



maestro Industrial

Trutalk User Manual V1.10

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1 INTRODUCTION

1.1 Background

The Maestro telemetry terminals is all controlled by the same set of commands and parameters.



Note: The commands in this document are related to firmware v106b. If your current firmware does not support a specific command that you want to use, then please contact Maestro Wireless Solutions for an upgrade option.

2 COMMAND MODE

By default the unit's main serial port acts as a standard modem. However this serial port is also used to enter commands and to configure the unit. The AT command AT\$TT is used to enter the Maestro Wireless Solutions TruTalk text mode command prompt. In this mode the unit will echo all incoming text, and add command prompts and readable carriage returns as well as line feeds. The command mode will time-out after a default 30 seconds, or can be quitted by typing <ctrl-z>, this will return the MAESTRO INDUSTRIAL into normal modem mode.

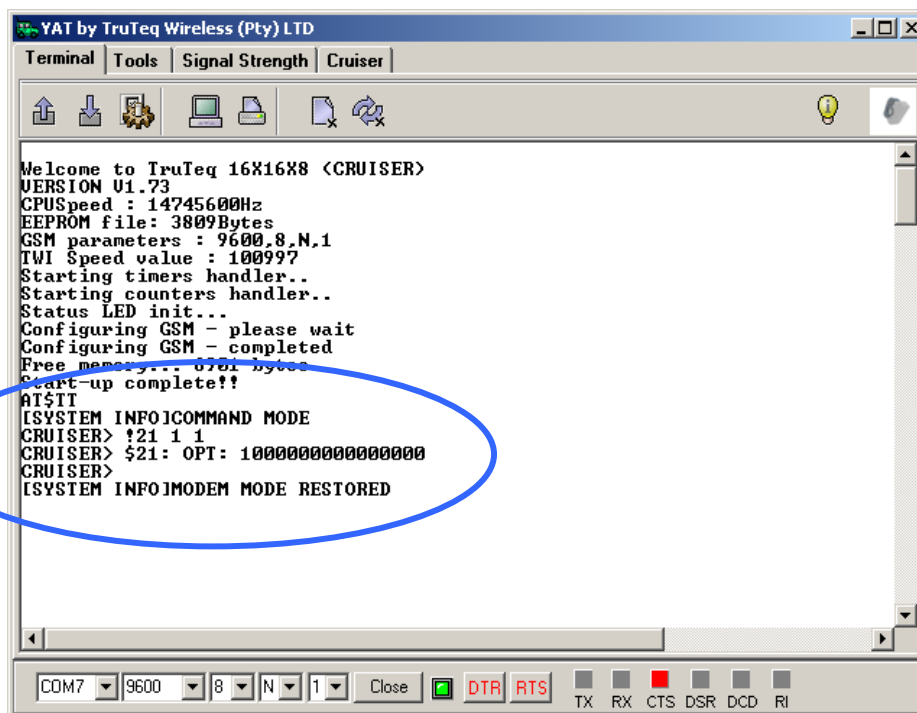
A simplified command mode is also available for use with serial applications by entering AT\$RT (RawText). In this mode there will be no echoing or prompts to simplify the serial encapsulation in a typical application.

2.1 Entering Commands

Commands can be entered via the serial port, sms, GPRS or even data call.

2.1.1 Serial Port

Commands can be entered via the serial port, once the unit has started up and printed "Start-up complete!!" on the serial port. **COMMAND MODE** is entered by typing-in **AT\$TT** <enter>



```
YAT by TruTeq Wireless (Pty) LTD
Terminal Tools Signal Strength Cruiser

Welcome to TruTeq 16X16X8 <CRUISER>
VERSION U1.73
CPUSpeed : 14745600Hz
EEPROM file: 3809Bytes
GSM parameters : 9600,8,N,1
TWI Speed value : 100997
Starting timers handler..
Starting counters handler..
Status LED init...
Configuring GSM - please wait
Configuring GSM - completed
Free memory... 0761 bytes
Start-up complete!!
AT$TT
[SYSTEM INFO]COMMAND MODE
CRUISER> ?21 1 1
CRUISER> $21: OPT: 1000000000000000
CRUISER>
[SYSTEM INFO]MODEM MODE RESTORED
```



Default serial parameters are: 9600,8,N,1.

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2.1.2 SMS

Commands can be send via sms.

Simply sms the command to the unit. Multiple commands can be send in 1 sms.



Note: make sure you are an allowed user before sending an sms to the unit

2.1.3 Data call / GPRS mode

Connect to the unit either via data call or TCP connection via GPRS.

Once the connection is made then command mode can be entered by sending 3 sequential minuses (---). The remote unit will now be in command mode and ready to receive commands over the air.

2.2 What's new

The MAESTRO INDUSTRIAL is constantly being upgraded with more and more features. The following has been implemented on the current release (V110) from the previous release (V103a).

2.2.1 *Firmware upgrade (command 9)*

The MAESTRO INDUSTRIAL now includes an application called FLASH MANAGER (FM). This application resides in the protected boot loader space of the microprocessor. At start-up it verifies the FLASH memory content and from there starts the application. The MAESTRO INDUSTRIAL command !9 can set a flag in the eeprom for the FM to enter serial boot mode. The user can now upload new firmware via the serial port using the Maestro Wireless Solutions YAT PRO software. To use this command enter “!9 SERIAL” on the command prompt.

2.2.2 *Serial input event handling (command 170/171)*

The serial input event has an added time-out option. The data field of command 170 indicates the wait time in steps of 100ms. This is the time to wait before the script in command 171 is executed. Enter *** followed by a pause to re-enter command mode.

2.2.3 *Setting of baud rate parameters (command 257)*

The GSM communications is now fixed to 8,N,1 character framing. The GSM (air link) framing is also not being printed out during start-up. The local port parameters can still be set to any of the following baud rates: 2400, 4800, 9600, 19200, 38400, 57600, 115200 (where 57600&115200 will print a warning of high baud rate – possible data loss). The local port framing options are 7,E,1 and 8,N,1. No more air link option in command 257. The MAESTRO INDUSTRIAL will also not restart any more after the settings have been changed. Just update the terminal program to the newly set parameters and press <enter>.

2.2.4 *Communications Port (command 263)*

The link between the MAESTRO INDUSTRIAL serial port and the GSM link can now be set to the following options:

1. No link to the GSM (more suitable for telemetry applications)
2. Only link during data connections (more suitable for AMR applications)
3. Always linked to the GSM (more suitable for modem applications)

2.2.5 *Modbus support (command 264)*

The MAESTRO INDUSTRIAL now supports TCP modbus protocol (when enabled – option 1). The following function codes are supported:
0x02 - Read Discrete Inputs (get status of digital inputs)
Enter *** followed by a pause to re-enter command mode.

2.2.6 Mains status reporting (command 265)

The MAESTRO INDUSTRIAL has an extra input in certain hardware profiles to indicate MAINS availability.

This command enable the use of that extra input and will display the status with <?6>

2.2.7 Dial-up modem configuration (command 266)

It is inevitable that customers want to use the MAESTRO INDUSTRIAL for modem dial-up connections made from PCs running Windows or other operating systems. During this mode the MAESTRO INDUSTRIAL bypasses ALL internal functions and only act as a modem. The user can now do dial-up at speeds up to 115200baud.

(TIP: this setting can also be used for uploading new firmware to the GSM module)

2.2.8 Data Flushing delay (command 267)

Some devices connected to a MAESTRO INDUSTRIAL are very timing critical when it comes to data flow. To avoid TCP packets segmentation and partial buffer flushing one can use command 267 to first wait a given time, before flushing the buffer as a constant output string.

3 COMMANDS & COMMAND LISTS

3.1 Commands – the building blocks of Command Lists

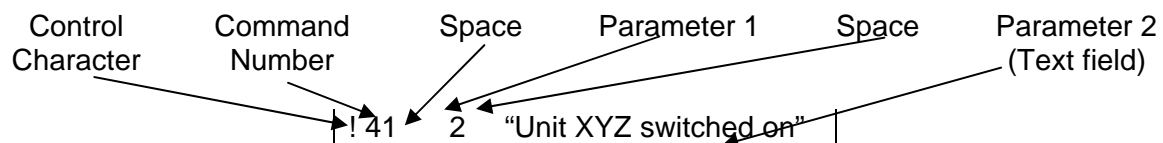
A Command starts with a Control Character (an exclamation mark <!> for a command, or a question mark <?> for a request), followed by a Command Number. This number indicates the action to be performed and are followed by different Parameters, which are always separated by at least one space.

Responses by the MAESTRO INDUSTRIAL unit are always returned to the Originator (person/machine who sent the request/command) in the same sequence as the request/command was made.

Any number of spaces can be used between separate Commands – the extra spaces are interpreted as white space and may be used to enhance readability. Just keep in mind that these spaces are also included in the maximum of 100 characters allowed in a Command List.

Double quotes <" "> indicates a text field and any control characters (!/?) or numbers contained between these double quotes, are handled as text only.

Example: (send SMS – <!41>)

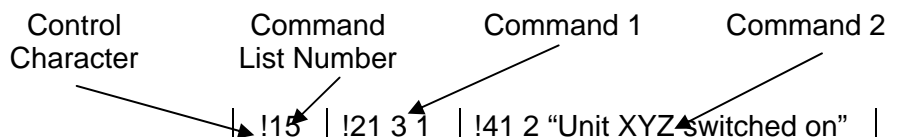


Note: Multiple commands can be entered at a time, in both the command mode and in an sms.

3.2 Command Lists

A Command List consists of a Control Character (an exclamation mark <!> for a command, or a question mark <?> for a request) and a Command List Number. This is followed by several Commands (minimum = 1, maximum = limitless). The total length of each Command List may not exceed 100 characters. The Command List Number is the association between an event and the following Commands.

Example: (start-up event – <!15>)



Note: Only one command list can be entered at a time, in both the command mode and in an sms.

3.3 Command Input Options

The state of a specific digital input can be specified (in Commands and Command Lists) with the following:

1. <0> - Switch off / disable / deactivate
2. <1> - Switch on / enable / activate

3.4 Command text Options

Text is entered between quotation marks "<text>", the content will be handled as one parameter. One can however add variables into the text area with the use of escape codes. Escape codes are placed between triangular brackets <escape code>. The following escape codes are available:

<C1-4>	Print counter 1 to 4
<S1>	Print serial input buffer 1
<T1-5>	Print timer 1 to 5 remaining time
<I0-20>	Print digital input 0 to 4 status (1=on 0=off) (0 = Mains Available on supported units)
<RS>	Received signal strength indication (0-100, or "—" if unknown)
<DQ>	Insert double quote (")
<RT>	Insert time from RTC
<RD>	Insert date from RTC
<CR>	Insert Carriage Return
<LF>	Insert Line Feed
<xHH>	Insert Byte – format is 0x HEX
<SN>	Insert Serial Number
<ST>	Insert Status string
<IP>	Print own IP address
<P1-8>	Insert Pulse Counter 1 to 8's value



Multiple escape codes can be within 2 brackets:
"<A1><A2><A3>" can also be written as "<A1A2A3>"

Example of sending a sms with the values of counter 1 and timer 2.

```
!41 1 "The value of counter1=<C1> and the value of timer2=<T2>"
```

If counter 1 was 25 and timer 2 was 14min and 23sec then this sms will display the following:

```
The value of counter1=25 and  
the value of timer2=00:14:23
```

4 COMMAND SUMMARY

No	Command String	Request String	Description
3		?03	Software Version
4		?04	Serial number
5		?05	Manufacturing details
6		?06	Quick view (will return all inputs, outputs and signal strength)
10	!10	?10	Modem Initialization String
11	!11 <N> <NoString>,<NameString>	?11 <N>	Write to phone book Note: NameString optional
12	!12 <String>	?12	Critical error command list
15	!15 <String>	?15	Start-up Commands
16	!16 <N> <Option>	?16 <N>	Control timer
17	!17 <N> <Option>	?17 <N>	Configure timer
18	!18 <N> <String>	?18 <N>	Timer time-out Command lists
21	!21 <N> <Option>	?21	Output state N+100 = internal GPIOs
32	!32 <N> <Option>	?32 <N>	Input Debounce
34	!34 <N> <String>	?34	Input trigger Commands (low to high)
35	!35 <N> <String>	?35	Input trigger Commands (high to low)
41	!41 <N> <String>		SMS Message sending
42	!42 <N> <time> "Event String"		Send event over GPRS fallback by sending SMS to phonebook position N
45	!45 <N> <String>	?45	Define customised list of Commands
46	!46 <N>		Execute custom command list number <N>
47	!47 <Dest> "String"		Send String to <Dest> 2 = Serial Port (1A – master ext)
48	!48 <Dest> <Hex-Array>		Send array of HEX chars to <Dest>
63	!63 <String>		Set PIN code
64	!64 <String>		Submit AT commands
66	!66 <Option>	?66	GSM Reset setup
67	!67 <Option>	?67	Allowed Data Call time
68	!68 <String>	?68	HouseKeeping interval
73	!73 <Option>	?73	Day-Time setting on clock

74	!74 <Option>	?74	Date setting on clock
75	!75 <1or2> <Option>	?75 <1or2>	en/disable Day-Time event
76	!76 <1or2> <Option>	?76 <1or2>	Day-Time event time-setting
77	!77 <1or2> <String>	?77 <1or2>	Day-Time event script
80	!80 <N> <Option>	?81 <N>	Counter Value Load
81	!81 <N> <Option>		Increment counter value
82	!82 <N> <Option>		Decrement counter value
83	!83 <N> <ValueLow> <ValueHigh>	?83 <N>	Counter Compare Values
84	!84 <N> <String>	?84 <N>	Counter <= Compare Low Command lists
85	!85 <N> <String>	?85 <N>	Counter >= Compare High Command lists
87	!87 <N> <Value>	?87 <N>	Manage Counters on flow meter card
90	!90 <PB pos> <String>	?90 <PB pos>	Incoming calls (Voice) Commands
91	!91 <PB pos> <String>	?91 <PB pos>	Incoming calls (Data) Commands
92	!92 <0/1>		Answer(1) or reject(0) incoming call
95	!95 <N><Option>	?95 <N>	Control allowed users
97	!97 ALL	?97	Query number of logs or erase all logs
98	!98 <String>	?98 <N>	Write log record, or read <N> number of logs
110	!110 <port#> <baud> <framing> <time out>	?110 <port#>	Set up communications processor ports
111	!111 <port#>		Remotely connect to communications processor port
120	!120 <N>	?120	Set number of Meters connected
121	!121 <N> <timeout>		Listen on meter <N> for <timeout> in msec or until <esc> is send
122	!122 <PortNo> <Baudrate> <framing>	?122 <PortNo>	Setup port character Baudrate:
150	!150 (1/0)	?150	GPRS Active/Inactive
151	!151 (1/0)	?151	GPRS Attached/Detached
152	!152 (1/0)	?152	GPRS Client/Server
153	!153 IP address	?153	IP address 1 (server mask)
154	!154 IP address	?154	IP address 2 (client connect)
155		?155	IP address 3 (own IP)
156	!156 <V>	?156	Server Listen Port no

157	!157 <V>	?157	Client Connection Port no
158	!158 APN add	?158	Access Point Name Server
159	!159 UserName	?159	APN username
160	!160 PassWord	?160	APN password
161	!161 <A> <C>	?161	GPRS manager setup
170	!170 (0 or time-out)	?170	Serial input Manager Active/Inactive
171	!171 <String>	?171	Execute <String> when serial input event occurs
251		?251	Get System uptime
252	!252 <digIn> <digOut> <AnIn>	?252	IO setup
254	!254 (1/0)	?254	RS485 enable / disable
255		?255	Display free memory
256	!256		Reset Unit
257	!257 <BaudRate> <IO_Framing>	?257	Set communications parameters
258	!258 <seconds>	?258	Set command mode timeout
260	!260 (0->4)	?260	Debugging to Serial port 0- No Debug 1- GSM Debug 2- System Debug 3- Allowed users Debug 4- Command handler Debug
261	!261 (0/1)	?261	Return SMS on Commands 0 – no return sms 1 – return sms (default)
262	!262 (0/1)	?262	Auto Remote Command Mode 0 – disable (default) 1 – enable
263	!263 (0/1/2)	?263	Communications Port 1 – No link to GSM 2 – Only link data 3 – Always linked
264	!264 (0/1)	?264	Modbus enable / disable
265	!265 (0/1)	?265	Mains input enable / disable
266	!266 (0/1)	?266	Dial-up option
267	!266 <N>	?266	Data flush delay

5 COMMANDS IN DETIAL

5.1 Query Firmware version _____ 3

This request is used to get the current firmware version installed on the device.

Write format:

?3

Example:

Operator to Unit	?3	Request firmware version
Unit to Operator	\$3: Firmware Version : Vx.xxx	

5.2 Query Unit Serial Number _____ 4

This request is used to get the device's serial number.

Write format:

?4

Example:

Operator to Unit	?4	Request serial number
Unit to Operator	\$4: Serial# : TFxxxxxx	

5.3 Query Unit Manufacturing Details _____ 5

This request is used to get the device's manufacturing details.

Write format:

?5

Example:

Operator to Unit	?5	Request manufacturing details
Unit to Operator	\$5: Manuf. details : xxxxxxxx	

5.4 Quick view _____ 6

This request is used to obtain the status of ALL the inputs, as well as the GSM signal strength (as a percentage). The status will be supplied in the following format:

- 1) Example A – one MAESTRO INDUSTRIAL input (digital):

IPT: ABCD (Input status)
SIG: XX% (Signal strength)

Where:

A is the status of **Input 1** (1 = on, 0 = off)
B is the status of **Input 2** (1 = on, 0 = off)
C is the status of **Input 3** (1 = on, 0 = off)
D is the status of **Input 4** (1 = on, 0 = off)

- 2) Example B – three MAESTRO INDUSTRIAL input/output boards (digital) and two analogue input boards:

IPT: ABCDEFGHIJKL (Digital input status)
SIG: XX% (Signal strength)

Where:

A is the status of **Input 1** (1 = on, 0 = off)
B is the status of **Input 2** (1 = on, 0 = off)
C is the status of **Input 3** (1 = on, 0 = off)
D is the status of **Input 4** (1 = on, 0 = off)

Write format:

?6

Example:

Operator to Unit	?6	Request status
Unit to Operator	IPT: 1001 SIG: 85%	Return status MAESTRO INDUSTRIAL digital input

5.5 Modem Specific Initialisation _____ 10

This Command is used to store a list of AT commands to be performed when the device is powered-up. The user can use this to enable/disable modem specific type of commands eg: set hardware flow control to none with AT+IFC=0,0 and set auto answer on with ATS0=1.

Write format:

!10 <STRING> (AT commands must be space delimited)

?10

Example:

Operator to Unit	!10 AT+IFC=0,0 ATS0=1	Set modem H/W flow control to none and auto answer incoming calls after 1 ring.
Unit to Operator	\$10: User Modem Init. String: AT+IFC=0,0 ATS0=1	
Operator to Unit	?10	Request current user specific init string
Unit to Operator	\$10: User Modem Init. String: AT+IFC=0,0 ATS0=1	



Note: The unit will re-start to implement the change

5.6 Write to phone book Command _____ 11

This Command is used to store user's cell phone numbers in the SIM Phone Book. The maximum number of cell phone numbers that can be stored, will be determined by the SIM card in use (typically 200). These numbers can be overwritten with new numbers (if required).

It is important to have the users names and numbers in the phone book, as it used for sending and receiving sms. Please also see the allowed user command number 95.



Note: These numbers are stored on the SIM card and not on the unit, so these numbers will have to be re-entered if the SIM card is swapped out or replaced.

Write format option1:

☞ Only the user's number is stored in this format.

!11 <Phone book position> <Cell phone number> < Phone book position> <Cell phone number>.....

?11 <Phone book position> <Phone book position> <Phone book position>.....

Example:

Operator to Unit	!11 15 +27835638592 117 +27836479220	Write phone number 0835638592 in position 15 and phone number 0836479220 in position 117 in the SIM phone book
Unit to Operator	\$11 15->+27835638592 117->+27836479220	
Operator to Unit	?11 15 117	Request current phone numbers in positions 15 and 177 in the SIM phone book
Unit to Operator	\$11 15->+27835638592 117->+27836479220	

Write format option2 (recommended):

☞ The user's number and name is stored in this format.

!11 <Phone book position> <Cell phone number>,<person's name> < Phone book position> <Cell phone number>,<person's name>.....

?11 <Phone book position> <Phone book position> <Phone book position>.....

Example:

Operator to Unit	!11 15 +27835638592,Peter 117 +27836479220,Jhon	Write phone number 0835638592 in position 15 and phone number 0836479220 in position 117 in the SIM phone book
Unit to Operator	\$11 15->+27835638592,Peter 117->+27836479220,Jhon	
Operator to Unit	?11 15 117	Request current phone numbers in positions 15 and 177 in the SIM phone book
Unit to Operator	\$11 15->+27835638592,Peter 117->+27836479220,Jhon	

5.7 Hardware failure Command List _____ 12

The MAESTRO INDUSTRIAL can be programmed to perform certain Commands when a hardware failure condition occurs inside the MAESTRO INDUSTRIAL, for example switching certain outputs on or off, sending an SMS message to a specific number in the SIM phone book, etc.

Write format:

!12 <Command1> <Command2> <Command3>

?12

Example:

Operator to Unit	!12 !41 2 "Critical error on Unit XYZ"	Send an sms when any hardware failure was detected
Unit to Operator	\$12 <String>	
Operator to Unit	?12	Request current Start-up Command List configuration
Unit to Operator	\$12: !41 2 "Critical error on Unit XYZ"	

5.8 Start-up Command List _____ 15

The device can be programmed to perform certain Commands when a start-up (power-up) condition occurs, for example switching certain outputs on or off, sending an SMS message to a specific number in the SIM phone book, etc.

Write format:

!15 <Command1> <Command2> <Command3>

?15

Example:

Operator to Unit	!15 !41 2 "Unit XYZ switched on"	Start-up Command List Number Send an SMS message to phone book position 2 that reads: "Unit XYZ switched on"
Unit to Operator	\$15 !41 2 "Unit XYZ switched on"	
Operator to Unit	?15	Request current Start-up Command List configuration
Unit to Operator	\$15 !41 2 "Unit XYZ switched on"	



Note: The unit will re-start to implement the change

5.9 Control timers Command _____ 16

There are 5 separate timers in the MAESTRO INDUSTRIAL and this Command can be used to start or stop any of the timers. When a specific timer runs out, a Command associated with the event could be to start the timer again, thereby creating a recurring timed event.



Tip: Remember to first load a time into the timer with command 17 before starting the count down timer.

Option Parameters:

0 = stop timer

1 = start count-down timer

2 = start count-up timer

Write format:

!16 <Timer number> <Option> <Timer number> <Option> <Timer number> <Option>.....

?16 <Timer number> <Timer number> <Timer number>.....

Example:

Operator to Unit	!16 4 0 1 1	Stop timer 4 and start timer 1
Unit to Operator	\$16: 1->1 4->0	
Operator to Unit	?16 1 4	Request current status of timers 1 and 4
Unit to Operator	\$16: 1->1 4->0	



Note: That when the count-up option is used there will be no event script associated with the timer. The event script is only executed when the timer reaches zero.

5.10 Configure timers Command _____ 17

This Command can configure the 5 timers' characteristics in hours, minutes and seconds to a maximum of 99 hours, 59 minutes and 59 seconds. If not configured, the default will be '0' (no timer).

Write format:

!17 <Timer number> <hh:mm:ss> <Timer number> <hh:mm:ss>.....

?17 <Timer number> <Timer number> <Timer number>.....

Example:

Operator to Unit	!17 1 00:10:30 5 06:00:00	Set timer 1 to 10 minutes and 30 seconds, set timer 5 to 6 hours
Unit to Operator	\$17: 1->00:10:30 5->06:00:00	
Operator to Unit	?17 5 1	Request current configuration of timers 5 and 1
Unit to Operator	\$17: 5->05:59:51 1->00:10:21	



Note: This Command doesn't physically switch any of the timers on, but just configures their characteristics. Use the Control timers Command <!16> to switch any/all of the timers on.

5.11 Timer time-out Command List _____ 18

The timers can be programmed to perform certain Commands when it runs out, for example it could switch certain outputs on or off, send an SMS message to a specific number in the SIM phone book, etc.

Write format:

!18 <Timer number> <Command1> <Command2> <Command3>

?18 <Timer number>

Example:

Operator to Unit	!18 4 !41 7 "Timer timed out" !17 4 24:00:00	Timer time-out Command List Number – in the event of a time-out of timer number 4 the following Commands will be performed: Send an SMS message to phone book position 7 that reads: "Timer timed out", Re-start the timer again (recurring timed event)
Unit to Operator	\$18 1->!41 7 "Timer timed out" !17 4 24:00:00	
Operator to Unit	?18 4	Request current Timer timed-out Command List configuration for Timer number 4
Unit to Operator	\$18 1->!41 7 "Timer timed out" !17 4 24:00:00	

5.12 Input Debounce Command 32

The Debounce period is the amount of time that lapses before a specific task is performed. This Command can configure the Debounce period of an input in hours, minutes and seconds to a maximum of 99 hours, 59 minutes and 59 seconds. If not configured, the input will (by default) have no Debounce period.



Note: Digital input # 0 refers to units with an internal battery that has a mains available option.

Write format:

!32 <Input number> < hh:mm:ss > <Input number> < hh:mm:ss >.....

?32 <Input number> <Input number> <Input number>.....

Example:

Operator to Unit	!32 1 00:00:25	Configure input 1 to have a 25 second debounce period before executing the associated Command List
Unit to Operator	No response	
Operator to Unit	?32 1	Request current Debounce period configuration of input 1
Unit to Operator	\$32 00:00:25	

5.13 Input trigger (low to high) Command List _____ 34

The device can be programmed to perform certain Commands when an input is triggered/opened/switched on, for example switch certain outputs on or off, start the timer, send an SMS message to a specific number in the SIM phone book, etc.



Note: Digital input # 0 refers to units with an internal battery that has a mains available option.

Write format:

!34 <Input number> <Command1> <Command2> <Command3> <;>

?34 <Input number> <Input number>.....

Example:

Operator to Unit	!34 1 !41 2 "Door has been opened";	Command List Number – in the event of a trigger on input 1 then the following Commands will be performed: Send an SMS message to phone book position 2 that reads: "Door has been opened"
Unit to Operator	No response	
Operator to Unit	?34 1	Request current Input trigger (low to high) Command List configuration for input 1
Unit to Operator	1: !34 1 !41 2 "Door has been opened";	

5.14 Input trigger (high to low) Command List _____ 35

In some applications one would want the device to perform certain Commands in the event when an input is switched off/closed/return to its original status or position.



Note: Digital input # 0 refers to units with an internal battery that has a mains available option.

Write format:

!35 <Input number> <Command1> <Command2> <Command3> <;>

?35 <Input number> <Input number>.....

Example:

Operator to Unit	!35 1 !41 2 "Door has been closed";	Command List Number – in the 'off' event of input 1 then the following Commands will be performed: Send an SMS message to phone book position 2 that reads: "Door has been closed"
Unit to Operator	No response	
Operator to Unit	?35 1	Request current Input trigger (high to low) Command List configuration for input 1
Unit to Operator	1: !35 1 !41 2 "Door has been closed";	

5.15 Send SMS message _____ 41

This Command is used to send SMS messages to any of the cell phone numbers in positions 1 to 200 of the SIM Phone Book. The same SMS message can be sent to multiple phone numbers in a single Command.

Write format:

!41 <Position number> <Position number> <Position number> <"> <Text message> <">

Example:

Operator to Unit	!41 3 55 69 "Hello World" 1 "Hello World was sent"	Send "Hello World" to the cellphone numbers in positions 3, 55 and 69 and send "Hello World was sent" to the cellphone number in position 1 in the SIM Phone Book
Unit to Operator	\$41: message send status.	

5.16 Send GPRS message _____ 42

This command creates a TCP Client connection to IP address 2 on port # 2 (see command 154 and 157). A SIM phone book position must also be supplied in case the GPRS connection was unsuccessful. The message will then be send via SMS. The connection open time-out must also be supplied (this field is in seconds).



Note: If the connection was made from command mode, and a time-out field was specified then the unit will quit command mode, however if the time-out field was set to zero, then the unit will stay in command mode after the message was send.

Write format:

!42 <Position number> <Connection Open Time-out> <"> <Text message> <">

Example:

Operator to Unit	!42 3 1 "Input 1 sw on!"	Send "Input 1 sw on!" to the IP address 2 on port # 2.If unsuccessful then send "Input 1 sw on!" via sms to phone book position 3.
Unit to Operator	\$42: message send status.	

5.17 Custom command list _____ 45

This Command is used to create custom command lists. There are 10 custom command lists.



Tip: Use custom command lists when deferent events must execute the same script, or when the 100 characters associated with an event is to little.

Write format:

!45 <List number> <Command List>

Example:

Operator to Unit	!45 5 !41 1 2 "Door status = <I4>"	When custom command list 5 is called then it will send a sms to phone book positions 1 & 2 giving the status of the door switch
Unit to Operator	\$45: 5->!41 1 2 "Door status = <I4>"	

5.18 Execute Custom command list _____ 46

This Command is used to generate the event that will execute the associated custom command list.

Write format:

!46 <List number>

Example:

Operator to Unit	!46 5	Execute custom command list 5.
Unit to Operator	\$46: Now running cmd list: 5	



Tip: Use command 261 to switch off return sms if the custom command list is going to send the required sms.

5.19 Send String command _____ 47

This Command is used to send a string to the serial port (Dest=2).

Write format:

!47 <Destination> "String"

Example:

Operator to Unit	!47 2 "Input4=<I4>"	Write input 4 status to serial port
Unit to Operator	\$47: text message send OK	

5.20 Send HEX Array command _____ 48

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This Command is used to send an array of HEX formatted characters including <NULL> to the serial port (Dest=2).

Write format:

!48 <Destination> <HEX-ARRAY>

Example:

Operator to Unit	!48 2 00010305060AFF	Write <x00 x01 x03 x05 x06 x0A xFF> to serial port
Unit to Operator	\$48: array send OK	

5.21 SIM PIN management 63

This Command is used to set/get the PIN number of the SIM card.

Read format:

?63

Write format:

!63 <PIN_NUMBER>

Example:

Operator to Unit	?63	
Unit to Operator	\$63: PIN=12345 (PIN enter failed!)	
Operator to Unit	!63 5670	
Unit to Operator	\$63: PIN=5670 (NEW PIN!)	
Operator to Unit	?63	
Unit to Operator	\$63: PIN=5670 (PIN OK)	

5.22 Submit AT command 64



This Command is used to submit an AT command to the modem, via the command mode prompt.

Write format:

!64 "<AT-command>"

Example:

Operator to Unit	!64 AT	Query modem
Unit to Operator	\$64: OK	
Operator to Unit	!64 "ATS0=1"	Set auto answer on after one ring
Unit to Operator	\$64: OK	
Operator to Unit	!64 "AT+CCED=0,1"	Query the connected base station information
Unit to Operator	\$64: +CCED: 655,10,278c,3811,40,85,63,,,0,,,0 OK	

5.23 GSM reset interval _____ 66

This Command is used to set/get the GSM reset interval in minutes.

Read format:

?66

Write format:

!66 <Interval>

Example:

Operator to Unit	?66	
Unit to Operator	\$66: GSM reset interval : 1440	
Operator to Unit	!66 2880	
Unit to Operator	\$66: GSM reset interval : 2880	



Note: It is recommended to keep the interval on 1440 (default value)

5.24 GSM data call reset interval _____ 67

This Command is used to set/get the GSM data call reset interval in minutes.

Read format:

?67

Write format:

!67 <Interval>

Example:

Operator to Unit	?67	
Unit to Operator	\$67: Data-call reset interval : 10	
Operator to Unit	!67 30	
Unit to Operator	\$67: Data-call reset interval : 30	



Note: It is recommended to set the interval to 0 (zero) if GPRS connections is used

5.25 GSM house keeping interval _____ 68

This Command is used to set/get the GSM house keeping interval.

Read format:

?68

Write format:

!68 <Interval>

Example:

Operator to Unit	?68	
Unit to Operator	\$68: HK interval : 1	



Note: It is recommended to keep the interval on 1 (default value)

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There are 4 separate counters in the MAESTRO INDUSTRIAL.

These commands can be used to load values, increment or decrement with values and assign command list to be executed when a counter reaches a certain value.

Note: Counters are signed 32bit integers thus the range is:

-2,147,483,648 to +2,147,483,648

The value of a counter can also be included in a message by using <Cx> inside the message eg: !41 1 "Counter values inside MAESTRO INDUSTRIAL: 1=<C1> 2=<C2> 3=<C3> 4=<C4>"

5.26.1 Counter Value Load 80

This Command is used to load a value into a counter (this will overwrite the current value of the counter).

It is also used to obtain the current value of the counter.

Read format:

?80 <N>

Write format:

!80 <N> <value>

Example:

Operator to Unit	?80 1	Read counter 1 value
Unit to Operator	\$80: 1->250	

5.26.2 Counter Increment 81

This Command is used to increment (increase the value of) any of the counters with a given value.

Write format:

!81 <N> <value>

Example:

Operator to Unit	!81 1 1	Increment counter 1 with 1
Unit to Operator	\$80: 1->251	
Operator to Unit	!81 1 15	Increment counter 1 with 15
Unit to Operator	\$80: 1->266	

5.26.3 Counter Decrement 82

This Command is used to decrement (decrease the value of) any of the counters with a given value.

Write format:
!82 <N> <value>

Example:

Operator to Unit	!82 1 1	Decrement counter 1 with 1
Unit to Operator	\$80: 1->249	
Operator to Unit	!82 1 15	Decrement counter 1 with 15
Unit to Operator	\$80: 1->234	

5.26.4 Counter low / high compare values 83

This Command is used to set/get the counter low & high compare values.

Read format:
?83 <N>

Write format:
!83 <N> <low compare value> <high compare value>

Example:

Operator to Unit	!83 1 10 20	
Unit to Operator	\$83: 1->10,20	
Operator to Unit	?83 1	
Unit to Operator	\$83: 1->10,20	

5.26.5 Counter low compare command list 84

This Command is used to set/get the counter low command list.
This command list will be executed when the counter value is smaller or equal to the low_compare_value set in !83

Read format:
?84 <N>

Write format:
!84 <N> <String>

Example:

Operator to Unit	!84 1 !21 1 1	
Unit to Operator	\$84: 1 !21 1 1	
Operator to Unit	?84 1	
Unit to Operator	\$84: 1 !21 1 1	

5.26.6 Counter high compare command list 85

This Command is used to set/get the counter high command list.

This command list will be executed when the counter value is higher or equal to the high_compare_value set in !83

Read format:

?85 <N>

Write format:

!85 <N> <String>

Example:

Operator to Unit	!85 1 !21 1 0	
Unit to Operator	\$85: 1 !21 1 0	
Operator to Unit	?85 1	
Unit to Operator	\$85: 1 !21 1 0	

5.27 Incoming Voice calls command list _____ 90

This Command can be used to program the MAESTRO INDUSTRIAL unit to execute certain commands when an incoming voice call is received from one of the first 10 numbers in the phonebook.

Read format:

?90 <N>

Write format:

!90 <N> <String>

Example:

Operator to Unit	!90 3 !92 0	Hang-up the incoming call
Unit to Operator	\$90 3->!92 0	
Operator to Unit	?90 3	Request the voice command list of user number 3
Unit to Operator	\$90 3->!92 0	

5.28 Incoming Data calls command list _____ 91

This Command can be used to program the MAESTRO INDUSTRIAL unit to execute certain commands when an incoming data call is received from one of the first 10 numbers in the phonebook.

Read format:

?91 <N>

Write format:

!91 <N> <String>

Example:

Operator to Unit	!91 5 !92 1	Answer the incoming call
Unit to Operator	\$91 5->!92 1	
Operator to Unit	?90 5	Request the data command list of user number 5
Unit to Operator	\$91 5->!92 1	

5.29 Incoming call control _____ 92

This Command can be used to program the MAESTRO INDUSTRIAL unit to answer (1) or reject (0) a call.

Write format:

!92 <Option>

Example:

Operator to Unit	!92 1	Answer the incoming call
Unit to Operator	\$92: incoming call : Answered	

5.30 Control allowed users Command _____ 95

This Command can be used to program the MAESTRO INDUSTRIAL unit to allow only some or all of the cell phone numbers in the first 10 positions of the SIM Phone Book to send Commands / Command Lists to the MAESTRO INDUSTRIAL unit.

Write format:

!95 <Allowed user number> <Option> <Allowed user number> <Option>.....

?95 <Allowed user number> <Allowed user number> <Allowed user number>


Example:


Operator to Unit	!95 2 0 4 1	Disable allowed user number 2 and enable allowed user number 4
Unit to Operator	\$95 2->0 4->1	
Operator to Unit	?95 2	Request the current status of allowed user number 2
Unit to Operator	\$95 2-0	

5.31 GPRS Set-up 150-161

5.31.1 GPRS activate / deactivate 150

This Command can be used to activate or deactivate the GPRS server functionality inside the MAESTRO INDUSTRIAL.

 Note: set parameters in commands 153 → 161 before setting GPRS manager to ACTIVE.

 Tip: first set GRPS manager in-active before changing any GPRS parameters (!150 0)

Write format:

!150 0 or 1

?150

Example:

Operator to Unit	!150 1	Activate GPRS server (Note: first setup parameters 152-160 before activating GPRS)
Unit to Operator	\$150: GPRS active	
Operator to Unit	?150	Request the current status of GPRS manager
Unit to Operator	\$150: GPRS active	

5.31.2 GPRS IP address 1 153

This parameter is reserved

5.31.3 GPRS IP address 2 154

This is the IP address to whom a client connection is made.

Write format:

!154 172.24.16.2

?154

Example:

Operator to Unit	!154 172.24.16.2	Make client connection to 172.24.16.2
Unit to Operator	\$154: IP address 2: 172.24.16.2	
Operator to Unit	?154	Request the current IP address 2 field
Unit to Operator	\$154: IP address 2: 172.24.16.2	

5.31.4 GPRS IP address 3 155

This is the IP address of the MAESTRO INDUSTRIAL, received from the network after a successful connection was established.

This will typ. be fixed IP add. on a private APN or variable IP add. on public APN

Write format:

?155

Example:

Operator to Unit	?155	Request the current IP address of the MAESTRO INDUSTRIAL
Unit to Operator	\$155: IP address 3: 172.24.16.7	

5.31.5 TCP Server Port number 156

This is the TCP Port where the MAESTRO INDUSTRIAL will be listing on.

Write format:

!156 502

?156

Example:

Operator to Unit	?156	Request the current TCP port number
Unit to Operator	\$156: Port # : 502	
Operator to Unit	!156 7800	Set the port number to 7800
Unit to Operator	\$156: Port # : 7800	

5.31.6 TCP Client Port number 157

This is the TCP Port where the MAESTRO INDUSTRIAL will be writing data to.

Write format:

!157 50030
?157

Example:

Operator to Unit	?157	Request the current TCP client port number
Unit to Operator	\$157: Port # : 50030	
Operator to Unit	!157 7800	Set the port number to 7800
Unit to Operator	\$157: Port # : 7800	

5.31.7 Access Point Name Server 158

Defines the APN server

Typ: "internet" for the Public APN
or "exampleAPN" for any other private APN

Write format:

!158 internet
?158

Example:

Operator to Unit	?158	Request the current APN setting
Unit to Operator	\$158: APN: internet	
Operator to Unit	!158 exampleSAPN	Set the APN to example APN
Unit to Operator	\$158: APN: exampleAPN	

5.31.8 User name 159

Username required for connection to the APN

Write format:

!159 myUserName
?159

Example:

Operator to Unit	?159	Request the current username
Unit to Operator	\$159: APN user name: myUserName	
Operator to Unit	!159	Clear the username field
Unit to Operator	\$159: APN user name: invalid Data	

5.31.9 Password 160

Password required for connection to the APN

Write format:

!160 myPassWord

?160

Example:

Operator to Unit	?160	Request the current password
Unit to Operator	\$160: APN user password: invalid Data	Empty password field
Operator to Unit	!160 myPassWord	Set password to myPassWord
Unit to Operator	\$160: APN user password: myPassWord	

5.31.10 GPRS manager configuration 161

The MAESTRO INDUSTRIAL is equipped with a GPRS connection manager. The manager maintains an “always available” connection for telemetry devices where no user intervention is possible.

Write format:

!161 <GPRS attach refresh interval> <retry interval when error received> <No data flow timeout>

?161

Example:

Operator to Unit	?161	Request the current GPRS manager setup
Unit to Operator	\$161: 240min 5min 75min	The MAESTRO INDUSTRIAL will detach and re-attach every 240min, in case of an error (typ GPRS network down) retries will happen every 5minutes. The MAESTRO INDUSTRIAL will detach and re-attach when a connection was made to the MAESTRO INDUSTRIAL, but no data flowed within 75minutes.
Operator to Unit	!161 1440 30 30	This will set the GPRS manager to refresh attachment to the GPRS network on a daily basis, with 30min retry intervals on errors and a 30min data flow timeout.
Unit to Operator	\$161: 1440min 30min 30min	

5.32 Serial input event 170-171

An instrument or measuring device with unsolicited serial output (for example a tag reader) can be connected to the MAESTRO INDUSTRIAL. The unit can be configured to perform certain tasks when such an unsolicited serial event occurs.



Note: The serial input buffer size is 150Bytes big, thus the event originating data must not be more than 150characters.



Tip: Use the text escape code <S1> to access the buffered serial data



Tip: By entering 3 asterisks (***) followed by a pause, will take the unit out of the serial input event, to enable the user to access the serial port normally and to be able to deactivate the feature, or to set-up other parameters.

5.32.1 Set Serial input event active / inactive 170

This Command is used to enable / disable the Serial Input Event functionality.

Write format:

!170 <0 or (wait time X 100msec)>

Read format:

?170

Example:

Operator to Unit	?170	Query if Serial Input event feature is active
Unit to Operator	\$170: Serial input event: Inactive	
Operator to Unit	!170 1	Set the Serial Input event to wait 100ms before executing associated script
Unit to Operator	\$170: Serial input event: Active	

5.32.2 Command List for the Serial Input Event 171

This Command is used to set the command list associated with the serial input event.

Write format:

!171 <String>

Read format:

?171

Example:

Operator to Unit	!171 !41 1 "Tag number	Set the unit to sms the input string to phone
------------------	------------------------	---

	is: <S1>”	book position 1
--	-----------	-----------------

5.33 System Hardware Set-up Parameters _____ 251-261



Note: The units will always be supplied from Maestro Wireless Solutions with the correct hardware configuration loaded.



Note: These commands must be used with caution, as a wrong hardware configuration might result in the unit not responding anymore!!!

5.33.1 *Get system uptime* _____ 251

This Command is used to get the unit's uptime since it was switched on.

Read format:

?251

5.33.2 *Set-up Hardware number of inputs* _____ 252

This Command is used to set the number of digital inputs, connected to the device.

Write format:

!252 <Digital Inputs> 0 0

For MI with option 1, <Digital Inputs> should be 4

Read format:

?252

5.33.3 *Set serial input to RS485* _____ 254

This Command is used to enable the RS485 (if fitted) option on the device

Write format:

!254 <0 or 1>

Read format:

?254

5.33.4 Get system free memory **255**

This Command is used to obtain the free memory available.

Read format:

?255

5.33.5 Force a hardware reset **256**

This Command is used to force a hardware reset.

Write format:

!256

5.33.6 Set-up serial port communications parameters **257**

This Command is used to set-up the serial port's data parameters. An added feature is that the data-framing to the end device does not have to be the same as on the unit, thus a meter communicating on 7,E,1 framing can be connected to a server only supporting 8,N,1 framing.

Write format:

!257 <Baud-rate> <local port framing>

or

!257 <Baud-rate>

Read format:

?257

Example:

Operator to Unit	!257 9600 7,E,1	Set the unit to connect to a meter at 9600,7,E,1
Operator to Unit	!257 115200	Only set the baudrate to 115200 (Don't change framing set-up)

5.33.7 Set command mode time out

258

This Command is used to set the time out period for command mode to return to modem mode. This time out is in seconds.

Write format:

!258 <time-out>

5.33.8 Set debug on or off

260

This Command is used to activate the debug data.

Available Options

0- No Debug

1- GSM Debug

2- System Debug

3- Allowed users Debug

4- Command handler Debug

Write format:

!260 <Option>

5.33.9 Enable return sms on commands received via sms

261

This Command is used to activate return sms to sender

Write format:

!261 <0 or 1>

5.33.10 Enable auto remote command mode

262

This Command is used to set device into auto remote command mode on incoming connections, either via CSD data call or GPRS connection. This is 'handy' when there's no device connected to the serial port, and only the TruTalk commands is used over the air.

Write format:

!262 <0 or 1>

5.33.11 Set communications Port

263

This Command is used to set the link between the MAESTRO INDUSTRIAL serial port and the GSM link with the following options:

Write format:

!263 <0~2>

- 0 (internal): No link to the GSM (more suitable for telemetry applications)
- 1 (data): Only link during data connections (more suitable for AMR applications)
- 2 (all): Always linked to the GSM (more suitable for modem applications)

5.33.12 **MODBUS**

264

The MAESTRO INDUSTRIAL supports TCP modbus protocol.

The following function codes are supported:

0x02 - Read Discrete Inputs (get status of digital inputs)

Enter *** followed by a pause to re-enter command mode.

Write format:

!264 <0/1>

0 : Don't use MODBUS commands

5.33.13 **Mains status reporting**

265

The MAESTRO INDUSTRIAL has an extra input in certain hardware profiles to indicate MAINS availability.

This command enable the use of that extra input and will display the status with <?6>



Note: Use digital input '0' to assign scripts to mains fail events

Write format:

!265 <0/1>

0 : Don't display Mains status

1 : Display Mains status

5.33.14 *Dial-up mode*

266

It is inevitable that customers want to use the MAESTRO INDUSTRIAL for modem dial-up connections made from PCs running Windows or other operating systems. During this mode the MAESTRO INDUSTRIAL bypasses ALL internal functions and only act as a modem. The user can now do dial-up at speeds up to 115200baud.
(TIP: this setting can also be used for uploading new firmware to the GSM module)

Write format:

!266 <0/1>

- 0 : Normal TruTalk mode
- 1 : Dial-up mode

5.33.15 *Data Flushing Delay*

267

Some devices connected to a MAESTRO INDUSTRIAL are very timing critical when it comes to data flow. To avoid TCP packets segmentation and partial buffer flushing one can use command 267 to first wait a given time, before flushing the buffer as a constant output string.

Write format:

!267 <time-out>

<time-out> is specified in X100msec

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7 GLOSSARY

Abbreviation	Description
API	Application programmers Interface
ASN.1	Abstract Syntax Notation One
CDR	Charge Data Record
CSV	Comma Separated Values
DB	Database
DNS	Domain Name System
FQDN	Fully Qualified Domain Name

GAIN	Gateway Application and Interface Node
HTTP	Hypertext Transfer Protocol
HTTPS	HTTP Secure
IVR	Interactive Voice Response
I/O	Input/Output
IP	Internet Protocol
MMS	Multimedia Message Service
MMSC	Multimedia Messaging Service Centre
PDA	Personal Digital Assistant
SMSC	Short Message Service Centre
SMPP	Short Message Peer to Peer Protocol
USSD	Unstructured Supplementary Services Data
WIG	Wireless Internet Gateway
WAP	Wireless Application Protocol
WML	Wireless Mark-up Language
WASP	Wireless Application Service Provider
XML	Extensible Markup Language

8 REVISION INFORMATION

Date	Version	Comments	Author
29 July 2008	1.0	Port to new format	Eric Guldemond
23. Dec 2008	1.10	Minor Revision	M.Boulanger

9 WARNINGS

WARNING: Do not open this equipment under any circumstances. High risk of electrical shock exists that may and probably will lead to injuries and/or death.

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