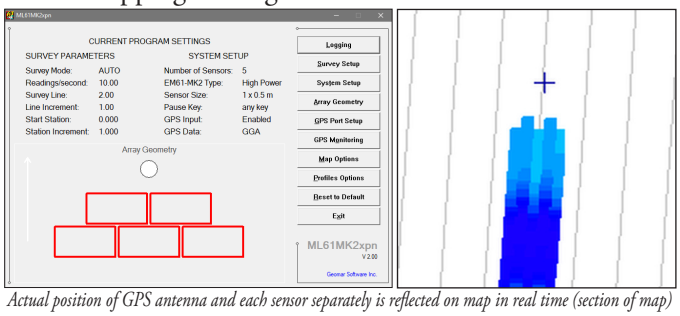
ML61MK2*xpn* data logging system

New Version 2

The **ML61MK2xpn** system for Geonics EM61-MK2 array (one or two row configurations) consists of two programs: the field data acquisition component ML61MK2xpn and the data processing software Multi61MK2. Features new in V2.00 are listed on the next page.

ML61MK2xpn will increase productivity significantly in areas where multiple EM61-MK2 systems can be configured as a single array. The ML61MK2xpn can collect readings from up to 9 EM61-MK2 systems and one GPS receiver into one file simultaneously. The software will significantly speed up the time it takes to complete a survey by providing uniformly spaced lines with real time navigation and quality control. Thereby preventing skipped areas and overlapping coverage.



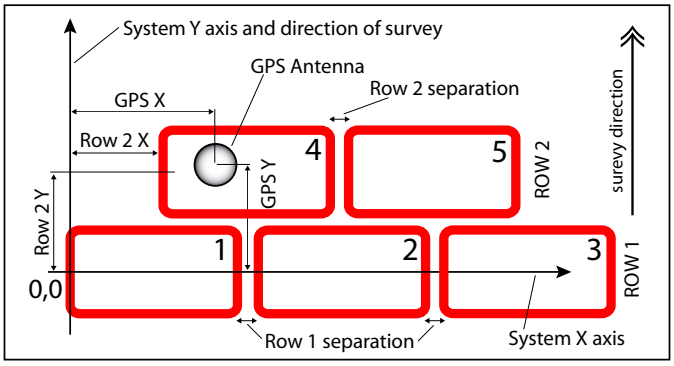
Actual position of GPS antenna and each sensor separately is reflected on map in real time (section of map)

All types and models of EM61-MK2 are supported.

ML61MK2xpn software works with virtually any GPS receiver by supporting several GPS NMEA messages, and Trimble and Leica Robotics Total Station, and features real time mapping and navigation by displaying logged positions as colour grid image or scaled array swath, while providing simultaneous graphical and numerical view of the collected EM data, and GPS parameters and coordinates.

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

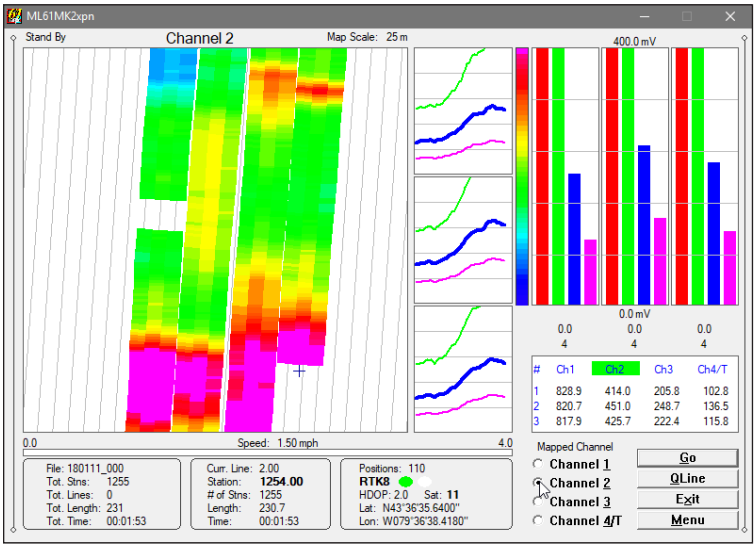
The accompanying Windows based data processing program Multi61MK2 is designed to process data collected under control of the ML61MK2xpn. The program positions each EM61-MK2 sensor based on the user specified array geometry (see Figure below), GPS recorded positions, instant heading of the array, and the user specified filters.



Specifying two row array geometry for five EM61-MK2 units and GPS antenna

Main features of the ML61MK2xpn:

- easy to read map with user specified colour scale for selected EM61-MK2 channel amplitude and size of current position indicator
- adjustable map size, grid interval or guide lines interval and tilt, and cursor band
- easy to read EM61-MK2 4 channel equalizer bar, profile and numeric display for all EM units
- append data file option
- continuous monitoring, visual and audio warnings for each instrument and GPS cable connections
- monitoring each EM61-MK2 battery level
- extensive survey parameters info
- number of GPS satellites, PDOP, and position quality indicator monitoring
- user specified GPS warning mask
- latitude/longitude or UTM coordinates display
- actual speed of the system
- one key toggle for extended length profile mode



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ML61MK2xpn Features (data acquisition program)

New in Version 2.00 and later:

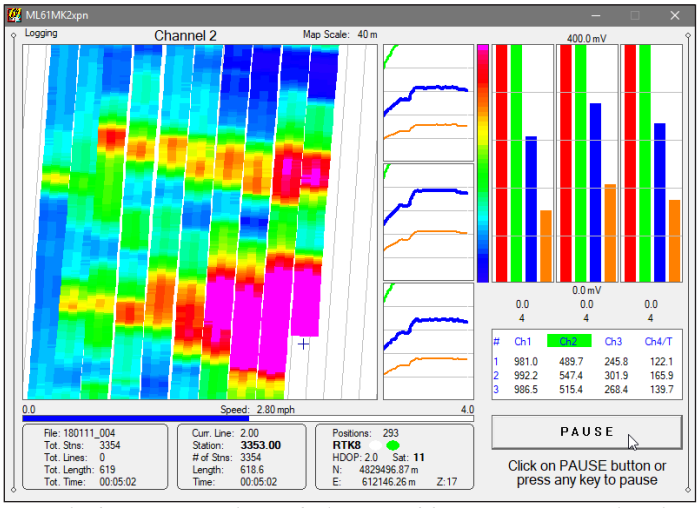
- Real time colour imaging of recorded amplitudes for selected EM61-MK2 channel at user specified range of colour scale
- Completely new graphic engine that makes program smoother during screen scrolls and faster map re-draw during re-scaling. Also, faster graphic operation will provide more uniform data and the maximum update rate is limited by hardware only
- Append data files function
- Guiding lines with user specified separation and tilt angle
- Grid setup (alternative to Guide Lines) is not limited to 20 lines
- New Audio functions: Tik-Tak during indicating data recording, Alarm Ring for any hardware (EM61-MK2 or GPS) disconnection, Alarm (more gentle than Alarm Ring) for GPS Warning Mask setting
- Improved interface for Windows 10/7 based tablets are employed. Most fonts and dialogs are enlarged to make easier touch screen operation, and dialogs are positioned for easy soft keyboard entry
- Several dialogs were re-designed to provide easier parameters entry
- Increased max. of positions in one data file, (no limit for EM data)

Main display functions:

- Real time color mapping and navigation, current location indicator shown as cursor, logged positions displayed as color image - color corresponds to amplitude of each sensor (in mapping mode)
- User specified map scale, guide (or grid) lines intervals and tilt angle, and cursor band; screen scrolls once the cursor band limit is reached
- All EM61-MK2 Channels are displayed as moving graphic bars, profiles (extended), in numeric form for each instrument in the array
- EM61-MK2 mode, instrument battery level or TX current
- Support for High Power, N.C.C. , and A.C.C. type of EM61-MK2
- Audio and Visual Alarms and Warnings (for disconnections, etc.)
- GPS antenna position in Lat/Lon or UTM m/ft, corrections (DGPS, various RTK), PDOP or equivalent, and number of satellites
- Display of survey parameters and settings, number of logged stations
- Monitoring of GPS signal and user specified GPS Warning Mask
- Continuous display of the actual speed of the system
- user specified of map size, amplitude scale, color mapping channel

GPS functions:

- Configuration of logger serial port to accommodate any GPS settings
- GPS output monitoring, GPS warning mask, connection alarm
- Support for NMEA messages: GGA, GGA/GSA, GLL, POS, LLQ, LLK, GGK, and Trimble and Leica Robotics Total Station stream
- Offsets for GPS antenna in any direction

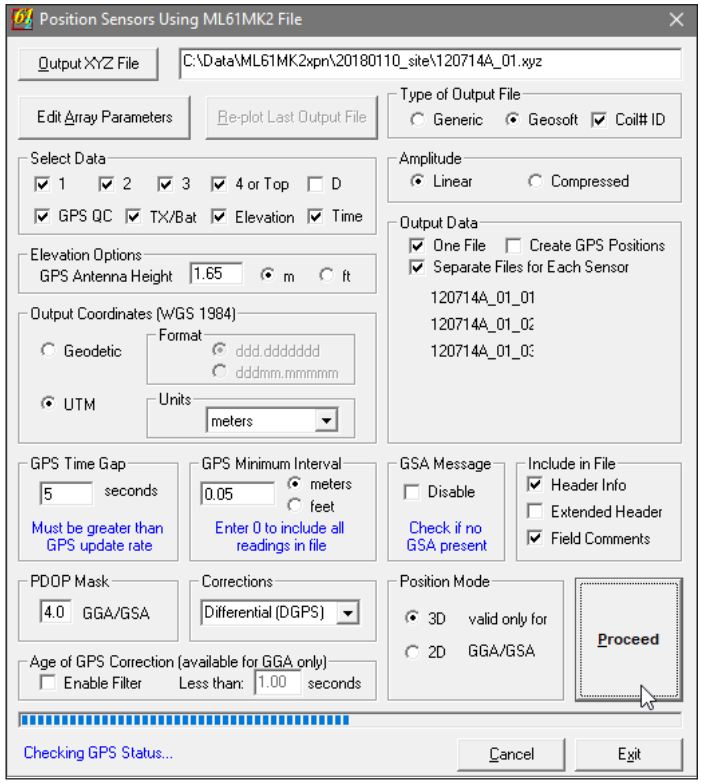


Example of ML61MK2xpn logging display: array of three EM61-MK2 consoles, colour image is displayed for Channel 2 (see label at the top of the map a well as green highlight in numeric display window), actual position of GPS antenna is shown by cursor

Multi61MK2 Features (data processing program)

Position sensors based on standalone ML61MK2xpn file:

- Apply GPS antenna offset at any direction (as entered in the field with an option of correcting these parameters 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), degree of differential corrections, and user specified GPS Time Gap and GPS Minimum Interval
- Support for Elevation (depends on employed NMEA message)
- 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

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:

- Full transparent compatibility with older ML61MK2 data files
- Edit Survey Geometry dialog for several survey parameters and array
- Field QC parameters (Quality Indicator, number of Satellites and PDOP) are written into the generated XYZ file
- Convert ML61MK2xpn files to Geonics DAT61MK2 format
- Convert ML61MK2xpn 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
- View, edit, and save modified data files

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