SETTOP M1 MONITORING SOLUTION

SUPPORTS TRIMBLE 4D CONTROL AND

IST connect SETTOP

2018/09

SETTOP

WHAT IS THE SETTOP M1?

The Settop M1 is a device which allows you to control and manage data received from sensors when undertaking monitoring tasks (Total Stations, temperature sensors, tilt sensors, GPS/GNSS etc.). It can handle all types of communications systems and links via the use of Trimble's 4D analysis and monitoring software.

Why should you choose the Settop M1?

Thanks to the Settop M1, your project will be an unqualified success. A successful outcome in projects is reached when the data captured and the level of control of the sensors reached are both wholly reliable and you are able to react quickly to any challenges that may arise in the field and adapt flexibly to the specific needs of each installation.

MONITORING APPLICATIONS

STATIC MONITORING WITH TOTAL STATIONS (Slopes, buildings, structures)

This type of monitoring is used for controlling deformations and/or static elements such as slopes, buildings, structures etc.

DYNAMIC MONITORING WITH TOTAL STATIONS (Bridges, platforms)

This type of monitoring is used to control the positioning of mobile elements which have to be placed in a specific place as set out and detailed in the project plans. Bridge launching is a clear example of dynamic monitoring.

DYNAMIC AND STATIC MONITORING WITH GNSS (Blocks, structures)

This type of monitoring is used for controlling the placement of concrete blocks and for verifying displacement of structures. A good example of this kind of monitoring is the sinking of concrete caisson blocks in maritime works, or the close control of areas where there could possibly be structural movement.

MONITORING WITH GNSS AND TOTAL STATIONS

This kind of monitoring is based on the combination of various diverse positioning sensors such as Total Stations and/or GNSS with additional sensors that can supply complementary data and information for the topographical study (thermometers, inclinometers, electro-accelerometers etc.).

FEATURES

The Settop M1 allows you to control and manage different types of sensors, from monitoring work with Total Stations to GNSS data, temperature sensors, and slope, all via diverse communications ports like Wi-Fi, Bluetooth, Radio, Ethernet, and GSM.

This flexibility and diversity makes the Settop M1 the instrument of choice in monitoring applications. Its hardware has been specifically designed to make it the smallest and lightest totally configurable device on the market.

SYSTEM STABILITY

- ✓ Operating System Watchdog (Automatic control of the internal functioning of the system)
- ✓ Auto Power (Automated startup in case of loss of power)
- ✓ Complete management of data transfer (register of all measurements on an internal memory card)
- ✓ Linux OS (Less vulnerable to hackers)
- ✓ Automatic detection of sensors
- ✓ Low consumption (hibernation mode)

EASY TO USE

- ✓ Autonomous monitoring
- ✓ Settop IST Connect Service (forget about spiraling bills when paying for IP landline services and save money)
- ✓ Integrated Communications
- ✓ Remote management via Web UI
- ✓ Management of multiple sensors
- ✓ Multiple power modes

SPECIAL APPLICATIONS

- ✓ Customized projects
- ✓ Implementation of specific applications
- ✓ Flexibility in configuration

1

INTEGRATED COMMUNICATIONS

Multiple communications options: Wi-Fi, Bluetooth, Ethernet, GSM, Serial, Radio, USB …

2

EXTERNAL CONNECTION

Different possibilities for connecting to the Internet (Wi-Fi, Ethernet, GSM) and of direct access to and control of the sensors being used

3

WEB INTERFACE

Easy configuration via a UI web browser, which allows access to the configuration of the equipment and the sensors linked to it

4

CONTROL OF SENSORS

Autodetection of sensors and remote management of data and configurations

5

SETTOP CONNECT

Integration of USB drivers for direct control and management of connected sensors (Trimble S Series Finelock, echosounders, slope and temperature sensors)

6

TOTAL DATA TRANSFER MANAGEMENT

Programmable automatic management of data transfer from sensors, of raw data, and post-processing

7

DATA LOGGING

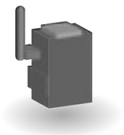
Internal memory storage of data from sensors (1GB upgradable to 9 GB)

8

CUSTOMIZED PROJECTS

Possibility of implementing internal applications for specific projects

SYSTEM COMPARISON

	SETTOP M1	INDUSTRIAL CELLULAR MODEM
		
• GPRS / 3.5G CONNECTION / RS232 / ETHERNET	✓	✓
• BLUETOOTH / WI-FI / USB HOST / INTERNAL RADIO / INTERNAL MEMORY	✓	✗
• IP67 (EXTENDED OPERATIONAL TEMPERATURE RANGE)	✓	✗
• WEB USER INTERFACE	✓	✗
• REMOTE TOTAL STATION CONTROL	✓	✗
• REMOTE RESETTING (CONTROL OF POWER SOURCE)	✓	✗
• OPERATING SYSTEM WATCHDOG	✓	✗
• INTERNAL MONITORING DATA STORAGE	✓	✗
• AUTOMATIC SENSOR DETECTION	✓	✗
• HIBERNATION MODE PROGRAMMING	✓	✗
• GNSS L1/L2/L5 INTERNAL GLONASS RTK *	✓	✗
• SPECIFIC DESIGN FOR MONITORING PROJECTS	✓	✗
• CUSTOMIZED APPLICATIONS	✓	✗
• REAL-TIME IMAGE	✓	✗

* Optional

SYSTEM ACCESSORIES

Airtight case

For incorporating additional sensors (sensors, power supplies, solar controllers etc.)

Solar panels

Scalable solar panels for autonomous powering of the whole system

Video camera

Transmission of images in real time via Settop M1

Temperature sensor

Temperature probe for Settop M1

200Ah Settop battery

12V 200Ah gel battery for Settop M1, Trimble S Series Finelock Total Station and additional devices.

Power system

12V 5Ah power source for Settop M1, Trimble S Series Finelock Total Station and additional devices.

Settop OctoHub

Connection multiplier to various different sensors and devices via Settop M1

EXAMPLE OF INSTALLATION

1

INSTALLATION PROCESS

The points to be monitored, the physical installation of the sensors, the power supply, cameras, and communications are all defined

2

TRIMBLE 4D CONTROL DATA RECEIVER MODULE

ADVANCED

Project requirements

- Monitor the affected area for 24 hours
- Send alarms by email
- Monitor with GNSS the position of the Total Station
- Install a video camera to visualize the affected area
- Install an autonomous power source
- Send data via mobile phone
- Capture video images in real time

Difficulties of the project

- Area difficult to access so a stable, fast, and reliable installation is needed
- Power source must be autonomous, using solar panels and external batteries

Hardware Used

- Trimble S series with Finelock
- Settop M1
- Temperature Sensor
- IP Video Camera
- Solar Panels
- Settop 200Ah Battery

Software Used

- Trimble 4D Control
- Settop IST Connect Service

Positioning: Placement of reference points for measurement and siting of instruments

Connection of Settop M1 to Trimble S Series Finelock: Just one cable is needed for power supply and communication between the Settop M1 and the Total Station

Solar panels + battery + camera + thermometer: All types of sensors can be connected to each other in order to get an optimal analysis of the project

Data collection: Measurement of the control points with the use of the learning mode module in advanced mode, or with the TA-Site Setup App in standard mode

Configuration of the Settop M1 device on Trimble 4D Control: Multiple reception options for data measured on an external software

Control of the Trimble S Series from Settop M1: Visualization in real time of the measuring process from a webpage without needing to install any additional software

WORKFLOW

2

TRIMBLE 4D CONTROL DATA RECEIVER MODULE

ADVANCED

3a

SET-UP

Measurement of observable points via Trimble Access Site Setup and import of JXL files on Settop M1 from a webpage

3b

SET-UP

Learning mode: Project creation and measurement of observable points directly from a webpage

4

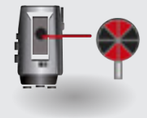
MONITORING CONFIGURATION

Planning of measuring cycles on Settop M1 via the net. Settop M1 directly controls the Total Station. Configuration of data transfer to Trimble 4D via TCP/IP Client, Settop IST Connect, NTRIP Client, or file based

5

START MEASURING

Start-up of measuring cycles from Settop M1. Automatic start-up and dispatch of observations of measuring cycles to the Trimble 4D Control external software



NEW OPTION VIDEO STREAMING

ADDITIONAL MODULES

EXTERNAL VIDEO CAMERA

INTERNAL VIDEO CAMERA

CONNECTIONS RS232, RJ45

TEMPERATURE SENSOR

TRIMBLE S SERIES TOTAL STATION

API FOR DEVELOPERS

USB PORT

POWER OUTPUT CONTROL

ADVANTAGES

	ADVANCED
NO STATIC IP NEEDED	✓
INTELLIGENT SETTOP CONNECT (SETTOP IST CONNECT)	✓
GNSS RAW DATA	✓
WATCHDOG	✓
ADMINISTRATION OF ENERGY	✓
AUTONOMOUS MONITORING OF CYCLES FROM SETTOP M1	✓
LOW CONSUMPTION OF DATA (ONLY SENDS RESULTS OF MEASUREMENTS)	✓
MEASUREMENT DATA MEMORIZED ON INTERNAL BACKUP	✓
HIBERNATION PROGRAM FOR ULTRA-LOW CONSUMPTION	✓
RECOVERY OF UNINTERRUPTED DATA IN CASE OF INTERNET CONNECTION LOSS	✓

PRODUCT SPECIFICATIONS

- Model **SETTOP M1**
- Model **SETTOP M1-15** (no GNSS, no Radio Module)

GPS/GNSS

- 220 Channels :
  - GPS: Simultaneous L1 C/A, L2E,L2C, L5
  - GLONASS: Simultaneous L1 C/A, L1 P, L2 C/A (GLONASS M Only), L2 P
  - SBAS: Simultaneous L1 C/A, L5
  - Galileo: Simultaneous L1 BOC, E5A, E5B, E5AltBOC[1]
  - BeiDou: B1, B2
  - QZSS: L1 C/A, L1 SAIF, L2C, L5
- Advanced Trimble Maxwell 6 Custom Survey GNSS Technology
- High precision multiple correlator for GNSS pseudorange
- Unfiltered, unsmoothed pseudorange measurements data for low noise, low multipath error, low time domain correlation and highdynamic response
- Very low noise GNSS carrier phase measurements with <1mm precision in a 1 Hz bandwidth
- Signal-to-Noise ratios reported in dB-Hz
- Proven Trimble low elevation tracking technology
- Initialization time: typically <10 seconds
- Initialization reliability: > 99.9 %
- 1 Hz, 2 Hz, 5 Hz, 10 Hz, 20 & 50 Hz positioning outputs (depends on installed option)
- Reference outputs: CMR, CMR+, RTCM 2.1, 2.2, 2.3, 3.0, 3.1
- Navigation outputs ASCII: NMEA-0183 GSV, AVR, RMC, HDT, VGK, VHD, ROT, GGK, GGA, GSA, ZDA, VTG, GST, PJT, PJK, BPQ, GLL, GRS, GBS

POSITIONING SPECIFICATIONS

Mode	Accuracy	Latency	Max. Rate
Single Baseline RTK (<30Km)	8 mm + 1ppm H. 15 mm + 1ppm V.	<20 ms	50 Hz
DGPS	0.25 m + 1ppm H. 0.50 m + 1ppm V.	<20 ms	50 Hz
SBAS6	< 5m 3D	<20 ms	50 Hz

COMMUNICATION PORTS

- 1 RS232/USB Host Event port, PPS Power In/Out
- 2 RS232/USB OTG port Power In/Out
- 1 TNC connector for GPS antenna
- 1 TNC connector for rodio antenna
- 1 FME connector for GSM antenna
- 1 Slot SIM card
- 1 Slot MicroSD card

ELECTRICAL AND OPERATING REQUIREMENTS

- External Power: 12V – 30V DC.
- Power:
  - All components activated at full power: 12.8W
  - GSM reception mode: 5.6W
  - GSM mode & radio off: 3.6W
- Operating temperature -40º to 75º C
- Storage temperature -55º to 85º C
- Random vibe MIL-STD 810F (7.7g RMS)
- Vibe SAEJ1211 (4g)
- Bump/Shock IEC 68-2-27 (30g)
- IP67

CONNECTIONS

Radio Module

- Bandwidth

403-470 Mhz

- Frequency Control
- Synthesized 12.5 kHz resolution setting
- Frequency Stability ± 1 ppm
- 12.5/25 kHz Channel Spacing (detectable)
- RF Transmitter Output
- 0.0 w (RX-only) y 0.1-2 w (Programmable)
- Sensibility:

-110 dBm VER = 1 x 10-5

- Adjacent Channel Sensitivity:

> 55 dB

- Certification type
- All models are accepted and certified to operate in the U.S., Australia and Canada FCC, IC, EU, NZ, Australia ETS300-113-2

GSM HSDPA modem (3,5G)

- Five-Bands UMTS/HSPA+ (WCDMA/FDD) (800/850/900/1900/2100 MHz)
- Quad-Band GSM (850/900/1800/1900 MHz)
- HSDPA Cat.10 / HSUPA Cat.6 data rates
- DL: max. 14.4 Mbps, UL: max. 5.76 Mbps
- EDGE Class 12 data rates DL: max. 237 kbps, UL: max. 237 kbps
- GPRS Class 12 data rates
- DL: max. 85.6 kbps, UL: max. 85.6 kbps

WiFi

IEEE 802.11 b/g/n Access Point Mode

Bluetooth 4.1 + BLE

INTERNAL MEMORY

- 1GByte + 1GByte Nand flash
- Expantion Micro SD port

SIZE AND WEIGHT

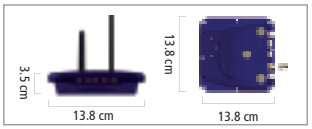
- Frontal Panel: 10 LED status indicators
- Size: 138 x 138 x 35 mm
- Weight: 600 g.

ACCESORIES AND OPTIONS

- Power cable 2 meters
- Clip for tripod
- External power font
- GSM Antenna
- Radio Antenna
- GPS Coaxial cable
- USB cable
- Serial cable
- Optional: USB to RJ45 adapter

1. Developed under a License of the European Union and the European Space Agency.

Specifications may change without notice.



SETTOPSURVEY, S.L.
Bofarull 14, 08027 Barcelona (Spain)
Phone: (+34) 93 700 44 66
www.settopsurvey.com info@settopsurvey.com

SETTOP