up the evaluation kit if only for AT commands communication to the MTD-1000 unit.

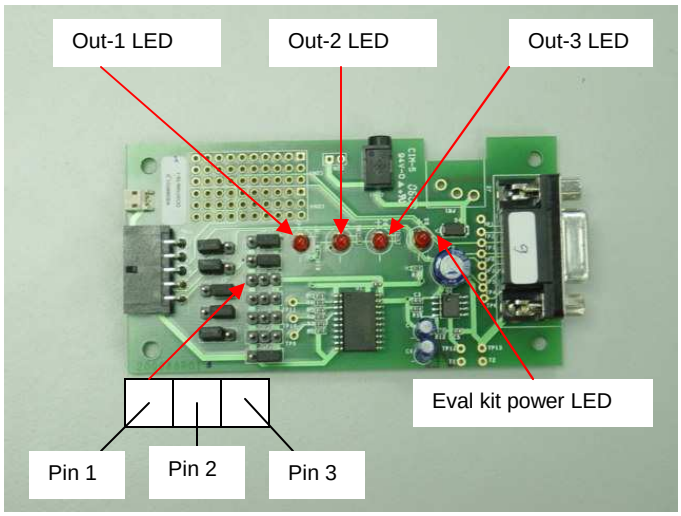
Configuring the jumpers requires the evaluation kit to be powered up by the external power adaptor

3.2.2 Full hardware setup for MTD1000 with evaluation board



MTD1000 hardware setup with the evaluation PCB board for AT commands communication..

3.3 Jumper pin orientation



3.3.1 Jumper selection description

Pin 1	Pin 2	Pin 3
JUP 11		
RTS	4	IN 4
JUP 12		
CTS	3	IN 3
JUP 13		
IN 6	8	Out-1
JUP 14		
IN 7	10	Out-2
JUP 15		
Out-3	6	IN 5

Pin 1	Pin 2	Pin 3
JUP 21		
0 V	IN 1	5 V
JUP 22		
0 V	IN 2	5 V
JUP 23		
0 V	IN 4	5 V
JUP 24		
0 V	IN 3	5 V
JUP 25		
0 V	IN 6	5 V
JUP 26		
0 V	IN 7	5 V
JUP 27		
0 V	IN 5	5 V

Note: In standard settings of MTD1000 with 2 outputs and 3 inputs, IN-4, IN-3, IN-6, IN-7 and OUT-3 are not functional. Please refer to section 1.5 Pin layout description pg. 6 of 34 for detailed information

Enabling OUT-1 selection of jumper position in JUP 13:

Pin 1	Pin 2	Pin 3
IN 6	■■■■■■■■	

(Out-1 is selected)

(Mini-jumper)

Disabling the Out-1 selection of jumper position JUP 13

Pin 1	Pin 2	Pin 3
■■■■■■■■		Out-1

(Out-1 is deselected)

(Mini-jumper)

3.3.2 Jumper default positions description

3.2.2.1 2 output port option:

1. JUP21 and JUP22 short PIN2 and PIN3 to make the Input Port 1 and Input Port 2 be pulled to +5V position
2. JUP11 and JUP12 short PIN2 and PIN3 to get MTD1000 to be ready of RS232 flow control function.
3. JUP13 and JUP14 PIN2 and PIN3 are shorted.
4. JUP15 PIN1 and PIN2 are shorted. JUP27 shorts PIN2 and PIN3.
5. JUP23, JUP24, JUP25 and JUP26 are opened.

3.2.2.2 3 output port option:

1. JUP21 and JUP22 short PIN2 and PIN3 to make the Input Port 1 and Input Port 2 be pulled to +5V position
2. JUP11 and JUP12 short PIN2 and PIN3 to get MTD1000 to be ready of RS232 flow control function.
3. JUP13 and JUP14 PIN2 and PIN3 are shorted.
4. JUP15 PIN2 and PIN3 are shorted. JUP27openned.
5. JUP23, JUP24, JUP25 and JUP26 are opened.

4. Firmware Downloading

4.1 TR-800 GSM/GPRS Module Firmware Downloader

There is NO need to perform the firmware download for the MTD1000 unit (unless requested by Daviscomms). The MTD1000 is already loaded with the latest firmware.
However if require the follow steps in this section will show you how the process is being carried out.

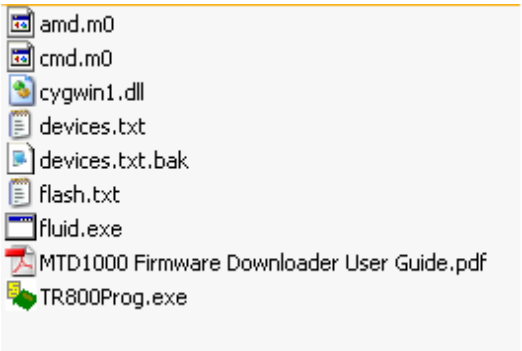
4.2 Hardware set-up for flashing of firmware

Step 1: Connect serial cable from PC host to MTD1000 via the Communication Cable as mentioned in section 2.1.4.

Step 2: Remove the internal battery and plug in the power source of The Product.

Step 3: Copy the whole TR-800 Programmer 4.0 folder into your PC.

Step 4: Run TR800Prog.exe.



TR-800 Programmer File v4.0

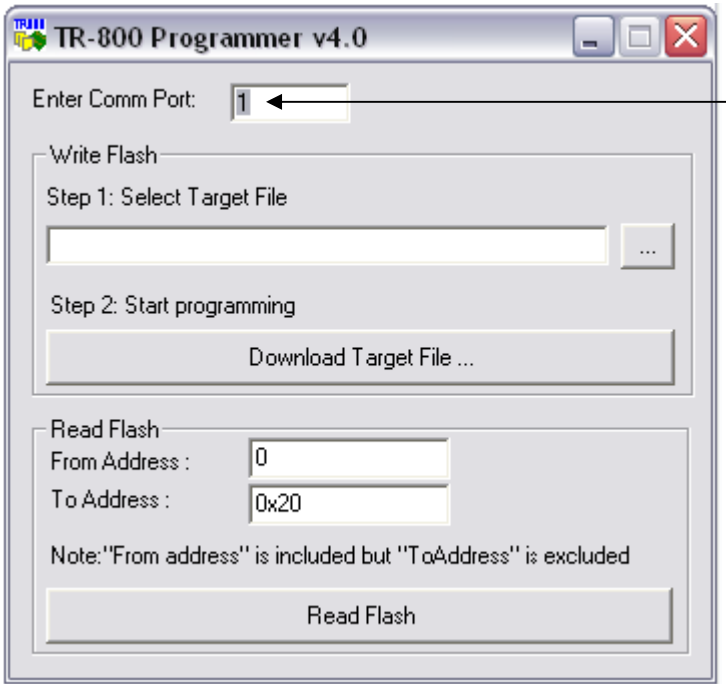
4.3 Use of the MTD1000 firmware downloader setup guide

This Setup Guide is applicable for the following hardware and software version:

- TR-800 Programmer: Version 4.0
- The Product – MTD1000

4.4 TR-800 programmer graphics user interface (GUI) setup

After running the TR-800Prog.exe, the below dialogue box will appear and please follow the steps to complete the set-up:

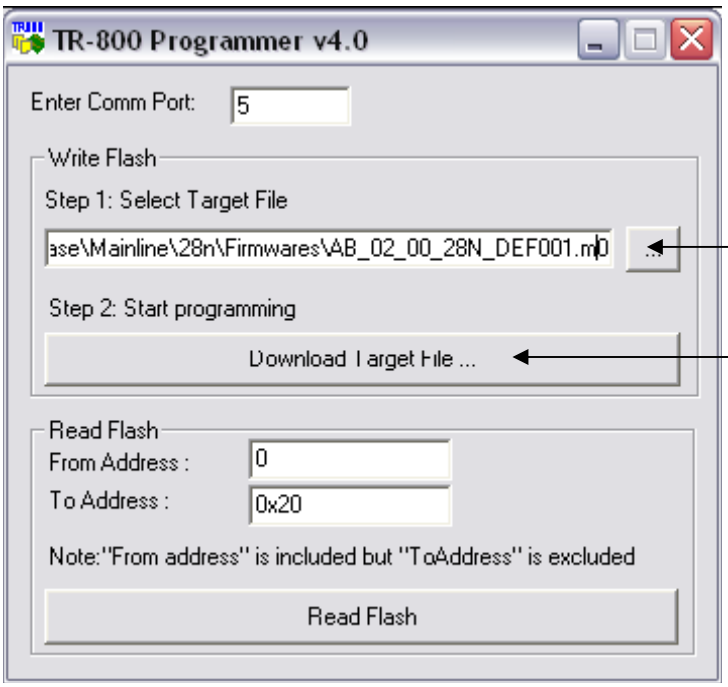


TR-800 PROGRAMMER

Step 1: Enter your COM Port number. The default value is 1. The programmer will set the COM port to the following settings:

COM Port Baud Rate = 115200 bps
Data Bits = 8
Parity = None
Stop Bit = 1
Flow Control = None

Step 2: Browse for the m0 file (firmware file) to be programmed into the module. Ensure that the path and file name of the m0 file is correct before proceeding.

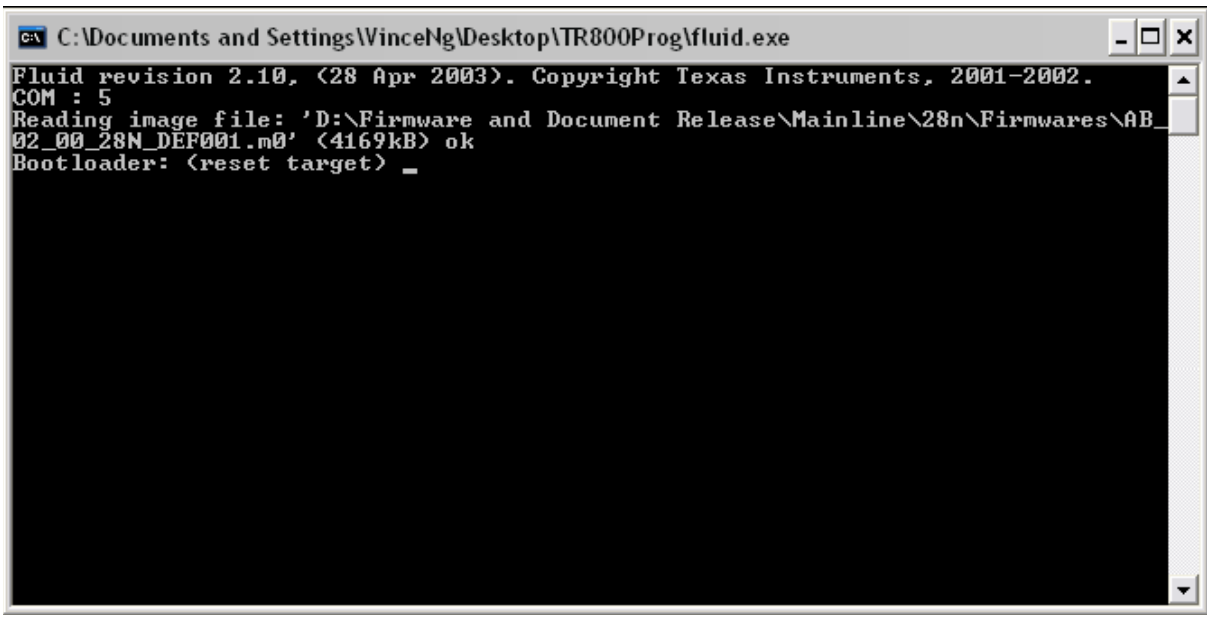


Browser firmware file

Click to begin programming

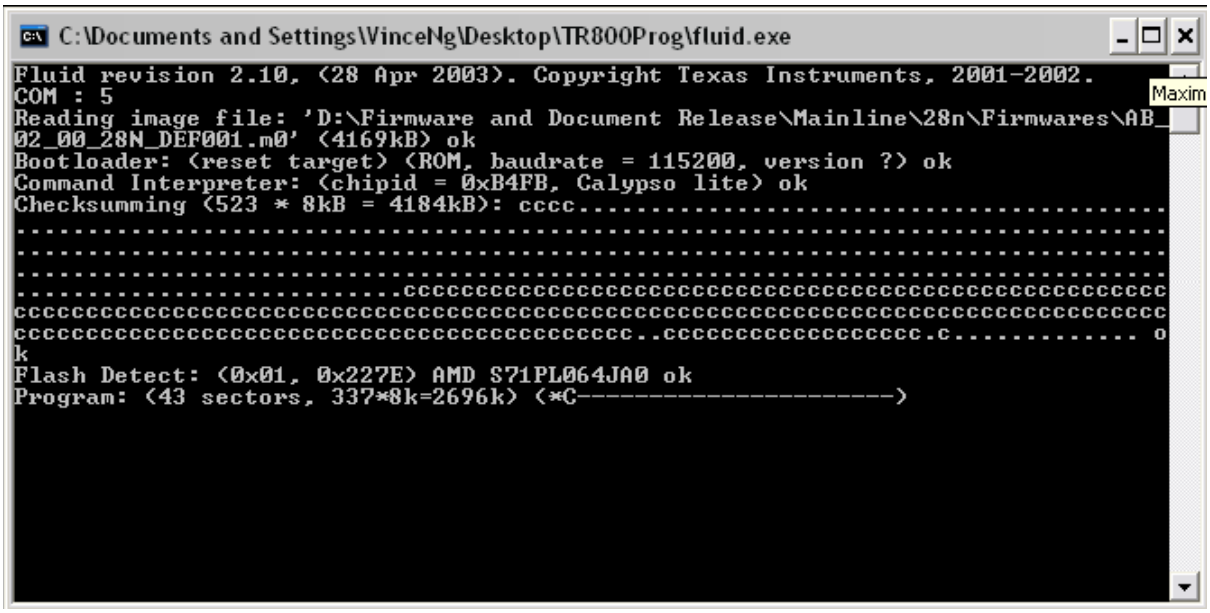
Step 3: Click the “Download Target File” button to begin programming.

Step 4: A new console window will be displayed as below:



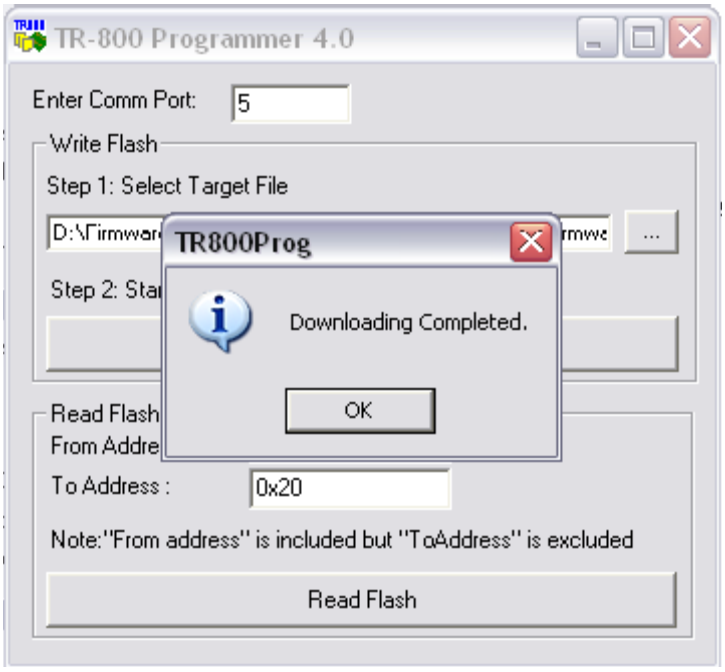
Step 5: Totally power off the Product and re-Power it up.

Step 6: The flashing process will run automatically. Wait for the process to be completed.



Note: Do not remove the module, power off the Product or close the TR-800 Programmer software during this period. Doing so might cause unforeseen damage to the module.

Step 7: If the downloading is successful, a "Downloading Completed" window will be displayed as follow:



If the downloading process is not successful, a display window showing "Fail. Please Try Again" will appear.
In case the downloading fails, repeat the set-up procedure from step 1.

5. Terminology

5.1 GSM
Global System for Mobile Communications. A digital cellular phone technology based on TDMA that is the predominant system in worldwide.

5.2 SIM CARD
Subscriber Identity Module (SIM) smart card that contains user account information

5.3 GPS
Global Positioning System, a worldwide MEO satellite navigational system formed by 24 satellites orbiting the earth and their corresponding receivers on the earth

5.4 GPRS
General Packet Radio Services (GPRS) is a packet-based wireless communication service that promises data rates from 56 up to 114 Kbps and continuous connection to the Internet for mobile phone and computer users. The higher data rates allow users to take part in video conferences and interact with multimedia Web sites and similar applications using mobile handheld

5.5 SMS
Short Messaging System, service for sending short text messages to mobile phones

5.6 Hyper-terminal

Hyper-terminal is a terminal emulation program that comes standard with every PC running Windows 95/98, Windows 2000 or NT. Hyper-terminal allows you to configure the MTD1000 unit through the serial port on the PC.

6. Application examples

6.1) Example 1
Retrieving GPS data remotely on the MTD1000 without the use of a SIM card

You may download the GPS data readings directly from the MTD1000 via hyper terminal to your PC. The readings will be captured in a text file format which can be later used to map out the coordinates on your GPS application map.

Setup:

Voltage value to trigger the MTD1000 to start collecting GPS data.

Assign:

AT$FE=2,1,268	// If external power supply 2nd flag is set at 8V to trigger

Or

AT$FB=5,1,684	// If battery 5th flag is set at 3.8V to trigger

Set the MTD1000 to start collecting data:

AT$ED=1,1,"E02","E02"	//When the external power supply is turned on

Or

AT$ED=1,1,"B10","B10"	//When the battery is plugged in

Set the MTD1000 to start saving data to logging memory every 3 minutes after the external power is turned on or the battery is plugged in.

Assign

AT$EE=1,1,1,"$SRS='Data'&'C1 S0'&180&0"	//To save data

Set the MTD1000 should stop collecting GPS to be stored in its logging memory in the following conditions:

Assign:

AT$ED=2,1,"E02","E00"	//To check if the external power supply is turned off
Or	
AT$ED=1,1,"B10","B00"	//To check if the battery is taken out
Or	
AT$EE=2,1,2,"$SRS='Data'&'C1 S0'&3&1"	//To stop to save data to logging memory after the external power is turned off or the battery is taken out.

Connect the MTD1000 to your PC after you have collected the GPS data remotely.
Run Hyper Terminal and click the "Transfer" at menu, select "Capture Text".
Decide where you save your data and what name for the data document.
In hyper terminal, click "Start" to be ready for data to be saved

In hyper terminal key in AT$MD=1 to dump the GPS coordinates to the location on your PC.

The data will scroll out at the hyper terminal screen.

To click the "Transfer" at menu, select "Capture Text" and "Stop". The data has been saved to your file. You may look into your file for tracking information.

6.2) Example 2
To program the MTD1000 to receive data and reports via SMS

The MTD1000 can be installed in your vehicle as a security tracking device.
This setup alerts your mobile phone via SMS when your vehicle security has been breached, sending the GPS data of your car's location using standard/compressed or NMEA report.

Setup:
Run the hyper terminal to configure the MTD1000 via AT commands

1. Set SMS Number List for MTD1000
   Assign:
   AT$CS=1,"12345678" //Set SMS #1
   AT$CS=2,"87654321" //Set SMS #2
   AT$CS=3,"+0987654321123456789" //Set SMS #3
   ……
   AT$CS=20,"+1234567890123456789" //Set SMS #20

   Up to 20 mobile phone numbers

   Please refer to 6 Channel Functions------6.1 SMS Number List – CS of MTD1000 Command Guide R2.6

To run hyper terminal or use the mobile phone which phone number has been set to the MTD1000 via above AT command to configure and program the MTD1000 via AT commands.

2. To configure and program the MTD1000 via Hyper Terminal or the mobile phone which phone number has been saved at the MTD1000 by AT$CS command above.

   a) Assign:
   AT$SI="000001" // Set the Unit ID via Hyper Terminal
   Or
   AT$SI="000001"; // Set the Unit ID via the mobile phone
   ……
   Please refer to 4 General Functions of MTD1000 Command Guide R2.6

   b). Assign:
   AT$MC // Memory is cleared via Hyper Terminal
   Or
   AT$MC; // Memory is cleared via the mobile phone
   ……
   Please refer to 5 Data Logging Functions of MTD1000 Command Guide R2.6

   c). Assign:
   AT$CT=1," 192.168.104.173",2020 //Assign the socket #1 via Hyper Terminal
   Or
   AT$CT=1," 192.168.104.173",2020; //Assign the socket #1 via the mobile phone
   ……
   Please refer to 6 Channel Functions of MTD1000 Command Guide R2.6

d). Assign:
AT$PS? //To read the current port status via Hyper Terminal
Or
AT$PS?; // To read the current port status via the mobile phone
……
Please refer to 7 I/O Functions of MTD1000 Command Guide R2.6

e). Assign:
AT$TL=1,"Intruder Alert!" //To assign text into the CAN Message #1 via Hyper Terminal
Or
AT$TL=1,"Intruder Alert!"; //To assign text into the CAN Message #1 via the mobile phone
……
Please refer to 8 Text Messaging Functions of MTD1000 Command Guide R2.6

f). Assign:
AT$SRS="ALARM","C7 S7" //Send a standard report to local memory, serial port and TCP/IP socket, and three mobile phones of #1, #2 and #3 via Hyper Terminal
Or
AT$SRS="ALARM","C7 S7"; // Send a standard report to local memory, serial port and TCP/IP socket, and three mobile phones of #1, #2 and #3 via the mobile phone
……
Please refer to 9 Reporting Functions of MTD1000 Command Guide R2.6

g). Assign:
AT$GFW=1,1,+89.121432,-103.242351,0.1 //Write the Geographical Fence #1 settings via Hyper Terminal
Or
AT$GFW=1,1,+89.121432,-103.242351,0.1; //Write the Geographical Fence #1 settings via the mobile phone
……
Please refer to 10 Geographical Fences – GF, GFW, GFR, GFI of MTD1000 Command Guide R2.6

h). Assign:
AT$TILT=18 //Setting Tilt Sensor sensitivity via Hyper Terminal

Or
AT$TILT=18; //Setting Tilt Sensor sensitivity via the mobile phone
……
Please refer to 11 Tilt Sensor Sensitivity – TILT of MTD1000 Command Guide R2.6

i). Assign:
AT$FT=1,1,1,10 //Setting timer #1 flag to be expired after 10 seconds via Hyper Terminal

Or
AT$FT=1,1,1,10; //Setting timer #1 flag to be expired after 10 seconds via the mobile phone
……
Please refer to 12 User Flags– TILT of MTD1000 Command Guide R2.6

j). Assign:
AT$ED=5,1,”E04 T01","E04 T01” //To define the #5 event to detect the External-Power-Monitoring #3 is TRUE AND the Timer #1 is EXPIRED via Hyper Terminal

Or
AT$ED=5,1,”E04 T01","E04 T01”; //To define the #5 event to detect the External-Power-Monitoring #3 is TRUE AND the Timer #1 is EXPIRED via the mobile phone
……
Please refer to 13.2 Event Definition – ED of 13 Events Functions of MTD1000 Command Guide R2.6

k). Assign:
AT$EE=1,1,5,"$FT=1&0|$TC=1&'C3 S0'|$SRS=’GPS’&'C3 S0’&10&1 "

//To set settings to disable the timer #1, send CAN Message #1 to local memory and serial port, and continue to send the standard report every 10 seconds (multiple commands) while the event definition #5 is triggered via Hyper Terminal

Or
AT$EE=1,1,5,"$FT=1&0|$TC=1&'C3 S0'|$SRS=’GPS’&'C3 S0’&10&1 ";

//To set settings to disable the timer #1, send CAN Message #1 to local memory and serial port, and continue to send the standard report every 10 seconds (multiple commands) while the event definition #5 is triggered via the mobile phone
……
Please refer to 13.3 Event Execution – EE of 13 Events Functions of MTD1000 Command Guide R2.6

6.3) Example 3

Configuring the MTD1000 to send an output to relay device and disable the fuel pump of the vehicle.

Schematic of relay connection to MTD1000

- Out 01 port of MTD1000 to pin 85 of BOSCH A relay device in fig.1
- IN-1 port of MTD1000 to pin 86 of BOSCH A relay device in fig.1

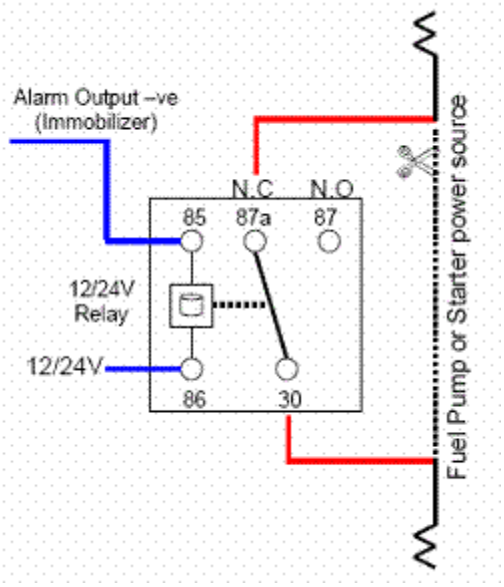


Fig.1

Configuring the AT commands on the MTD1000

SMS List number
at$cs=1,"sms number 1"
at$cs=2,"sms number 2"

Output port configuration
at$ipc=03
at$pd=03

Setting external power flag
at$fe=1,1,100

Setting internal battery flag
at$fb=1,1,100

GPRS profile list configuration
at$cg=1,"apnname","","",""

TCP socket list configuration
at$ct=1,"tcpaddress",portnumber

Unit ID
at$si=”limoXX”

Canned messages configuration
at$tl=1,"Ignition On"
at$tl=2,”Ignition Off”
at$tl=3,"Main Battery Disconnected"
at$tl=4,"Internal Battery Disconnected"
at$tl=5,"Immobilisor Switched On”
at$tl=6,"Immobilizer Switched Off”

Events Defined

1) When ignition on, connect to TCP/IP and send canned message "Ignition on" and send GPS data every 5 secs to TCP/IP server.
at$ed=1,1,"P08","P08"
at$ee=1,1,1,"$CO=1&1&1&1”
at$ed=2,1,”W9”,”W9”
at$ee=2,1,2,”$FT=1&1&0&10|$FT=2&1&0&60”
at$ed=3,1,”T01”,”T01”
at$ee=3,1,3,”$TC=1&'C7 S0'|$SRS='IgnOn'&'C7 S0'&5&0|$ED=4&1”

2) Configure MTD1000 to check and reconnect to server when GPRS socket is not present during IN-1 is high.
at$ed=4,1,"T02 W9","T02 W1"
at$ee=4,1,4,"$SRS|$CO=0|$CO=1&1&1&1”

3) When ignition is off, send canned message ""Ignition off" to TCP server and disconnect server connection.
at$ed=5,1,"P08","P00"
at$ee=5,1,5,"$SRS|$TC=2&'C7 S0'|$FT=5&1&0&5|$ED=4&0”
at$ed=6,1,”T10”,”T10”
at$ee=6,1,6,”$SRS='IgnOff’&'C7 S0'|$CO=0”

4) When external power is disabled, send message "External power disconnected" to SMS list and send output to toggle relay device.
at$ed=7,1,”E01”,”E00”
at$ee=7,1,7,”$tc=3&’C0 S7’|$ps=1,0”

5) When internal battery is disabled, send message "Internal battery disconnected" to SMS list and send output to toggle relay device.
at$ed=8,1,”B01”,”B00”
at$ee=8,1,8,”$tc=4&’C0 S7’|$ps=1,0”

6) Configure MTD1000 to reply SMS list "Immobilizer Switched On” when output 1 is low.
at$ed=9,1,”P01”,”P00”
at$ee=9,1,9,”$tc=5&’C0 S1’”

7) Configure MTD1000 to reply SMS list “Immobilizer Switched Off” when output 1 is high.
at$ed=10,1,”P01”,”P01”
at$ee=10,1,10,”$tc=6&’C0 S1’”

8) To disable or enable the output ports via SMS
$ps=1,0;
$ps=1,1

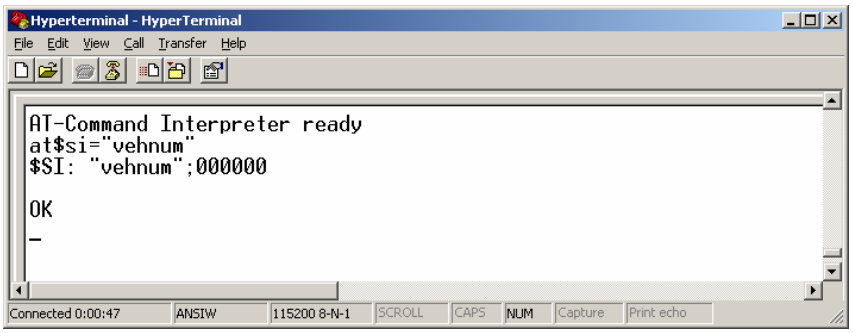
Note: Only index 1 of SMS list (at$cs) can control the MTD1000. Refer to page 18/73 MTD1000 commands guide R2.6.

6.4) Example 4

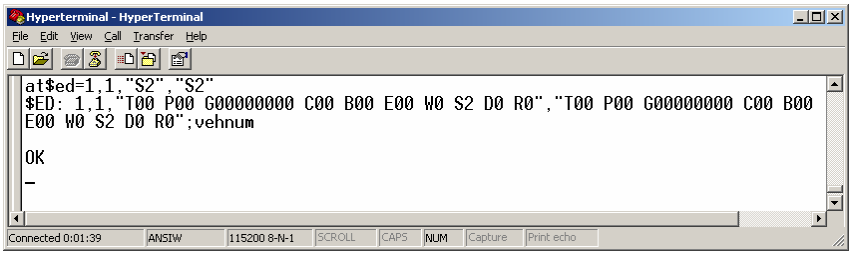
Programming the MTD1000 to log SRS messages to memory when GPS location is fixed and dumping the SRS messages to a text file

1. Programming the MTD1000 to log SRS messages to memory when GPS location is fixed

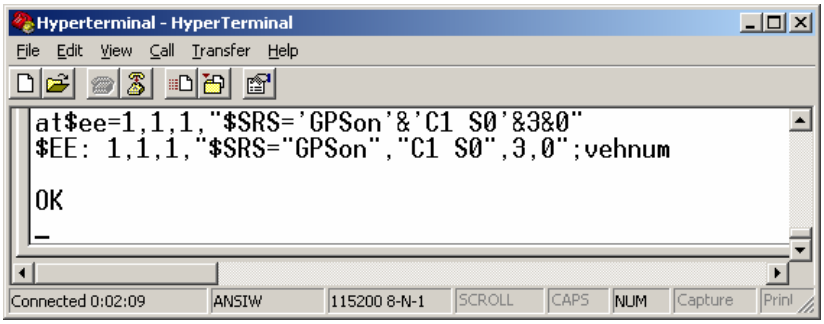
a. Type at$si="vehnum" to define vehicles plate number in MTD1000 (text in blue can be changed in its value up to six characters)



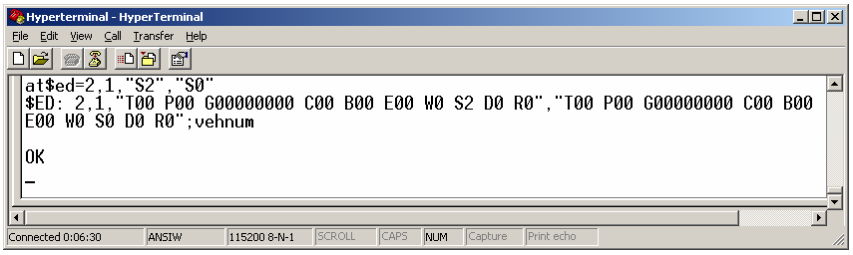
b. Type at$ed=1,1,"S2","S2" to define MTD1000 to start logging GPS data when location is fixed



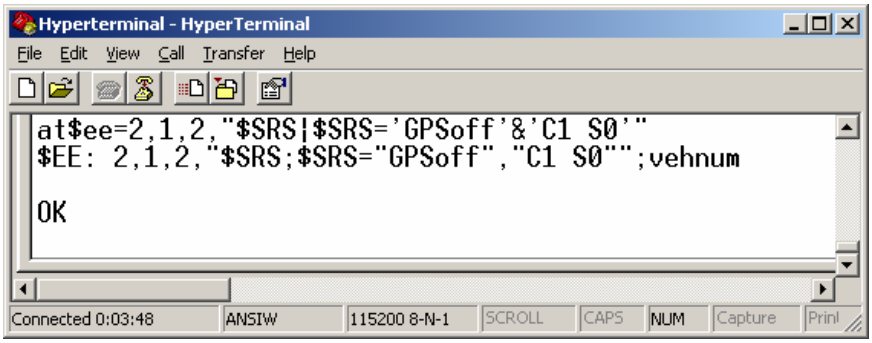
c. Type at$ee=1,1,1,"$SRS='GPSon'&'C1 S0'&3&0" to define MTD1000 to log GPS data every 3 seconds (text in blue can be changed in its value from 1 to 2678400 seconds)



d. Type at$ed=2,1,"S2","S0" to define MTD1000 when location is not fixed



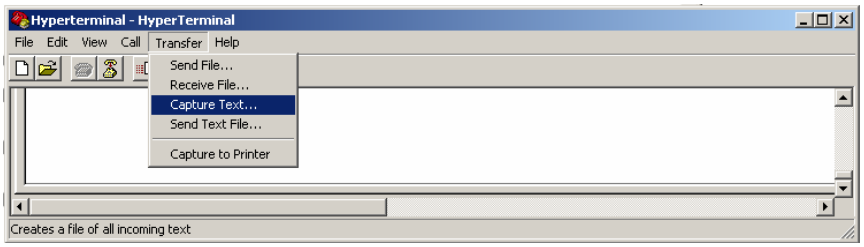
e. Type at$ee=2,1,2,"$SRS|$SRS='GPSoff'&'C1 S0'" to define MTD1000 to stop logging GPS data when GPS is not fixed and send the last known GPS fix location to memory.



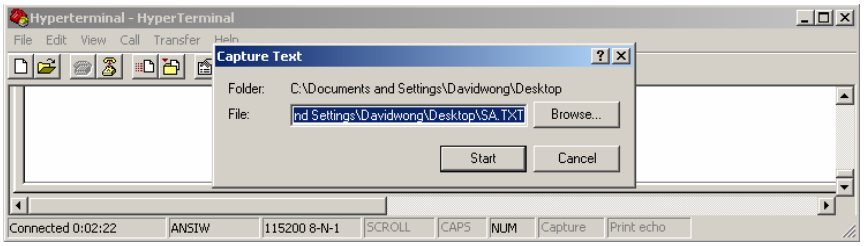
*Note
Now after enter these commands, the MTD1000 will automatically start logging data to its memory when there is GPS fix location.
When there is no GPS fix location, the MTD1000 will stop logging GPS data to memory and send the last known fix location to its memory.

2. <u>Dumping of SRS messages to a text file</u>

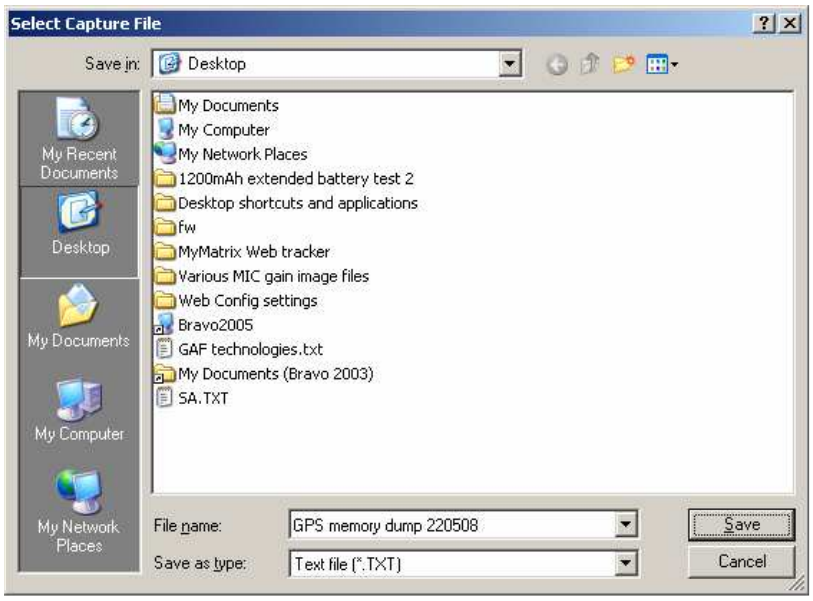
a. Set “Capture Text” in hyper terminal to capture the GPS data to a text file.



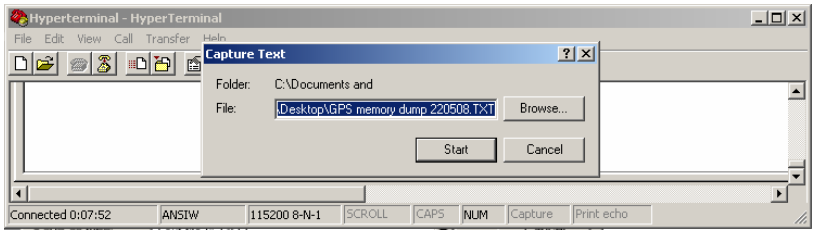
b. Click “Browse”



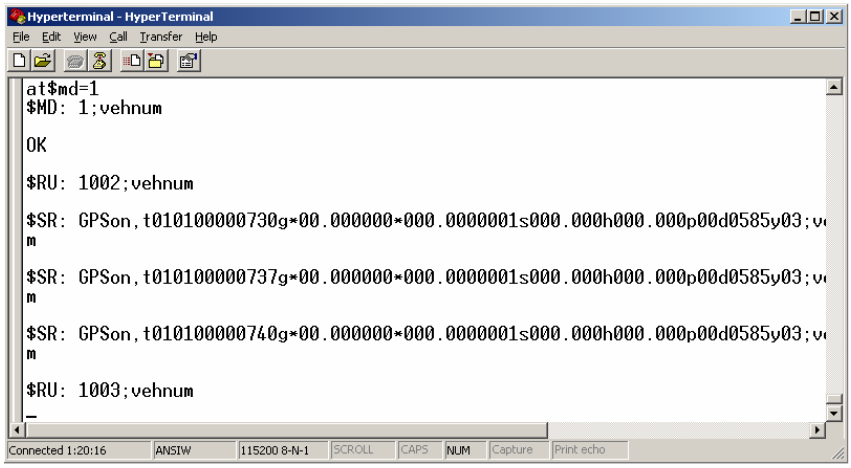
c. Create a text file with the following convention “GPS memory dump 220508” to identify the data dump file and click save



d. Click start

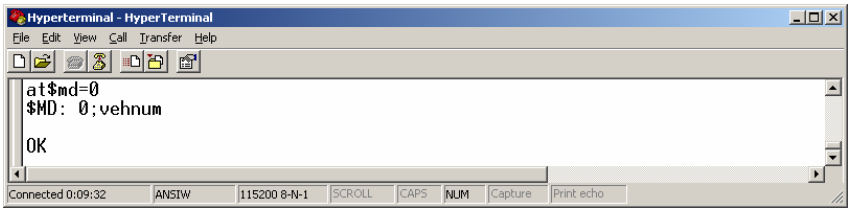


e. Type at$md=1 in hyper terminal to start dumping GPS data to serial port of PC

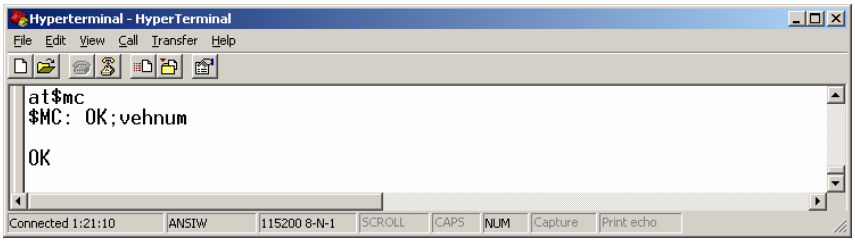


Note*
“$RU: 1002” indicates that the data dumping has started
“$RU: 1003” indicates that the data dumping is completed

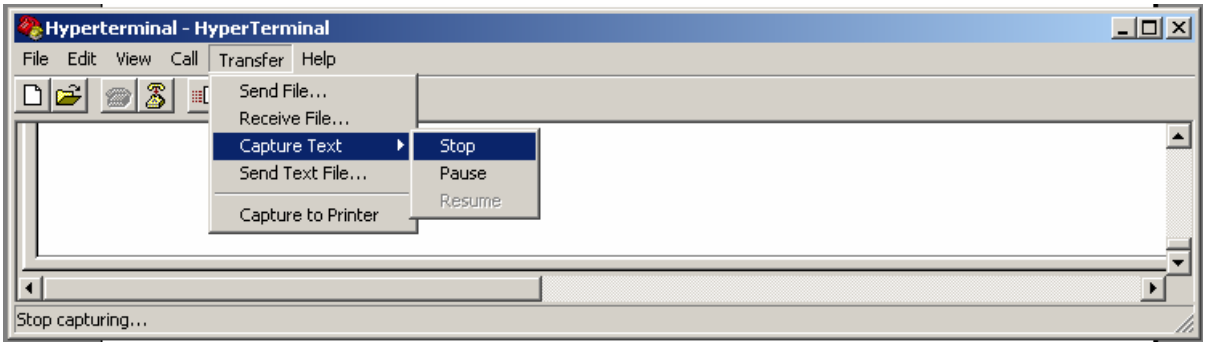
f. Type at$md=0 to stop dumping of data to serial port of PC



g. Type at$mc to clear memory data of MTD1000 after dumping is complete



h. In the hyper terminal menu click on Transfer/Capture text/Stop to end the text capturing



i. Now go to the text file where you created to view the GPS data from the SRS messages captured from hyper terminal.

j. To read and define the GPS messages are as below:

9.2 Standard Report Format

9.2.1.1 Format

$SR:<prefix>,<date><position><speed><heading><ports><memory><system>;<unit ID>

9.2.1.2 Parameters

Fields	Identifier	Description	
Prefix		6 Alphanumeric characters. User defined short-text prefix for the reports.	
Date	t	t<DDMMYYhhmmss> D: Day; M: month; Y: year; h:hour; m:minute; s:second.	
position	g	g<saa.bbbbbbqrrr.hhhhhj>	
		saa.bbbbbb	Latitude s: '+' = North, '-' = South aa.bbbbbb degree
		qrrr.hhhhhh	Longitude q: '+' = East, '-' = West rrr.hhhhhh degree
		j	Status indicator 0 = valid 1 = invalid
speed	s	s<nnnmmm> nnn.mmm km/h 000.000 – 300.000 km/h	
heading	h	h<nnnmmm> nnn.mmm degree 000.000 – 359.999 degree	
ports	p	p<aa> a = 00 to FF Bit 0 to 6: Port #1 to #7	
memory	d	d<aaaa>	
		a = 0000 – 1024 K bytes of Free Memory	
system	y	y<aa> aa = 00 – 15 Bit 0: GSM Registered Bit 1: GPRS Registered Bit 2: GPRS connected Bit 3: TCP Socket or CSD online	

Example of an SRS message which contains the latitude and longitude to provide the GPS data:

```
$SR:ALARM1,t060701234559g+01.225296+103.5219911s067231h4034121
p03d0000y00;VEH123
```

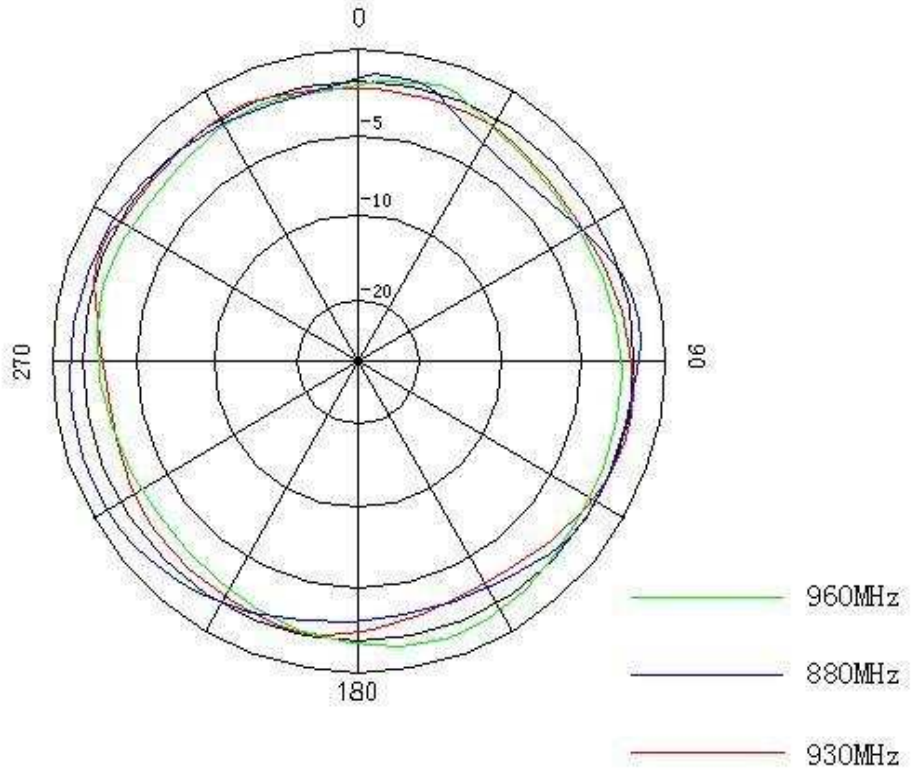
+01.225296 in the standard report format above is the latitude value
+103.5219911 in the standard report format above is the longitudes value

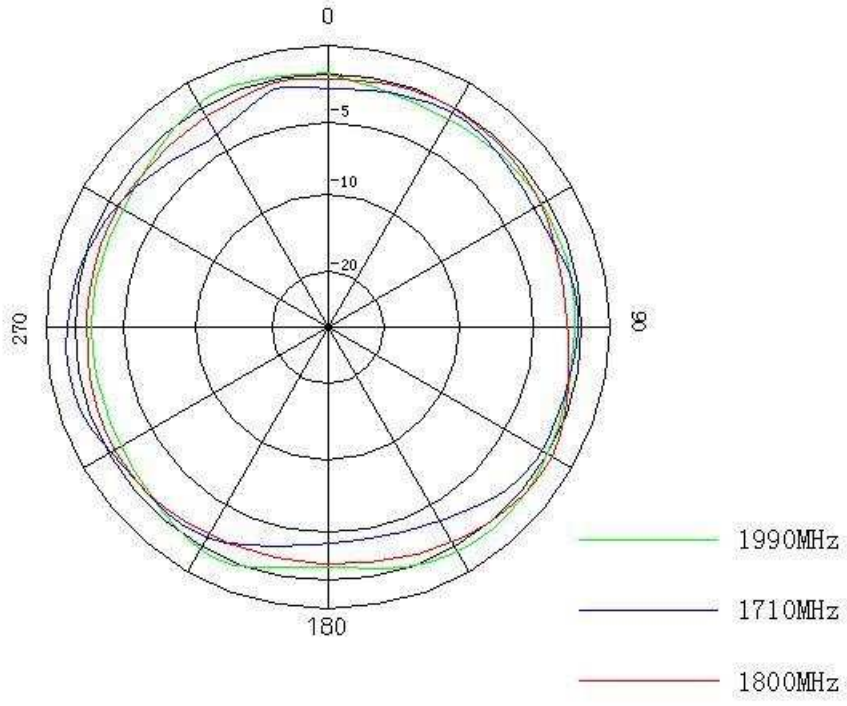
7. GSM Antenna

GSM/GPRS/AMPS ANTENNA FOR AUTOMOBILE SPECIFICATION

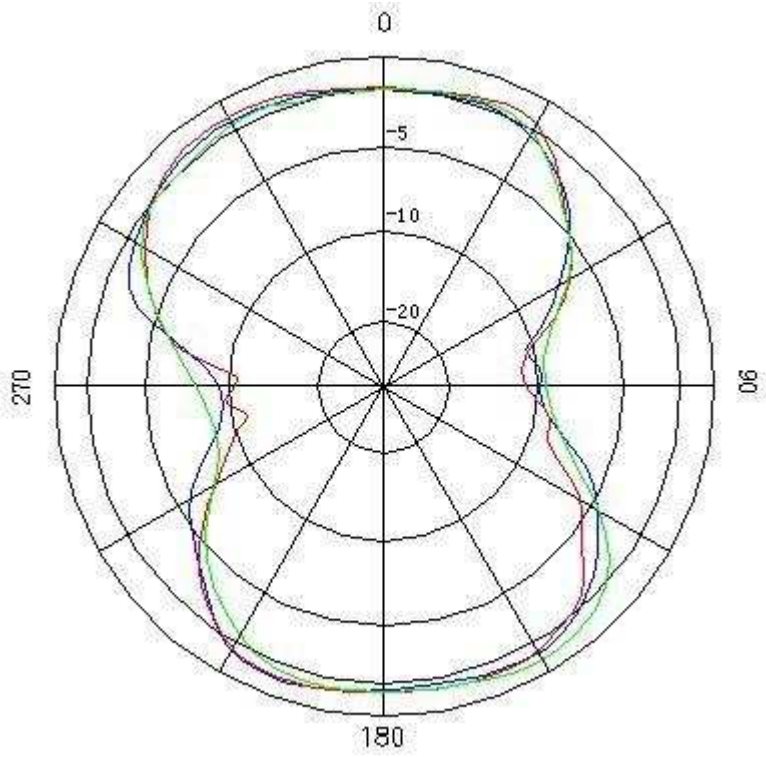
Vertical pattern

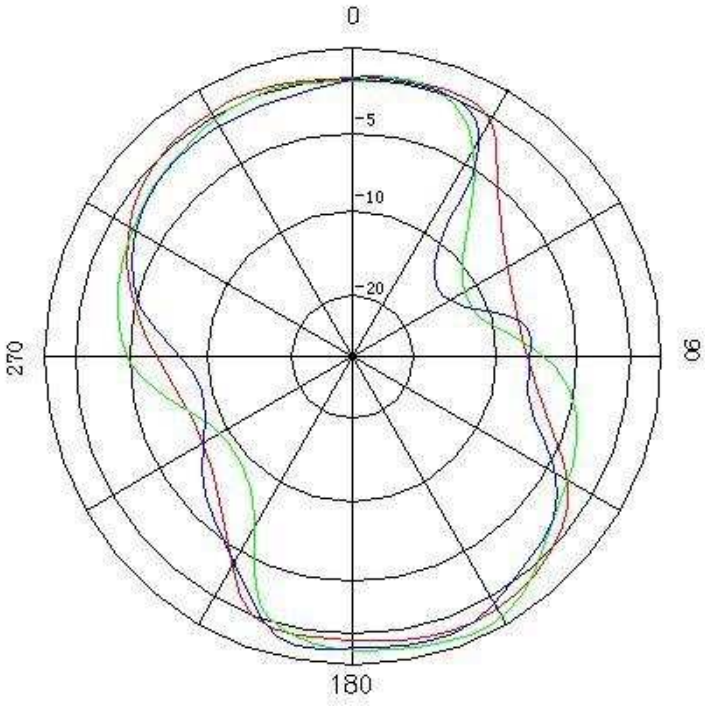
Electrical Specification		**Mechanical Specification**	
Product type	GSM/ GPRS/AMPRS antenna	**Product type**	Right SMA or RP-SMA
Model Type	BH015	**Model Type**	BH015
Frequency Range	800/1900/900/1800Mhz	**Height**	46.5mm
Impedance	50 ohms	**Max diameter**	9.0mm
VSWR	1:1:5	**Min Diameter**	6.0mm
Gain (Typical)	2.15db	**Connector**	SMA RA
Gain (Max)	2.5db	**Lightning protection**	Yes
Polarization	Vertical		
Radiation	0mni		
Max Power	20V		
Maximum Input Power	50w		



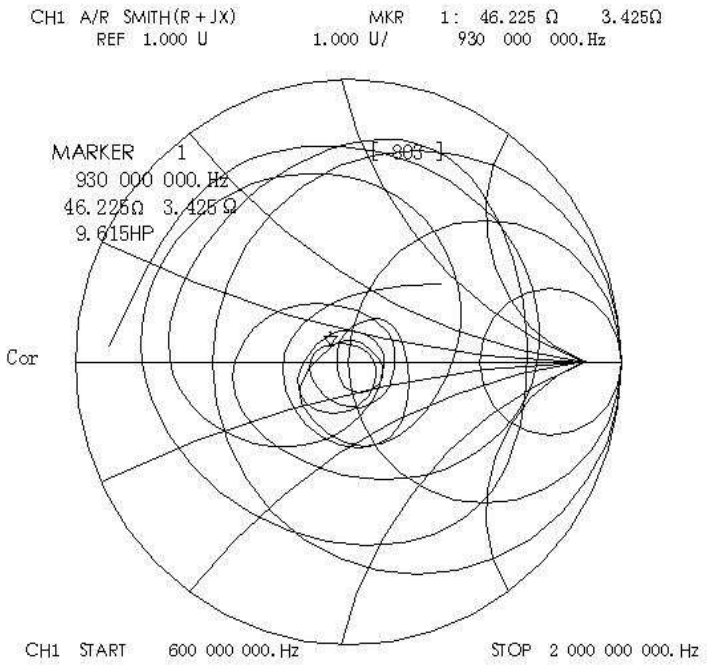


Vertical pattern at 960Mhz





Impedance circle diagram (Smith circle diagram)



Usage: Connecting the SMA connector which is at the end of the antenna with the equipment directly.

Regulatory and Warning Information

Radio Frequency Interface Requirements


Tested To Comply With FCC Standards

Note: This equipment has been tested and found to comply with Part 22/24 of the FCC rules. Operation is subject to the condition that this device does not cause harmful interference. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user's guide, may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to any electronic devices, the user is encouraged to consult the dealer for help.

This equipment complies with part 22/24 of the FCC Rules. Operation is subject to the following two conditions: (1) this equipment may not cause harmful interference, and (2) this equipment must accept any interference received, including interference that may cause undesired operation. Any changes or modifications made without the approval by the party responsible for compliance could void the user's authority to operate this equipment.

Note: The manufacturer is not responsible for any interference caused by unauthorized modifications made by the user to this equipment. Such modifications could void the user's authority to operate the equipment.