

Uranus Meteo Sensor

COMMAND PROTOCOL

COMPATIBLE WITH FIRMWARE $\leq$ V1.2



DOCUMENT VERSION 1.1 - 2022-NOV-01

VERSION HISTORY

Version #	Implemented By	Revision Date	Reason
1.1	<i>Evans Souglakos</i>	<i>01/11/2022</i>	<i>Initial Document</i>



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INTRODUCTION

Thank you for purchasing the Uranus Meteo Sensor. This pocket-sized device is an all-around astronomer, astro-imager companion. Smaller than the size of a cigarette box, and equipped with a variety of digital sensors, can precisely report the ambient temperature, humidity, pressure, cloud height, cloud coverage, astronomical dawn, twilight time, and the night sky brightness.

COMMUNICATION CHANNEL

A USB to Serial interface allows communication with the device. Plug in the USB-C cable to discover the device.

Note1: The device remains open and ignores any configured sleep time when the USB cable is plugged in.

Note 2: Display turns off during Sky Quality measurements.

Device USB Name is: **Uranus Meteo**

Device USB discovery ID is:

VID	03EB
PID	204A

Serial connection parameters are:

Speed	115200
Data Bits	8
Parity Bit	N
Stop Bit	1

COMMANDS

- All commands are case-sensitive.
- Each command is a string of characters. The beginning command string consists of two ASCII characters plus ':' followed by the message.
- Command ends with a CRLF.

E.g.:

Send: => **GO**
Receive: <= **GO:[value]:CRLF**

UNIT SYSTEM

All units outputted from the USB to Serial channel are in the **metric system**.

ABBREVIATIONS

interger	n
decimal number	n.n
x	Char
b	boolean (0 or 1)



COMMAND LIST

1.1 General

M# Get the health status of the device – Acknowledgment that the device is operational.
Returns:
MS_OK

MV Get the firmware release
Returns: (double)
MV:n.n

MQ: Device MCU reset
Returns:
Nothing

SR Serial Number of the device
Returns: (16 char hex string)
SR:xxxxxxxxxxxxxxxx

1.2 Sensors

MA Combined sensor report
Returns:
MS_OK:value:value:value:...

1	Ambient temperature in °C	n.n
2	Relative Humidity %	n
3	Dew Point in °C	n.n
4	Absolute (Station) Pressure (hPa) [300-1250 hPa]	n.n
5	Relative (Sea Level) Pressure (hPa) [300-1250 hPa]	n.n
6	Barometric Altitude (m) When GPS fix is 0, altitude is barometric altitude When GPS fix is 1, altitude is real GPS altitude	n.n
7	Sky temperature in °C	n.n
8	Infrared sensor temperature in °C	n.n
9	Battery usage - ignore 0 is battery, 1 is USB cable (As the device is on USB power it always reports 1)	b
10	Battery voltage (in volts) - ignore (e.g 4.60) As the device is on USB power it reports USB channel voltage.	n.nn



SQ:1 Initiates a Sky Quality Sensor Measurement
Returns: (string)
SQ:MSR

SQ Reports last Sky Quality measurement values
Returns:
SQ:value:value...

1	MPSAS (mag/arcsec ²)	n.n
2	Naked Eye Magnitude limit (NELM in mags)	n.n
3	Full spectrum raw value	n
4	Visual spectrum raw value	n
5	Infrared spectrum raw value	n

BR Reset Bosch BME Sensor
Returns:
Nothing

CI Cloud Index Report
Returns:
CI:value:value...

1	Temperature Difference [ambient – sky] in °C	n.n
2	Cloud Index % [the higher the index, the more the clouds in the sky]	n
3	Sky temperature in °C	n.n
4	Ambient temperature in °C	n.n
5	Infrared emissivity calculation value in double format [value from 0.00 to 1.00] The default configured value is 1.00, Human Body is 0.98 The setting is saved in the sensor's memory A device restart is recommended in case of wrong values from the sensor.	n.n



1.3 GPS

GP GPS Information
Returns:
GP:value:value:value:...

1	GPS fix status 0 = no fix 3 = 3d fix	n
2	GPS time (in UNIX time epoch)	n
3	Timezone offset (should include daylight savings)	n
4	Latitude (in degrees)	n.n
5	Longitude (in degrees)	n.n
6	Satellite Number [how many satellites are fixed] [requires at least 4 satellites for a 3d fix position]	n
7	GPS speed (in kph)	n
8	Bearing (in degrees)	n (0-359)

GO GPS NMEA Output (RJ12 output at the side of Uranus device)
Returns: (boolean)
GO:n [0 is disabled, 1 is disabled]

1.4 Astronomical Calculations

MP Moon information
Returns:
MP:value:value:value

1	Moon Phase	n.n
2	Moon Type 1 is waxing, 2 is waning	n
3	Moon Visibility Percentage	n.n

AS Astro Sunrise and Sunset
Returns:
AS:value:value:value

1	Sunrise time astronomical sunrise in fractional minutes past midnight (in local time)	n.nn
2	Sunset time (in seconds after midnight) astronomical sunset in fractional minutes past midnight (in local time)	n.nn
3	Moon Phase	n



1.5 Config

CF Config Read
Returns:
CF:value:value..

1	Units (metric = 0 or imperial = 1)	b
2	NMEA RJ12 output (0 is off, 1 is on)	b
3	Keep OLED ON during polling (0 is off, 1 is on)	b
4	Reserved for future usage- ignore	b
5	Sleep after minutes	n
6	SQM calibration offset	n
7	Time zone offset (includes daylight savings hour)	n
8	Reserved for future usage- ignore	n
9	Last unique id	n
10	Dotnet time zone id	n

C1 Config – Imperial Units
This has an effect **only** to the device display, all serial units are metric
Returns: (boolean)
C1:n 0 is metric, 1 is imperial

C2 Config – Sleep after n minutes [0-30]
0 is disabled, any other value is in minutes
Returns: (int)
C2:n

C3 Config – UTC offset
Shows the configured UTC offset. Offset is required for GPS local time calculation and astronomical calculations.
Always include extra daylight-saving hour when you set this offset.
Returns:
C3:n 0 is metric, 1 is imperial

C4 Config – Sky Quality MPSAS Calibration offset
Returns:
C4:n 0 is metric, 1 is imperial

C5 Config – Time zone id
This is for the Unity Platform Dotnet time zone identification – ignore for any other usage
Returns:
C5:n 0 is metric, 1 is imperial



C6	Config – OLED On / Off Returns: C6:n 0 is metric, 1 is imperial
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CE:	Get Infrared Sensor Emissivity From 0-100. Returns: (integer) CE:n
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CE:n	Set Infrared Sensor Emissivity 100 for sky measurement (default) 98 for human skin measurement Returns: (integer) CE:n
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1.6 Memory Banks

MW	Memory Write Stores latest sensor value readout to the next available memory bank Returns: MW:n 0 is fail, 1 is success
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MN	Memory Number Reads how many bank records are used and what is the increased (last) record since the first operation of the Uranus device. Returns: (long) MN:n
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MZ	Memory Banks Erase This command practically erases all memory banks and starts from bank number 1 Returns: MZ:n 0 is fail, 1 is success
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MR Memory Banks Read
Returns:
MR:value:value:value:....

1	Record count of readout list (long)	n
2	Unique id (long)	n
3	Timezone	n
4	GPS fix	n
5	Unix_time (epoc unixtime)	n
6	Latitude (in decimal format)	n.n
7	Longitude (in decimal format)	n.n
8	Temperature °C	n.n
9	Humidity %	n
10	Altitude (m)	N
11	Pressure (station) in hPa	n.n
12	Sky quality (MPSAS) in mag/arcsec ²	n.n
13	Cloud index %	n

