

Multi61MK2 data logging system

The **Multi61MK2** system for Geonics EM61-MK2 array consists of two programs: field data acquisition component (ML61MK2) and the Windows (98/2K/XP) based data processing software (Multi61MK2).

Multi61MK2 will increase productivity significantly in areas where multiple EM61-MK2 systems can be configured as a single array. The ML61MK2 data acquisition software can collect readings from up to 5 EM61-MK2 systems and one GPS receiver into one file simultaneously. The program can process, display and record up to 30 readings per second when used with the Allegro field computer.

The program is designed for Allegro Field PC as well as for Pro4000 field computer screen size.



Two units array (photo courtesy of USA Environmental, Inc.)



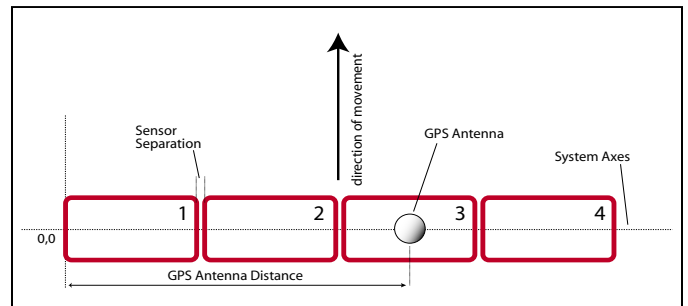
Allegro Field PC



Pro4000 Field Computer

Multi61MK2 software works with virtually any GPS receiver by supporting NMEA messages: GGA, POS, GLL, LLQ, LLK, GGK, and Leica Robotics Total Station TPS1100, and collects all EM61-MK2 units and GPS data into one file simultaneously, while providing a graphical and numerical view of the collected EM61-MK2 data, and GPS quality parameters and coordinates.

The accompanying Windows based data processing program Multi61MK2 is designed to process data collected under control of the ML61MK2. The program positions each EM61-MK2 sensor based on the user specified array geometry (see Figure below), GPS recorded positions, and instant heading of the array. Positioning of sensors for grid based surveys is provided as well.



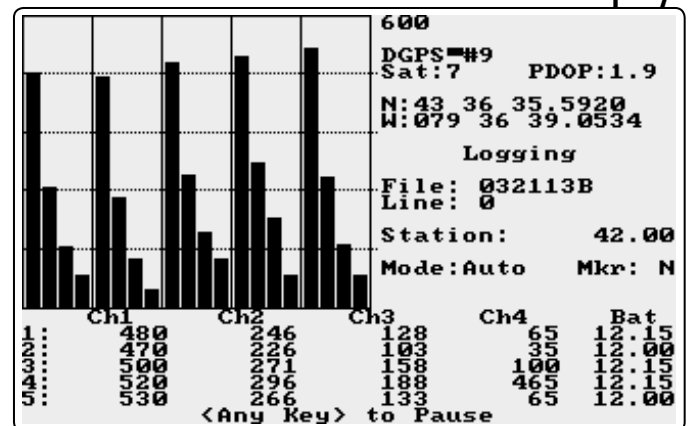
Specifying array geometry for four EM61-MK2 units and GPS antenna

Even though a large amount of records and parameters is displayed on a relatively small field computer screen, a quick glance at the accompanying data is all it takes to have a clear read of the information.

Features provided by the display:

- easy to read EM61-MK2 four channel equalizer bar display for all employed instruments
- concurrently displays EM61-MK2 readings in numerical format for each instrument
- channels are updated at a rate of up to 30 Hz
- continuous monitoring of EM61-MK2 battery level for each instrument
- all survey parameters and settings
- number of GPS satellites, PDOP, and position quality indicator, latitude and longitude coordinate display

ML61MK2 Display



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ML61MK2 Features (data acquisition program)

Display functions:

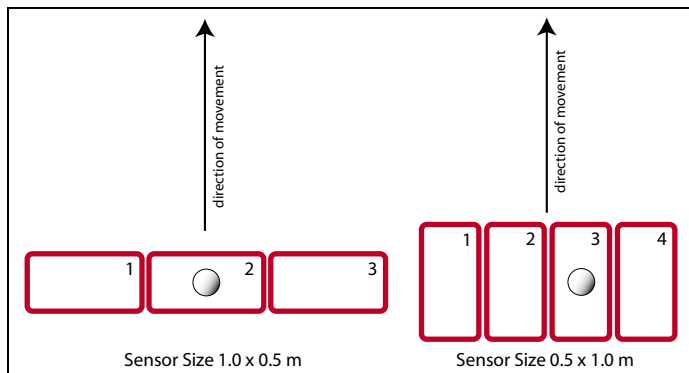
- EM61-MK2 Channels 1, 2, 3, and 4 or T are displayed with moving graphic bars and in numeric form for each instrument in the array
- EM61-MK2 mode and instrument battery level for each instrument also monitored
- Current GPS antenna position in Latitude/Longitude, type of differential corrections (DGPS and various modes of RTK), PDOP or other equivalent parameter (depends on NMEA used), and number of satellites
- Survey parameters and settings
- Current number of stations and GPS positions logged in the data file

Survey parameters:

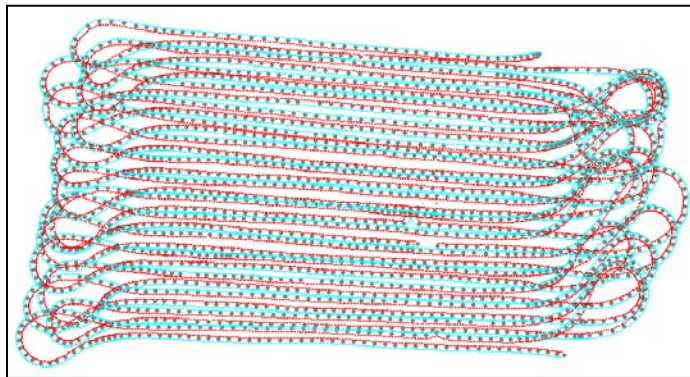
- Survey modes supported (Auto, Wheel, or Manual)
- Maximum rate of data acquisition is 30 Hz (assuming 1 Hz GPS output) for total number of units in array
- New Line, New Station, Comment entry
- Change of scale of equalizer bar display at any time
- Entry of array geometry: number of units, sensors size, separation between sensors, position of GPS antenna

GPS functions:

- Configuration of logger serial port to accommodate any GPS settings
- GPS output monitoring
- Support for NMEA messages: GGA, GGA/GSA, GLL, POS, LLQ, LLK, GSK, and stream from Leica Robotics Total Station TPS1100
- Offset for GPS antenna in any direction along array axis



Selection of 1 x 0.5 sensor size and GPS antenna

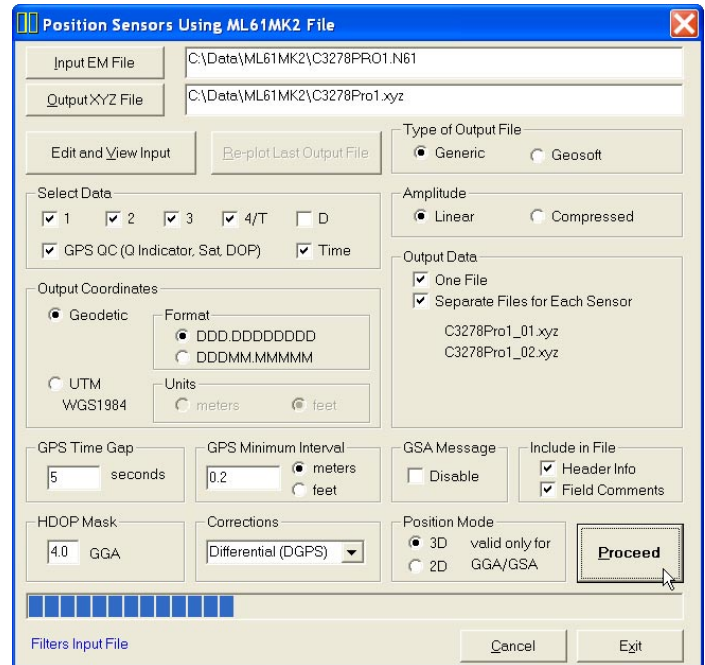


Layout of stations after data processing for two units array; large dots - GPS positions, red dots - EM61-MK2 #1, blue dots - EM61-MK2 #2

Multi61MK2 Features (data processing program)

Position sensors based on standalone ML61MK2 file:

- Apply GPS antenna offset along the array axis (as entered in the field with an option of correcting this parameter during data processing)
- Output to one and/or separate XYZ files for each instrument
- Filters the quality of positioned data based on GPS parameters as PDOP (or equivalent) and the degree of differential corrections
- Further enhancement of the EM61-MK2 readings position is obtained by specifying the GPS Time Gap and GPS Minimum Interval.
- Choice of coordinates in generated XYZ file: Geodetic coordinates (Latitude/Longitude in degrees) or in UTM coordinates (meters, feet or US Survey Feet, WGS1984 datum)



Position all EM61-MK2 readings and create XYZ file based on external GPS file (*This function is used when real time GPS differential corrections are not available, or when further post processing of GPS data may improve positioning accuracy*)

- Apply GPS antenna offset in any direction (as entered in the field with option of correcting this parameter during data processing)
- Further enhancement of the EM61-MK2 readings position is obtained by specifying the GPS Time Gap and GPS Minimum Interval

Position EM61-MK2 by merging standalone GPS file (*This function can be used only as an emergency when direct interface of GPS was not possible during field work*)

Miscellaneous:

- Field QC parameters (Quality Indicator, number of Satellites and PDOP) are written into the generated XYZ file
- Convert ML61MK2 files to Geonics DAT61MK2 format
- Convert ML61MK2 files to general format ASCII file
- Convert GXY file to ASCII file containing positions
- Retrieve and position field comments from ML61MK2 file
- Apply System Time Constant delay (lag) in generated XYZ file
- Transfer data file from field computer to PC
- View TrackMaker61MK2 file contents