DATA SHEET
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MPX15

Multiplexer for RM15/RM15-D Resistance Meters

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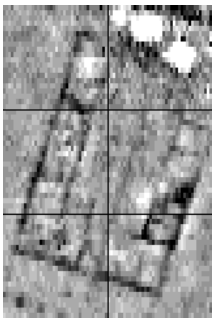
Simultaneous Measurements



0.5m Twin

1.0m Twin

MPX15 Features

- Multiplexer for RM15-D and RM15
- For use with PA20 or PA5 probe arrays
- Offers a wide range of configurations eg:
  Parallel Twin for faster ground coverage or more detailed area coverage.
  Multiple Twin for depth investigations eg pseudosections
  Simultaneous configurations eg Twin, Wenner alpha / beta / gamma arrays.
- User programmable
- Up to 8 user defined programs
- Up to 8 sequences per program
- Logs up to 4 readings per second
- Predefined programs available

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MPX15

Multiplexer for RM15/RM15-D Resistance Meters

Introduction

The Multiplexer MPX15 is designed specifically for use with RM15-D and RM15 resistance meters when used with either a PA20 or PA5 probe array. It opens up a much wider range of arrays and applications compared to the use of single adapters. For example it allows parallel Twin arrays for much faster ground coverage or more detailed area coverage with virtually no time penalty, multiple Twin arrays (up to 6 different spacings) for depth investigations, simultaneous measurement using Twin and Wenner alpha, beta and gamma arrays etc giving different perspectives on buried structures.

The MPX15 is also fully programmable via the RM15/RM15-D, allowing the user to define and store 8 different programmed sequences, with 8 configurations per sequence. The auto-log mode of the RM15-D or RM15 can be used with the MPX15, making multiplexing totally automatic, surveys even faster and more efficient, whilst reducing operator errors and fatigue. The multiplexer uses a matrix of solid state relays which results in higher reliability, lower power consumption and reduced weight than would be possible with conventional reed relays.

Operation

The MPX15 is suitable for use with either the BASIC or ADVANCED RM15/RM15-D and is powered and controlled by the RM15/RM15-D expansion port. It has an on board microprocessor that decodes and acts upon the commands sent from the RM15/RM15-D. The survey tracking information displayed on the RM15/RM15-D expands to indicate the status of the multiplexer if more than one reading is being logged per station. Special menus on the RM15/RM15-D allow the user to select a measurement sequence or program their own. The A, M, N and B terminals of the RM15/RM15-D and the pair of remote probes are all controlled by the MPX15.

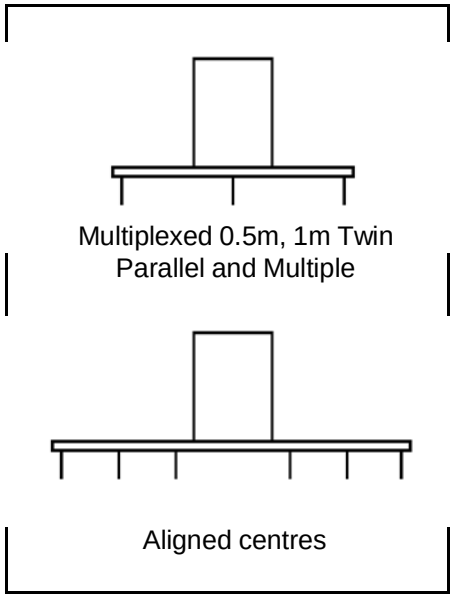
Logging of a multiplexed sequence can be performed by a single press of the LOG key. Alternatively, an auto-log sequence can be initiated by pressing the START key which will step through the first logging sequence. The logging sequence will then be automatically repeated on subsequent re-insertions of the probe array, so the operator only has to move the array to the next reading station. If conditions permit, and Fast auto-log is selected, readings can be logged at 4 readings per second, allowing very rapid data collection

Measurement Modes

The RM15/RM15-D/MPX15 system has three different measurement or logging modes : **Single**, **Parallel Twin** and **Multiple**. The Single log mode has just one probe configuration per reading station - ie a conventional survey.

The Parallel Twin log mode has two Twin configurations **of the same probe separation** mounted side by side on the PA20 beam. Using a 1.5m beam, instead of covering the ground with just one 0.5m Twin, it is possible to effectively mount two 0.5m Twin configurations side by side, with their centres separated by 1m, on the PA20. When multiplexed by the MPX15, this array almost doubles the speed at which the ground is surveyed, since two parallel traverses are effectively made at the same time. Using a 1m beam, the two 0.5m Twin configurations can be separated by just 0.5m, allowing a doubling of sampling density with little increase in survey time.

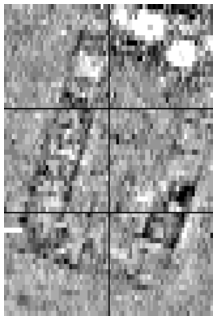
The Multiple log mode has more than one measurement configuration, **of either different type or different probe separation**, mounted on the PA20. For example soundings could be made at each reading station, under the control of the MPX15, with Twin configurations at 0.5m and 1m, together with a 0.5m Wenner. Alternatively, soundings could be made with Twin configurations at 0.25m, 0.5m, 0.75m, 1m, 1.25m, and 1.5m separations. These measurements could be used to provide valuable depth response information. In addition, Wenner and Double-Dipole measurements could also be made at the same time.



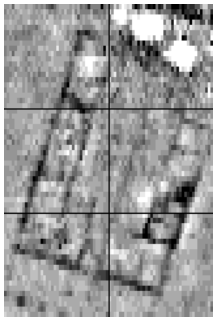
Example survey with the MPX15

A survey at the the Roman town of Wroxeter highlights the value of resistivity surveying with different probe configurations and separations. An RM15 resistance meter, MPX15 multiplexer and PA5 probe array with medium wings was configured with six probes, to make simultaneous 0.25m, 0.5m, 0.75m, 1.0m, 1.25m and 1.5m Twin measurements, along with 0.5m Wenner and Double-Dipole measurements at each reading station - the newer PA20 can be configured in the same way with a 1.5m beam. These data sets, shown below, reveal different structures at the different probe separations. The narrower spacings emphasise the cellular nature of the buildings and internal partitions whilst the wider spacings reveal more substantial, underlying internal structures, along with lines of external colonades. All data sets have been despiked, edge-matched, high-pass filtered, normalised and interpolated using Geoplot.

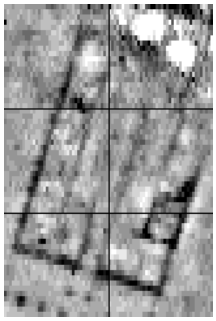
The six Twin data sets can also be used to generate sequences of stacked pseudo-sections, in both the x and y directions, which can provide a measure of depth information. Stacked pseudo-sections, as shown on the right hand side below, offer the advantage of presenting simultaneously both plan and section views, and structures located by both narrower and wider spacings show at the same time. There are many ways of presenting this data, ranging from use of the raw data to various normalisation techniques. The data shown below was generated using Geoplot 3 and is normalised and high pass filtered to give good visual clarity. Different normalisation schemes may be used for detailed data interpretation.



0.25m Twin



0.5m Twin

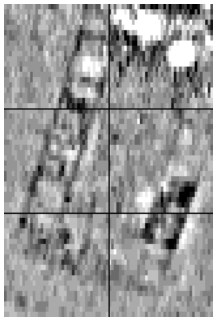


0.75m Twin

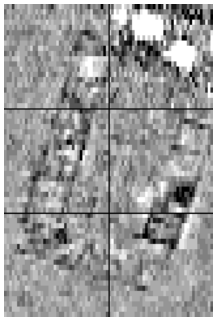
1.0m Twin

1.25m Twin

1.5m Twin

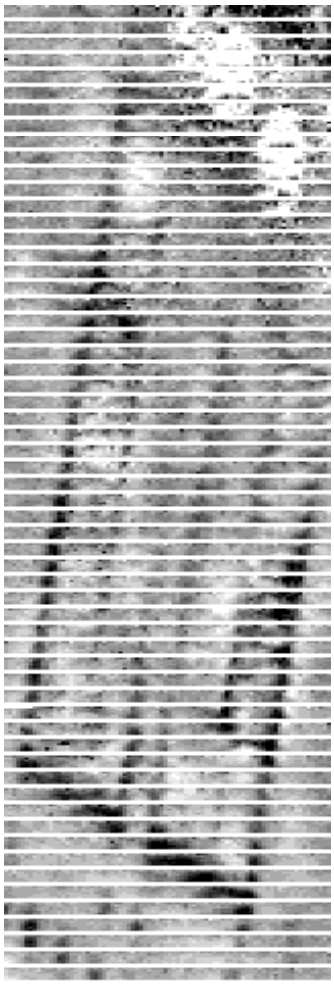


0.5m Wenner



0.5m Double-Dipole

Sequence of 8 multiplexed measurements taken with the MPX15, RM15 and PA5 probe array. Data sets are normalised and plotted in the range -2 SD to + 3 SD.



Stacked pseudo-sections produced from the 6 twin resistance data sets. Each data set was normalised before assembly using Geoplot 3. Grey scale levels are -2 SD (light) to +3 SD.

MPX15

Multiplexer

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Multiplexer for RM15/RM15-D Resistance Meters

Mounting the MPX15 on a PA20 or PA5

The MPX15 fixes onto the PA20 or PA5 frame via the mounting plate supplied, just underneath the RM15/RM15-D (see front page).. Three flying leads connect into the 'Mobile Probes', 'Remote Probes' and 'Expansion Port' connectors of the RM15/RM15-D. The 6 way waterproof plug of the PA20 or PA5 frame plugs directly into the underside of the MPX15 and, when required, the cable from the remote probes of a Twin array also plug directly into the underside of the MPX15.

Guarantee

The equipment supplied by Geoscan Research is guaranteed against defective material and faulty manufacture for a period of 12 months from the date of despatch. Our responsibility is in all cases limited to the cost of making good the defect in the instrument itself. The guarantee does not extend to third parties or other equipment, nor does it apply to defects caused by abnormal conditions of working, accidents, neglect or wear and tear.

Typical Specifications

Solid State Relay voltage rating	200 V
Solid State Relay current rating	40 mA
Solid State Relay on-resistance	160 ohms
Solid State Relay power handling	325 mW
Power consumption	2-8 mA at 5V, array dependent
Case dimensions	160 x 80 x 55 mm
MPX15 weight, including leads and mounting plate	0.4 Kg

All specifications subject to change without prior notice.

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