Fargo Telecom

Fargo Maestro 100
Fargo Maestro 20
GSM GPRS Modem
900 / 1800

Value Added Feature
USER MANUAL

Revision history

Rev.	Date	Details	Originated by
0.9	22July 2005	First release	Wallace Lee
0.91	22Feb 2006	- Remove AT command history feature - Remote AT command : when enabled all incoming SMS will be erased	Wallace Lee
0.92		AutoTCP/UDP : Add DCD/DSR signaling : modify command/data mode swithcing	Wallace Lee

Fargo Telecom Asia ltd.

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1. INTRODUCTION

The Fargo Maestro Value-Added Feature package is a software solution for Fargo Maestro modem (*see note 1). New functions added are to increase application range of various industrial and automated applications:

- Automatic and self-recovery TCP/UDP socket connection (* see note 2)
- Remote AT command (AT command through SMS)
- I/O triggered AT command execution

Users can configure and use the above features by AT commands.

Note 1: Not all Fargo Maestro can have this feature installed. Please refer to Chapter 2
Note 2: For Fargo Maestro 100 with TCP/IP only

2. INSTALLATION

2.1 Identifying your Fargo Maestro

Not all Fargo Maestro can have the Value-added feature installed, so you need to check if your Fargo Maestro before installation first.

2.1.1 Identifying Fargo Maestro 20

Start HyperTerminal, choose correct baud rate to communicate with the modem (default is 9600bps, 8N1)

Then enter the following and see the response according to the following table :

Command	Expected response
AT+WOPEN=2	+WOPEN: 2,"AT v02.10"

If you get the same response then this modem is ready for installation.

2.1.2 Identifying Fargo Maestro 100

Start HyperTerminal, choose correct baud rate to communicate with the modem (default is 115200bps, 8N1)

Then enter the following and see the responses according to the following table:

Command	Expected response
AT#VVERSION	#VERSION: "eDsoft-W302_V2.10 116686 Dec 10 2003 12:20:17"
AT+WOPEN=2	+WOPEN: 2,"AT v02.10", “AT V02.10”

If you get the same response then this modem is ready for installation.

2.2 Installing the Value added feature

2.2.1 Erasing the connectivity feature (AT# feature) (Fargo Maestro 100 only)

For Fargo Maestro 100, you need to erase the IP connectivity feature before downloading the Value added feature. Again, on HyperTerminal enter the following commands step by steps :

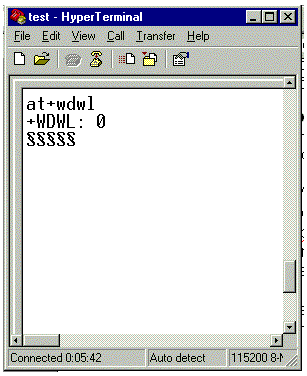
Command	Expected response
AT+WOPEN=0	(modem will reset)
AT+WOPEN=3	OK
AT+WOPEN=4	(modem will reset)

2.2.2 Downloading the file

a. Check the HyperTerminal is configured with setting “8 data bits, no parity, 1 stop bit, and hardware flow control (CTS/RTS)

b. For Fargo Maestro 20, it is suggested to set the baud he RS232 link is changed to 115200 bps. You can first start HyperTerminal session with 9600 bps. The on the screen type command AT+IPR = 115200 and then press “Enter”. Then change the HyperTerminal speed to 115200bps. (For Fargo Maestro 100 the default speed is 115200bps)

c. On the screen type the command AT+WDWL and then press “Enter”. The modem should answer +DWL: 0, and then a series of strange characters appears or the cursor is just moving forward slowly. (the module is sending the first characters of the Xmodem protocol).

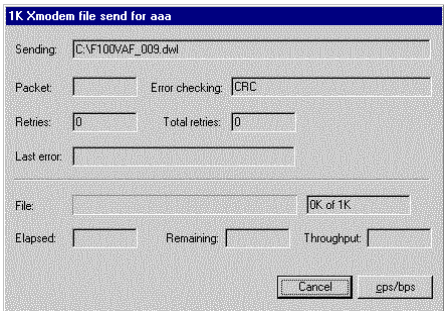


d. Then on HyperTerminal you choose “Transfer” –“Send File”

e. When you see the dialog box, on the “Filename” you choose file according to the modem:
Fargo Maestro 20 : F100VAF_0092.dwl
Fargo Maestro 100 : F20VAF_0092.dwl

Then on “Protocol” choose “1K-Xmodem”, Then press “OK”

f. Then the downloading process will start:



g. After finishing downloading enter command AT+CFUN=1 to restart modem
h. After restarting enter command AT+WOPEN=1 to start the VAF program.
i. Enter one VAF AT command to verify :

Command	Expected response
AT+SMSAT?	+SMSAT : 0,000000 OK

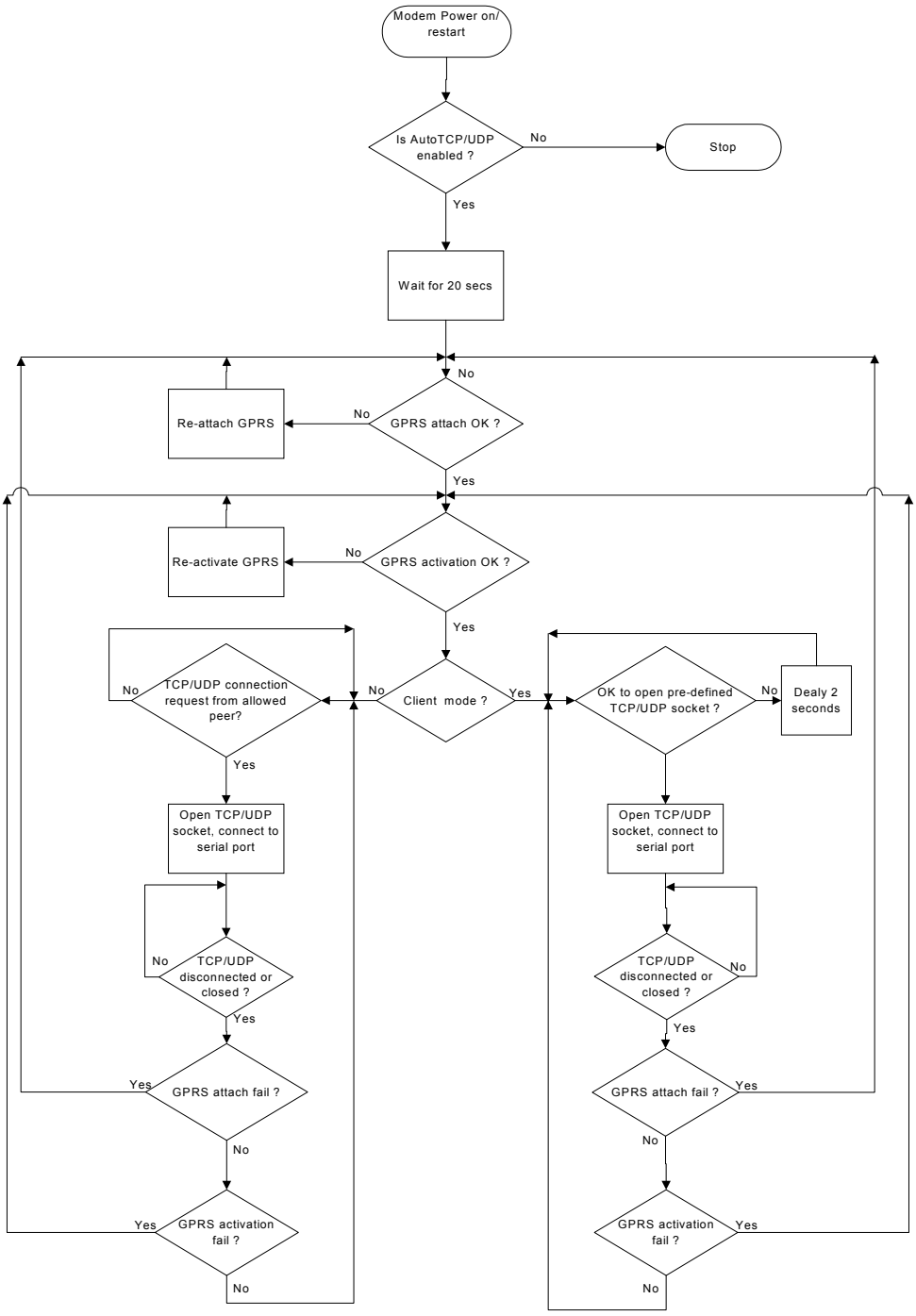
Now the Fargo Maestro Value added Feature installation has been done. You can follow other chapters to use the features.

Not all Fargo Maestro can have the Value-added feature installed, so you need to check if your Fargo Maestro before installation first.

3. AUTO TCP/UDP CONNECTION (Fargo Maestro 100 only)

The Auto TCP/UDP connection feature is defined for accessing serial devices over the Internet. Fargo Maestro can be configured that after power up it will connect to a remote TCP/UDP socket (client mode) or to wait for the TCP/UDP socket connection request from remote peer (server mode).
If the socket connection is unsuccessful or disconnected it will repeat the connection request and back to waiting stage. This make remote peer can access serial device connected to Fargo Maestro.

3.1 Flow diagram of Auto TCP/UDP function



3.2 AT commands for Auto TCP/UDP

3.2.1 AT+AUTOTCP

Description:

This command controls the Maestro 100 to start TCP socket connection automatically.

Note:
- Before using **AT+AUTOTCP** TCP and GPRS settings MUST be setup properly using **AT+IPTCP and AT+IPGPRS** command respectively.
- **+AUTOTCP** function is mutually exclusive with **+AUTOUDP** function; if **+AUTOUDP** is set to 1 already you will get **ERROR** on enabling **AUTOTCP**

Syntax:

Command Syntax
AT+AUTOTCP=<mode>

Response syntax:
+AUTOTCP: <mode>

Command	Possible responses:
AT+AUTOTCP=0	OK *Note : disable AutoTCP*
AT+AUTOTCP=1	OK *Enable AutoTCP*
AT+ AUTOTCP?	+AUTOTCP : 1 OK *Note display current status*
AT+AUTOTCP=?	+AUTOTCP : (0-1) *Note : possible argument*

Defined Values:

<mode>
1 enable auto TCP
0 disable auto TCP

Notes :
- Before enabling Auto TCP, it **MUST** be properly set the GPRS settings by **AT+IPGPRS** command and TCP settings by **AT+IPTCP** command
- **ONLY** GPRS PDP context # 1 will be used. So please setup +IPGPRS settings with <cid>=1
- Once AutoTCP is enabled, it will start the TCP socket connection automatically after 20 seconds.
- Once the TCP connection is established successfully, the serial port will go to data mode, all data entered to the serial port will be sent to remote TCP peer. No more AT commands will be accepted then.
- In TCP connected data mode, the DSR and DCD signals of the serial port will go to high.

- If the TCP connection is broken the modem will try to reconnect automatically. During re-connection period serial port will go back to command mode, and DSR/DCD signal back to low.
- The setting will be saved, and after power off, the AUTOTCP will be restarted with the 20 seconds delay after power up.
- To stop auto TCP connection, you need to enter the command **AT+AUTOTCP=0** within 20 seconds after power up, or during reconnection (serial port back to command mode)

3.2.2 AT+IPTCP

Description:

This command specifies the TCP socket parameters and mode that to be used by **AT+AUTOTCP** command.

Syntax:

Command Syntax
AT+IPTCP=<port>,<mode>,<server>,<TCPTxDelay>

Response syntax:
+ IPTCP: <port>,<mode>,<server>,<TCPTxDelay>

Command	Possible responses:
AT+ IPTCP?	+IPTCP: 0,"S","",100 OK *Note : show current settings*
AT+ IPTCP =23	OK *Note: set the TCP port to 23*
AT+ IPTCP =23,”C”,202.144.111.222”,100	OK *Note: to set the modem to connect TCP socket Client (caller) mode* *to target :address 202.144.111.222 and port 23*
AT+ IPTCP =23,”S”,255.255.255.255”,100	OK *to set the modem to wait for TCP socket connection request (Server (listening) mode)* *any calling IP address allowed, port 23*
AT+ IPTCP =?	+IPTCP: (0-65535),("C","S"),(120),(0-32760) OK *Note : possible argument*

Defined Values:

<port>
The port number to be used for the TCP socket connection. Default value is 0. Valid range is 0 to 65535.

<mode>
Mode of TCP operation. Default value is “S”.
“S” Server (Listening) mode. This configures Fargo Maestro to open a listening TCP connection on the specified **port** . The TCP connection will be active upon getting socket connection request from the allowed remote TCP peer (see **<address>**)
“C” Client (caller) mode. This configures Fargo Maestro to request opening a TCP to the server with the specified **address** and **port** .

<address>
The address of the TCP server (or host). Default value is empty. Legal values could be 32-bit in dotted-decimal notation (i.e. xxx.xxx.xxx.xxx) or alphanumeric ASCII test string up to 120 characters (only if DNS is available on the GPRS network)
Note: In “Server” (Listening) mode the modem will only accept TCP connection request for the caller with address specified in the **<address>** field. Yet if the **address** is set to “255.255.255.255” the modem will accept request from ANY address.

<TCPTxDelay>
This parameter determines the time delay introduced before sending a TCP frame that has not been entirely filled with user data. The timer is entered in milliseconds and it should be noted that a value of ‘0’ initiates the sending of a TCP frame as soon as possible after the reception of a single character value from the host.
The default value is 100.

3.2.3 AT+AUTOTCP

Description:

This command controls the Maestro 100 to start UDPcket connection automatically.

Note :
- Before using **AT+AUTOUDP** TCP and GPRS settings **MUST** be setup properly using **AT+IPUDP and AT+IPGPRS** command respectively.
- **+AUTOUDP** function is mutually exclusive with **+AUTOTCP** function; if **+AUTOTCP** is set to 1 already you will get **ERROR** on enabling **AUTOUDP**

Syntax:

Command Syntax
AT+AUTOUDP=<mode>

Response syntax:
+AUTOUDP: <mode>

Command	Possible responses:
AT+AUTOUDP=0	OK *Note : disable AutoUDP*
AT+AUTOUDP=1	OK *Note: Enable AutoUDP*
AT+ AUTOUDP?	+AUTOUDP : 1 *OK* *Note: display current status*
AT+AUTOUDP=?	+AUTOUDP : (0-1) *Note : possible argument*

Defined Values:

<mode>
1 enable auto UDP
0 disable auto UDP

Notes :
- Before enabling Auto UDP, it **MUST** be properly set the GPRS settings by **AT+IPGPRS** command and UDP settings by **AT+IPUDP** command
- **ONLY** GPRS PDP context # 1 will be used. So please setup +IPGPRS settings with **<cid>**=1
- Once AutoUDP is enabled, it will start the UDP socket connection automatically after 20 seconds.
- Once the UDP connection is established successfully, the serial port will go to data mode, all data entered to the serial port will be sent to remote TCP peer. No more AT commands will be accepted then.
- In UDP connected data mode, the DSR and DCD signals of the serial port will go to high.
- If the UDP connection is broken the modem will try to reconnect automatically. During re-connection period serial port will go back to command mode, and DSR/DCD signal back to low.
- The setting will be saved, and after power off, the AUTOUDP will be restarted with the 20 seconds delay after power up.
- To stop auto UDP connection, you need to enter the command **AT+AUTOUDP=0** within 20 seconds after power up, or during reconnection (serial port back to command mode)

3.2.4 AT+IPUDP

Description:

This command specifies the UDP socket parameters and mode that to be used by **AT+AUTOUDP** command.

Syntax:

Command Syntax
AT+IPUDP=<port>,<mode>,<server>,<UDPTxDelay>

Response syntax:
+ IPUDP: <port>,<mode>,<server>,<UDPTxDelay>

Command	Possible responses:
AT+ IPUDP?	+IPUDP: 0,"S","",100 *OK* *Note : show current settings*
AT+ IPUDP =23	OK *Note: set the UDP port to 23*
AT+ IPUDP =23,"C",202.144.111.222",100	OK *Note: to set the modem to connect UDP socket Client (caller) mode to target :address 202.144.111.222 and port 23*
AT+ IPUDP =23,"S",255.255.255.255",100	OK *Note: to set the modem to wait for UDP socket connection request (Server (listening) mode) any calling IP address allowed, port 23*
AT+ IPUDP =?	+IPUDP: (0-65535),("C","S"),(120),(0-32760) OK *Note : possible argument*

Defined Values:

<port>
The port number to be used for the UDP socket connection. Default value is 0. Valid range is 0 to 65535.

<mode>
Mode of UDP operation. Default value is "S".
"S" Server (Listening) mode. This configures Fargo Maestro to open a listening UDP connection on the specified **port** . The UDP connection will be active upon getting socket connection request from the allowed remote UDP peer (see **<address>**)
"C" Client (caller) mode. This configures Fargo Maestro to request opening a UDP to the server with the specified **address** and **port** .

<address>
The address of the UDP server (or host). Default value is empty. Legal values could be 32-bit in dotted-decimal notation (i.e. xxx.xxx.xxx.xxx) or alphanumeric ASCII test string up to 120 characters (only if DNS is available on the GPRS network)
Note: In "Server" (Listening) mode the modem will only accept UDP connection request for the caller with address specified in the **<address>** field. Yet if the **address** is set to "255.255.255.255" the modem will accept request from ANY address.

<UDPTxDelay>
This parameter determines the time delay introduced before sending a UDP frame that has not been entirely filled with user data. The timer is entered in milliseconds and it should be noted that a value of '0' initiates the sending of a UDP frame as soon as possible after the reception of a single character value from the host.
The default value is 100.

3.2.5 AT+IPGPRS

Description:
This command is used to setup GPRS network parameters for the AutoTCPUDP feature.

Syntax:

Command Syntax
AT+IPGPRS=<Cid>,<APN>,<UN>,<PW>

Response Syntax
+IPGPRS: <Cid>,<APN>,<UN>,<PW>

Command	Possible responses:
AT+ IPGPRS?	+IPGPRS: 1,"INTERNET","" ,"" *OK* *Note : show current settings*
AT+ IPGPRS=1	OK *Note: set Cid value to 1*
AT+ IPGPRS =1,"INTERNET"	OK *Note: set the PDP value to 1 and APN to "INTERNET"*
AT+ IPGPRS=?	+IPGPRS: (1-4),(100),(50),(50) OK *Note: possible values*

Defined Values :

<Cid>
PDP context identifier.
Note: to use with **AT+AUTOTCP**/ **AT+AUTOUDP** command this value must be set to **1**.

<APN>
Access point name of the GPRS network. Max 100 characters.

<UN>
User name to access the GPRS service. Max 50 characters.

<PW>
Password used to access the GPRS service. Max 50 characters.

3.2.6 AT+IPBUFF

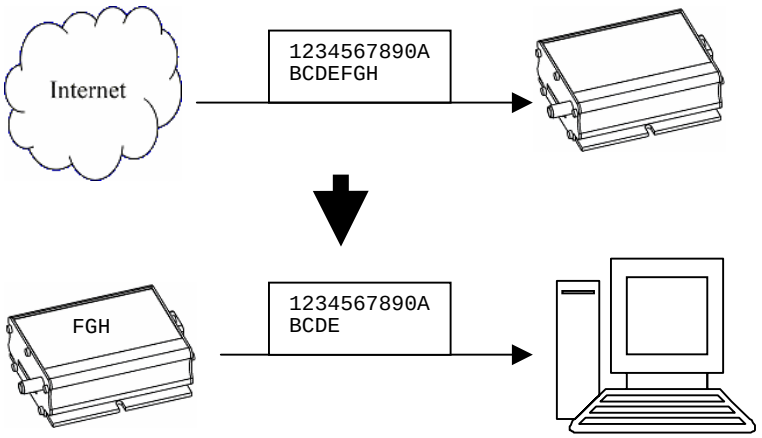
Description:

This command specifies the number of bytes of data from remote peer buffered inside the modem.

- If the quantity of buffered data reach this value, the whole buffered data will be sent out to the serial port.

- If the data from remote is large at one time, only multiple of this value data will be sent out to the serial port remainder will be kept inside buffer

Example: **AT+IPBUFF=5**



18 bytes of data sent from TCP or UDP socket to modem

15 bytes (multiple of 5) data sent out to serial port, remaining data buffered inside the modem

Syntax:

Command Syntax
AT+IPBUFF=<buff>

Response syntax:
+ IPBUFF: <buff>

Command	Possible responses:
AT+ IPBUFF?	+IPBUFF: 0 OK Note : show current settings
AT+ IPBUFF =10	OK *Note : set the IPBUFF value to 10*
AT+ IPBUFF =0	OK *Note: disable buffering when set the value to 0*

Defined Values :

<buff>
The number of bytes of data to be buffered. Default value is 0 (i.e. no buffering). Valid range is 0 to 50.

Notes:

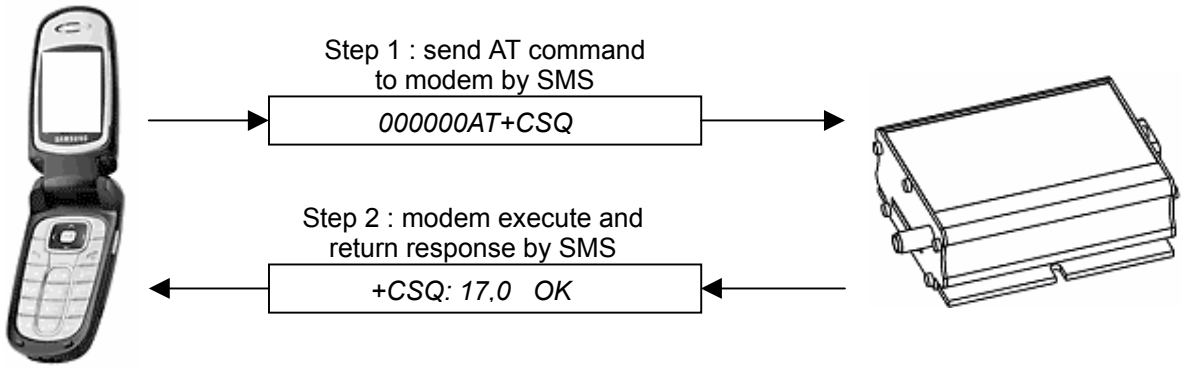
- If the TCP or UDP socket connection is broken, buffered data will be lost.

4. REMOTE AT COMMAND BY SMS

This feature is to control the modem to interpret AT command from incoming SMS, executing it, and return the result to sender by SMS.

The user can enable the modem to receive AT command by incoming SMS. See following about **AT+SMSAT** command.

4.1 Description of the Operation



1. When enabled, **the modem will treat the incoming SMS as a source of AT command only if <u>all</u> of the following conditions (a,b and c) are fulfilled :**

   a. The content of SMS sent to the modem is using standard 7-bit GSM data decoding scheme,
   b. The first 6 characters of the SMS content matches the **<key>** parameter set by AT+SMSAT command, (default key is “000000”)
   c. The 7th and 8th characters of the SMS content is “AT” (in capital letters)

2. If SMSAT is enabled , the modem will read each incoming SMS, if the conditions mentioned in 1 are matched the message will be executed, even it is an invalid AT command

3. When using SMSAT feature, only +CNMI:x,1,x,x,x setting could be used (i.e. incoming message will be stored in SIM card). If the incoming SMS is treated as with AT command inside, the SMS will be deleted after execution. If not the modem will leave it in SIM, just like normal SMS.

4. The maximum length of the AT command is limited by length of SMS, i.e. 160-6 = 154 characters

5. When the SMS AT command is executed , all intermediate and final responses will be buffered recorded, then return to the sender’s phone number in one single SMS.

6. If response(s) of the AT command is(are) more than 160 characters, only the first 160 characters will be returned.

7. In case the modem cannot get terminal response within 26 seconds, the modem will then abort the command, and return intermediate responses (if present).

8. If SMSAT feature is enabled all incoming SMS, either with valid AT command or not, will be erased. This is to prevent SIM card memory from fully filled, such the modem will not receive new SMS.

4.2 AT command for configuring AT command by SMS

4.2.1 AT+SMSAT

Command Syntax
AT+SMSAT=<mode>(,<key>)

Response syntax:
+SMSAT: <mode>,<key>

Command	Possible responses:
AT+SMSAT=0	OK *Note : disable remote AT command by SMS*
AT+ SMSAT =1	OK *Enable remote AT command by SMS*
AT+ SMSAT?	+SMSAT : 1,000000 OK *Note display current status*
AT+SMSAT=2,123456	OK *Note: set the <key> value*
AT+ SMSAT =?	+SMSAT : (0-2),(6) OK *Note : possible argument*

Defined Values:

<mode>
0 disable remote AT command by SMS
1 enable remote AT command by SMS

<key>
A 6-digit numeric character key from 000000 to 999999. Only incoming SMS with the first 6 characters matching with this key will be treated as a valid source of remote AT command.

4.3 Limitation and caution to be taken when using remote AT command

This feature will not 'judge' the result of executing the command, so care has to be taken not to enter improper command that make the modem becoming out of control:

1. Never send 'interactive' AT command by SMS, e.g. AT+CMGS=….
   This feature cannot return the prompt to the sender for second input

2. Always wait for the return SMS with AT responses before you send another SMS AT command.

3. Currently commands created by OpneAT (e.g. **AT+SMSAT**) cannot be sent by SMS.

4. It could be in some case (e.g. network failure) the modem cannot return response SMS. The modem will try sending response SMS for three times max. If still not successful it will abort.

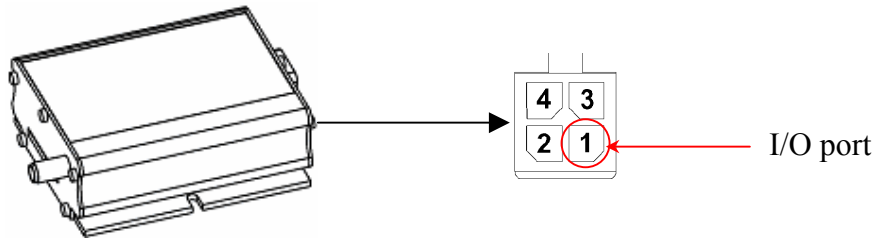
5. Always think twice before you send AT command by SMS. For example if you send AT+CPOF it will turn off the modem, and you need to go to access the modem to reset it.

5. I/O TRIGGERED AT COMMAND

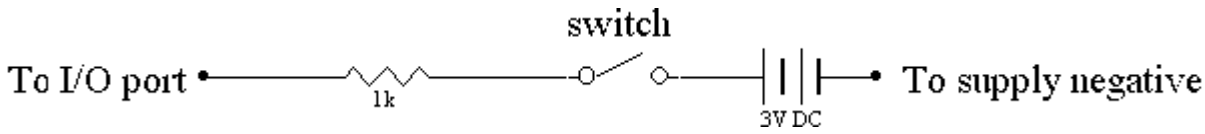
This feature making use of the Fargo Maestro Input/Output port as a sensor. If the signal to the port match the pre-defined condition a stored AT command will be executed.

User can use **AT+IOAT** command to set the condition and store AT command to be executed.

5.1 Description of the operation



Wiring Diagram :

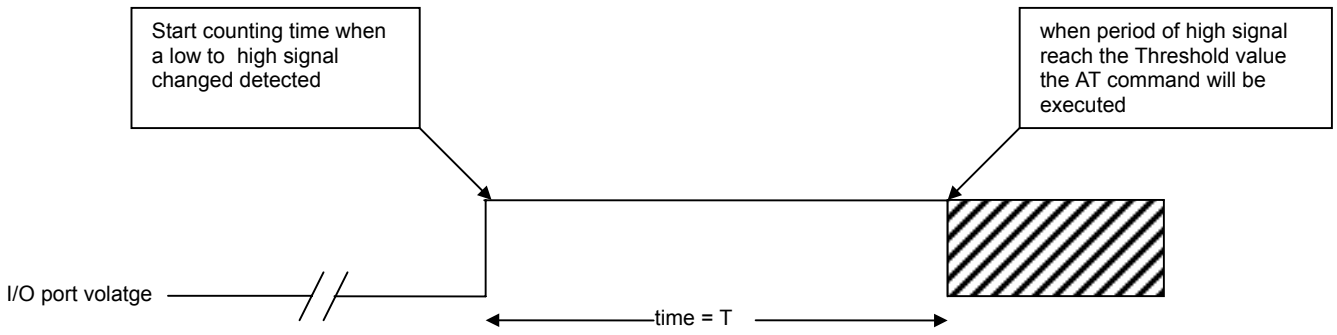


1. When the I/O port is connected to high 3V signal,
   Switch closed : logic level high
   Switch opened : logic level low.

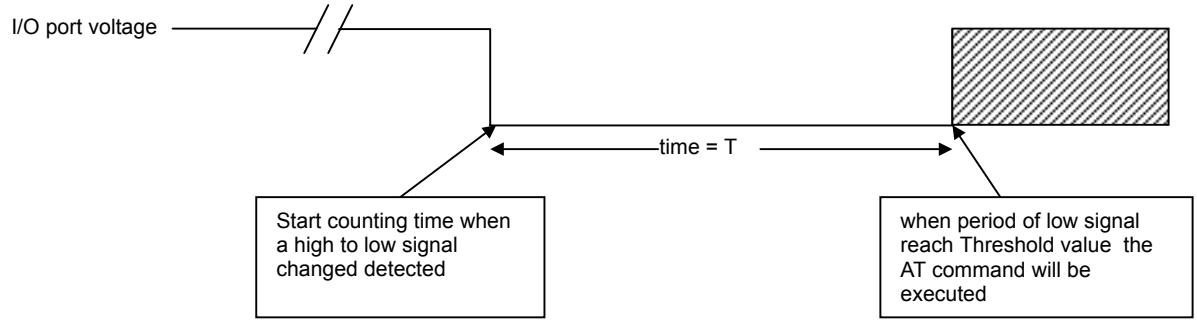
2. The switch can be placed as a triggering device, e.g. to detect door opening.

3. According to the setting of AT+IOAT command, the stored AT command will be executed either I/O signal from high to low, or from low to high :

When set as low-to-high triggering:



When set as high-to-low triggering :



* See **AT+IOAT** command on setting Threshold value T.

5.2 AT command for configuring I/O triggered AT command

5.2.1 AT+IOAT

Command Syntax
AT+IOAT=<action>(,<dir>,<Threshold>,<cmd>)

Response syntax:
+SMSAT: <action>,<dir>,<Threshold>,<cmd>

Command	Possible responses:
AT+IOAT=0	OK *Note : disable I/O triggered AT command execution*
AT+IOAT =1	OK *Enable remote I/O triggered AT command execution*
AT+ IOAT?	+IOAT : 1,1, 10,"AT+CMSS=5" OK *Note display current status*
AT+IOAT=2,1,10,"AT+IPR=115200"	OK *Note: set the parameters < dir>, <Threshold>, <cmd> low-to-high triggering, Threshold=1000 ms command is "AT+IPR=115200"*
AT+ IOAT =?	+IOAT : (0-2),(0-1),(1-50),(128) OK *Note : possible argument*

Defined Values:

<action>
0 disable I/O triggered AT command execution
1 enable I/O triggered AT command execution
2 configure I/O triggered AT command parameters

<dir>
0 configure as low-to-high triggering
1 configure as high-to-low triggering

<Threshold>
Time required for the detected state to trigger the AT command exestuation. Unit is in millisecond.
Valid value from 1 to 50 (0.1 sec to 5 sec). Refer to the above timing diagram in section 5.1.

<cmd>
AT command to be executed when the I/O port is triggered successfully. The length of the command is limited to 128 characters. See section 5.3 for more details.

5.3 Notes and cautions to be taken when using I/O triggered AT command

1. The I/O port is limited to drain current 10mA max. Never give too high input voltage to the I/O port or the modem will be damaged.

2. Use only cable/metal contact designed for Molex MicroFit™ connector. Using incompatible connector will damage the modem. Contact your dealer or FargoTelecom if you need wire for the I/O port connection.

3. The modem will NOT check the command you entered to the **<cmd>** field. It will be executed even it is not a valid AT command (or even not an AT command). Check by yourself when you enter the command.

4. When triggered, the command will be executed in ‘quiet’ mode, i.e. without any response like “OK” or “ERROR” will be sent to external application.

5. Do not enter “interactive” AT command (e.g. AT+CMGS=…), otherwise when the command is executed, the modem will in a state of waiting further input, not to do other jobs.

6. With this feature enabled user cannot control the I/O port by other AT commands anymore.

7. Due to product limitation the modem cannot detect switching action with period less than 100ms. If the switch’s open/close action is done in less than 100ms this feature will not be able to detect accurately.

6. KNOWN ISSUES

The Fargo Maestro Value Added Feature will affect certain other AT commands' operation. Please note :

6.1 AT+WIND command

1. **AT+WIND** command will be disabled (Fargo Maestro 100 only)

6.2 Saving of parameters to non-volatile memory

1. You cannot save the settings of the following AT commands by concatenating the **&W** command (Fargo Maestro 100 only):

   AT+CREG
   AT+CGREG
   AT+CGEREP

   To save the above settings please enter AT&W separately.

Please read also Chapter 7 for other issues.

7. QUESTIONS AND ANSWERS

7.1 Installation

Q. If my Fargo Maestro cannot match with the requirement stated in section 2.1, can I upgrade it?
A. No. Older Fargo Maestro cannot be upgraded.

Q. Can I have the TCP/IP (IP connectivity) feature together with this VAF for Fargo Maestro 100?
A. No. You can only choose one of them.

Q. If I changed my Fargo Maestro with the VAF installed, can it be changed back to have TCP/IP feature?
A. It depends. Contact Distributor or FargoTelecom

Q. I have downloaded the dwl file, and entered AT+WOPEN=1, but I still cannot use those features, why ?
A. It could be installation problem. You can issue command AT+WOPEN=0, then AT+WOPEN=4, then repeat the download procedure. If this still not help you may need to re-flash the main firmware first.

Q. Can I stop the VAF ?
A. Yes, you can enter AT+WOPEN=0 to stop.

Q. I get message “Invalid modem” message after downloading and issuing AT+WOPEN=1, why ?
A. Maybe you have downloaded file into incorrect or damaged modem. Please contact FargoTelecom.

7.2 AutoTCP/UDP

Q. Can I specify **<server>** by URL (e.g. xxxx.com) rather than IP address?
A. Yes, but only if your GPRS network have proper DNS service. You cannot specify your own DNS server

Q. If I enabled AutoTCP or AutoUDP, how can I stop it ?
A. You can cut the power or issue a reset command (AT+CFUN=1) through SMS (when AT command by SMS feature is enabled). After restarting the modem has 20 seconds for your to enter AT+AUTOTCP=0 or AT+AUTOUDP=0

7.3 AT command by SMS

Q. Can I send any AT command to control other features described in this document?
A. No. AT commands described in this document cannot be sent over SMS.

7.4 I/O triggered AT command

Q. Can I put any AT command to control other features described in this document?
A. No. AT commands described in this document cannot be executed by this feature.