

APEX

MAXMIN I+9 EM SYSTEM

I+ designation, with improved transmitter efficiency and increased dipole moments, 1998

- Designed for groundwater and mineral exploration, and for geoenvironmental applications, continuing and expanding the concepts of the earlier and highly popular MaxMin models.
- Frequency span is extended to nine octavely spaced frequencies from 110 to 28160 Hz, with 11 coil separations from 12.5 to 400 or 10 to 320 metres. These and other developments result in greater performance, more applications and enhanced interpretation.
- Advanced spheric and powerline interference rejection is still further improved, resulting in faster and more accurate surveys, particularly at the larger coil separations.
- MaxMin Computer or MMC, which is described in a separate data sheet, is offered for digital data processing, display, storage and transfer. The MMC displays and stores the in-phase and quadrature readings, their standard deviations, and the corresponding apparent ground conductivity values. Rough terrain surveys are also simplified with the MMC.
- MaxMin Pro data interpretation and presentation software program is available for layered earth parametric soundings and discrete conductor surveys done with MaxMin.



TRANSMITTER

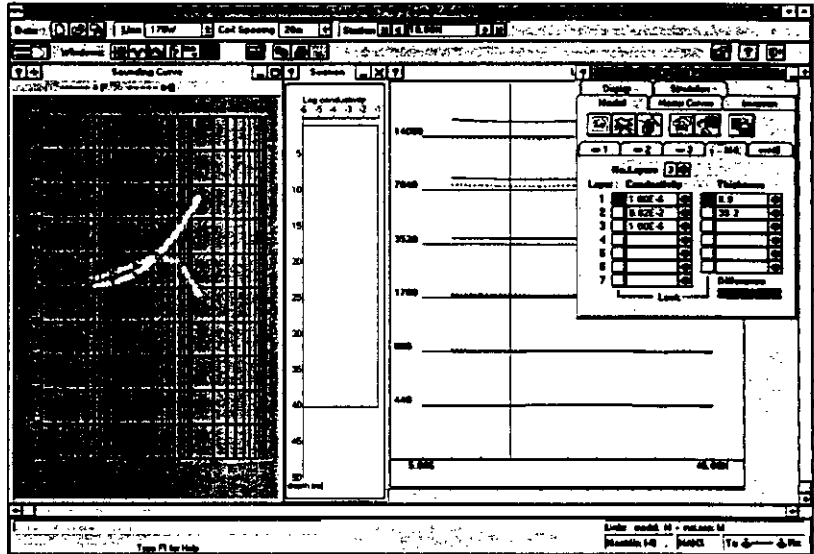


RECEIVER + MMC



LAYERED EARTH INTERPRETATION:

- ◆ Semi-automated curve matching with half-space, 2 and 3 layer models.
- ◆ Forward modeling and Inversion.
- ◆ Up to 7 layers models.
- ◆ Parameter locking or constrained range for inversion.
- ◆ Complete inversion statistics output.
- ◆ Parametric (frequency), geometric (spacing), or mixed mode sounding.
- ◆ Data masking: can reject bad data points or use only quadrature.
- ◆ Optional normalization to low frequency in-phase to correct for geometrical errors.



ADDITIONAL MAXMIN PRO FEATURES:

SIMPLIFIED DATA INPUT:

- ◆ Automatically extracts data and survey information from the .MMD file.
- ◆ Graphical entry of plates.

SUPPORT FOR ALL OF THE MAXMIN MAXIMUM COUPLED MODES.

VERSATILE DISPLAY AND DATA VIEWS:

- ◆ In-phase and in-quadrature vs. frequency sounding.
- ◆ Phasor (Argand) diagram.
- ◆ Survey map (zoomable).
- ◆ Stacked line profile.
- ◆ Vertical conductivity section.
- ◆ Inversion statistics.
- ◆ Persistent display shows several models at once.
- ◆ User configurable window placement.

EASY DATA POINT SELECTION:

- ◆ Tape deck style line and station selectors or
- ◆ Selection by mouse click on survey map.

MODEL DATA BASE:

- ◆ Automatic creation of a model data base.
- ◆ Allows for interpretation in multiple sessions as previous results are saved.

VERSATILE OUTPUT CAPABILITIES:

- ◆ File output, including Geosoft .XYZ format.
- ◆ Printed report.
- ◆ Windows® clipboard for transfer to other applications.

ON-LINE DOCUMENTATION:

- ◆ Full featured Windows® Help hypertext documentation.

HARDWARE PROTECTION:

- ◆ Uses a «dongle» rather than software protection.

System requirements: Any x86 computer running Windows® 3.1 or later, Windows 95®, or Windows NT® 3.5 or later with 2MB of disk space. A mouse or other pointing device is essential. While not absolutely essential, a color monitor of at least SVGA resolution is highly recommended. VGA is the minimum supported resolution. Floating point support is very highly recommended. Printer port is essential for printing and for connecting the hardware protection key.

A DEMONSTRATION PROGRAM IS AVAILABLE ON REQUEST

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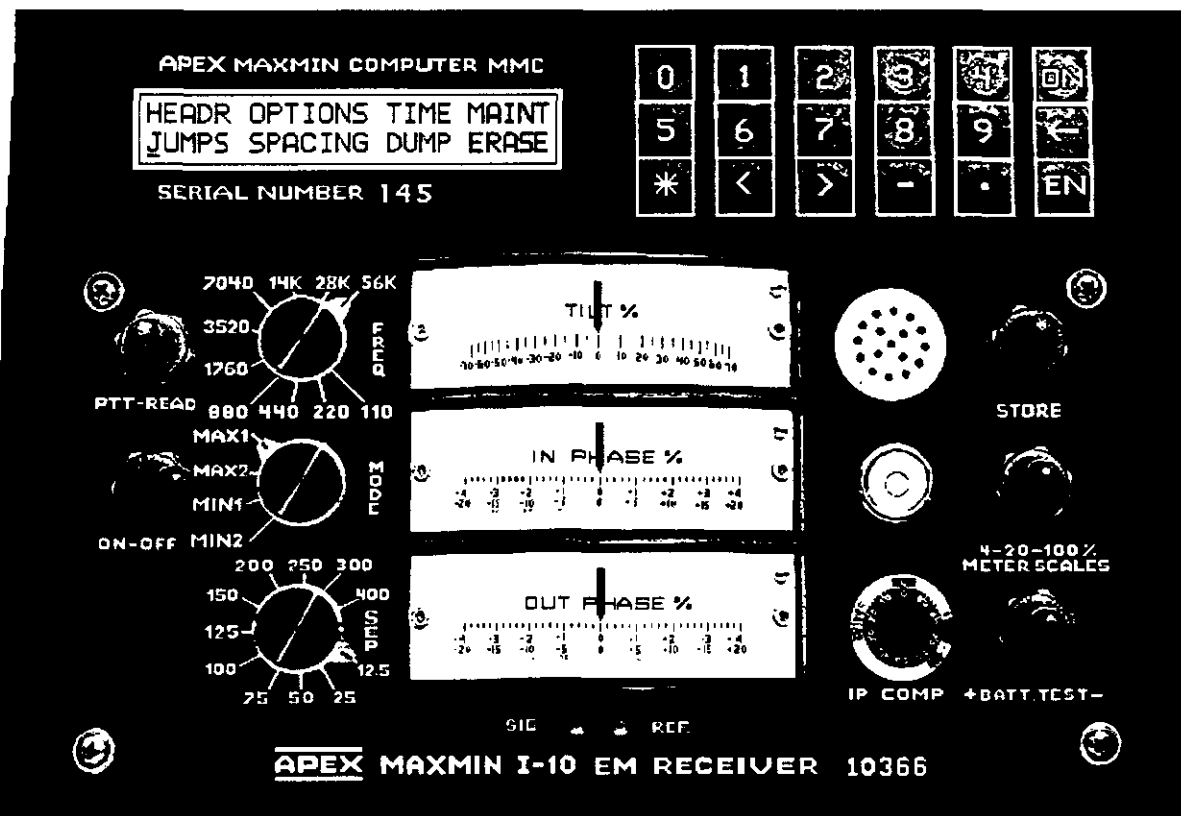
Telephone: 1 905 - 852 5875 Fax: 1 905 - 852 9688

P. O. Box 818, Uxbridge, Ontario, Canada L9P 1N2

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MAXMIN COMPUTER MMC

- The MMC interfaces with MaxMin EM System receivers for digital data processing, display, storage and transfer, enhancing survey productivity and data accuracy.
- Digital display and logging of in-phase (real) and quadrature (imaginary) readings with standard deviations, the corresponding apparent ground conductivity values, line, station, terrain slope and coil tilt information.
- Easy fingertip operation by read and store switches on MaxMin receiver front panel, with digital averaging for improved signal to noise ratio.
- Rough terrain surveys are simplified with the use of built-in tilt meter, slope entry and computed coil orientation and separation information.
- Data transfer, formatting, correcting and viewing programs are supplied for personal computers. Program for computing multi-frequency best-fit apparent conductivities and fit errors is provided.
- MaxMin Pro data interpretation and presentation software program is available for multi-layer parametric or geometric soundings and for discrete conductor surveys done with MaxMin EM and MMC.



MMC INSTALLED WITH MAXMIN I-10 RECEIVER IN THE LEATHER CARRYING CASE

MAXMIN COMPUTER MMC SPECIFICATIONS:

OPERATING SYSTEM:	Menu driven user-friendly hierarchial operating system, interfacing with MaxMin EM System receiver and with personal computers.
DISPLAY:	Extended temperature Liquid Crystal Display, with two lines of 24 alphanumeric characters each.
KEYBOARD:	18 tactile pushbutton keys
BEEPER:	To provide audible operator guidance and to speed up operations, especially in very cold weather.
CLOCK CALENDAR:	Date and Time (year, month, day, hour and minute).
COIL TILT:	Tilt display, with built in tilt sensor and measurement, with $0\pm 99\%$ topographic grade range and with 1% resolution.
IN-PHASE & QUADRATURE:	$0\pm 199.9\%$ autoranging programmable gain system with 0.1% resolution for displayed data and 0.01% resolution for stored data.
APPARENT CONDUCTIVITY:	0.1 to 3276 milliSiemens [millimho] per metre available conductivity range, with conductivity arrived at using the quadrature, in-phase, frequency and coil separation data.
PROCESSOR:	16 bit low power CMOS CPU and bus at 6 MHz clock rate.
MEMORY:	ROM: 16 Kb, expandable to 64 Kb. RAM: 256 Kb, static CMOS.
PHYSICAL SIZE:	24.2 x 17.3 x 4.3 cm, to fit inside the MaxMin receiver leather case notebook pocket.
CARRYING WEIGHT:	1.0 Kilogram.
BATTERIES:	Two 9V-0.6Ah alkaline batteries. Battery life 28 hours continuous duty, less in cold weather. Optional 1.2 Ah lithium batteries recommended for very cold temperature operation. One lithium 3 Volt memory back-up battery, type 2032.
CONNECTIONS:	19 pin bayonet connector receptacle to connect to MaxMin receiver with the supplied tubular aluminum connectors. One each of DB25S and DB9S data transfer cords supplied for downloading data to personal computer serial ports.
TEMPERATURE RANGE:	Minus 30 to plus 60 degrees Celsius. Temperature sensing, measurement and display built-in.

Specifications are subject to changes without prior notification.

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Airport: Toronto International



LAYERED EARTH INTERPRETATION.



THIN PLATE INTERPRETATION.



ACCEPTS APEX .MMD FILES, COMPATIBLE WITH MAXMIN COMPUTER.



USER-FRIENDLY WINDOWS® BASED OPERATOR INTERFACE.



CLIPBOARD SUPPORT FOR DATA TRANSFER TO OTHER PROGRAMS.

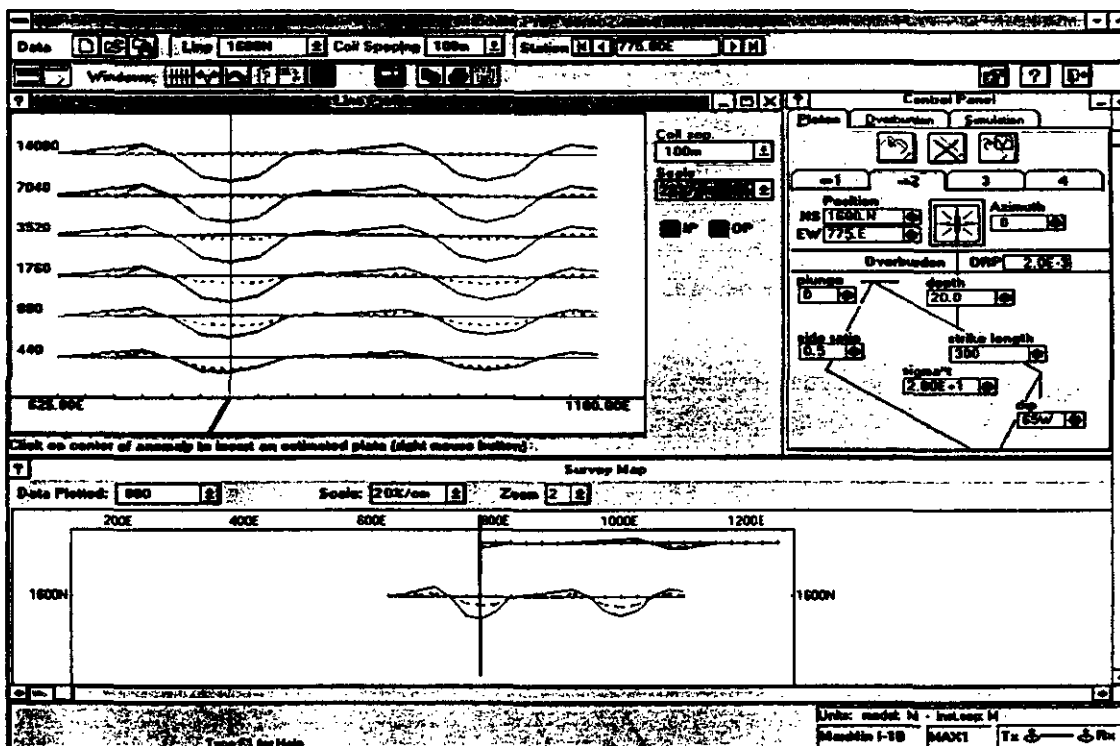


ON-LINE DOCUMENTATION.



PLATE INTERPRETATION:

- ◆ Computing engine derived and improved from classical U of Toronto PLATE program.
- ◆ Up to 4 plates.
- ◆ Graphical insertion of plates.
- ◆ Plates positioned in survey grid coordinates.
- ◆ Automated curve matching for quick preliminary anomaly interpretation.
- ◆ Corrects for overburden conductivity.
- ◆ Up to 4 overburden zones.
- ◆ Graphical entry of overburden zones.



MAXMIN I+9 ELECTROMAGNETIC SYSTEM SPECIFICATIONS:

FREQUENCIES: 110, 220, 440, 880, 1760, 3520, 7040, 14080 and 28160 Hz.

COIL SEPARATIONS: SET No. 1: 12.5, 25, 50, 75, 100, 125, 150, 200, 250, 300 and 400 metres (the standard set).
 SET No. 2: 10, 20, 40, 60, 80, 100, 120, 160, 200, 240 and 320 metres (selected with grid switch inside the receiver).
 SET No. 3: 50, 100, 200, 300, 400, 500, 600, 800, 1000, 1200 and 1600 feet (selected with grid switch inside the receiver).

TRANSMITTER DIPOLE MOMENTS:

110 Hz: 250 Atm ²	3520 Hz: 120 Atm ²
220 Hz: 245 Atm ²	7040 Hz: 60 Atm ²
440 Hz: 240 Atm ²	14080 Hz: 30 Atm ²
880 Hz: 230 Atm ²	28160 Hz: 15 Atm ²
1760 Hz: 220 Atm ²	

MODES OF OPERATION: MAX 1: Horizontal loop or slingram - transmitter and receiver coil planes horizontal and coplanar.
 MAX 2: Vertical coplanar loop mode - transmitter and receiver coil planes vertical and coplanar.
 MIN 1: Perpendicular mode 1 - transmitter coil plane horizontal and receiver coil plane vertical.
 MIN 2: Perpendicular mode 2 - transmitter coil plane vertical and receiver coil plane horizontal.

PARAMETERS MEASURED: In-phase and quadrature components of the secondary magnetic field, in % of primary field.

READOUTS: Analog direct edgewise meter readouts for in-phase, quadrature and tilt. Additional digital LCD readouts provided in the optional MMC computer. Interfacing and controls are provided for ready plug-in of the MMC.

RANGES OF READOUTS: Switch activated analog in-phase and quadrature scales: 0±4%, 0±20% and 0±100%, and digital 0±199.9% autorange with optional MMC. Analog tilt 0±75% and 0±99% grade with MMC.

RESOLUTION: Analog in-phase and quadrature 0.1 to 1% of primary field, depending on scale used, digital 0.01% with autoranging MMC; tilt 1% grade.

REPEATABILITY: 0.01 to 1% of primary field, typical, depending on frequency, coil separation and conditions.

SIGNAL FILTERING: Powerline comb filter, continuous spheric noise clipping, autoadjusting time constant, and more.

WARNING LIGHTS: Receiver signal and reference warning lights to indicate potential error conditions.

SURVEY DEPTH PENETRATION: From surface down to 1.5 times coil separation for large horizontal target and 0.75 times coil separation for large vertical target, values typical.

REFERENCE CABLE: Lightweight unshielded 4/2 conductor teflon cable for maximum operating temperature range and for minimum pulling friction.

INTERCOM: Voice communication link provided for operators via the reference cable.

TEMP. RANGE: Minus 40 to plus 60 degrees Celsius, operating.

RECEIVER BATTERIES: Four standard 9 V - 0.6 Ah alkaline batteries. Life 20 hours continuous duty, less in cold weather. Optional 1.2 Ah extended life lithium batteries available (recommended for very cold weather).

TRANSMITTER BATTERIES: Rechargeable gel-type lead-acid 12 V - 14 Ah batteries (4 x 6 V - 7.2 Ah) in nylon belt pack.

TRANSMITTER BATTERY CHARGERS: 14.8 V - 2.5 A nominal output with automatic switching to 13.8 V float mode after battery pack is charged. Operation from 110 - 120 and 220 - 240 VAC, 50/60/400 Hz, and from 10 - 14 VDC supplies.

RECEIVER WEIGHT: 8 Kg carrying weight (including the two ferrite cored receiver coils), 9 Kg with MMC computer.

TRANSMITTER WT: 15 Kg carrying weight.

SHIPPING WEIGHT: 60 Kg plus reference cables at 3 Kg per 100 metre, plus optional items if any. Shipped in two aluminum lined field/shipping cases.

STANDARD SPARES: Spare transmitter battery pack, spare transmitter battery charger, two spare transmitter retractile connecting cords, spare set of receiver batteries.

OPTIONS AND ACCESSORIES, PLEASE SPECIFY:

- ◆ MMC, Optional MaxMin Computer
- ◆ Data interpretation and presentation programs
- ◆ Reference cables, lengths as required
- ◆ Reference cable extension adapter
- ◆ Handheld inclinometer for rough terrain
- ◆ Receiver extended life lithium batteries
- ◆ Transmitter ni-cad battery and charger option
- ◆ Receiver rechargeable battery & charger option
- ◆ Minimal, regular or extended spare parts kit

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