

RD4000 as 'External Sensor' for Trimble Data Collectors with TerraSync Software

Version 1.3 - November 19, 2002

This application note is designed to guide users, sales and support staff through connecting a Radiodetection Precision Pipe and Cable Locator, model RD4000 (hereinafter referred to as RD4k) to a Trimble (or other manufacturer) data-collector. The end goal is using the locator to aid the mapping technician in gathering accurate positional data of buried utilities for inclusion into a Geographic Information System (GIS).

There are several choices in data collector firmware and hardware currently available from Trimble and some do not work in this application. Asset Surveyor and TerraSync do work. Survey Controller does not as it does not allow external sensors to be added. Other brands usually do work and their setup will be similar to this procedure. The TSCe data collector does work, as does the GeoExplorer when using TerraSync. Incidentally, the TerraSync product runs under Windows CE.

There is a new section (#7) at the bottom of this document that offers some suggestions regarding trouble-shooting this process.

With a bit of practice, users will find this system is a fast, convenient, and accurate method of collecting utility position and depth data.

Several steps are required, including setting up the Trimble Data Dictionary (TDD), setting up the RD4k as an external sensor and connecting the RD4k to the TSCe. The basic of gathering data is also included.

1) To properly set up the TDD to accept the RD4k data, you must include a new feature (F3) of type Point and a Feature name of 'Depth Point' or similar in the TDD. Within that feature, a new attribute (F7) of Numeric type, with the following settings:

- Atttribute Name of 'Depth' or similar.
- Comments as desired
- Decimal Places: 2 (note if using Imperial measurements, use 0)
- Minimum: 0
- Maximum: 1500 (up to 1500 cm of depth are possible)
- Default: 0
- Field Entry on Creation: Required or Normal (not 'not permitted')
- Field Entry on Update: Required or Normal (not 'not permitted')
- Auto-Incrementing: No Increment

Using a numeric data type for the depth attribute will help GIS systems as recognizing the depth as a number value when analyzing data to find installation problems such as too little depth of cover.

Other components of the TDD would likely include a feature of type Line to mark the position of the pipe or cable being located that included attributes describing the type, nature, owner, size, pressure, etc. of the line. If multiple utilities are being located at once, multiple line (for position) and point (for depth) features may be required, one pair for each utility type.

Note: the TDD can be edited within the TerraSync software, just make sure the OK button is selected at the very bottom of the edit screen.

**NOTE: Some problems have been reported with some versions of data collector software. If the above procedure does not work, define the attribute for the feature of type Text and capture the data as characters, not as a numeric value.**

An important part of setting up this system for data gathering is the positional data recording rate. The trade off is accuracy versus data set size. Users may be tempted to use a relatively long period between position points. While this may be adequate for a long, straight utility, the accuracy of the corner positions may be severely compromised. Nor can we assume that all corners are basically the same. Some systems such as gas pipes are typically all 90 degree elbows and "T's" and laid square to the property lines. Cables are sometimes laid diagonally or with large radius bends. If TerraSync is set to record data every say 10 seconds, that may show up a sharp 90 degree bend as a longer, larger radius path. To put a number on this, if the user is walking at 1 meter per second (an average walking speed), corners could be out 5 - 9 meters with a 10 second sample rate. A more frequent recording rate of once every 1 or 2 seconds would reduce these errors substantially. It would also mean that less time would have to be spent taking a depth point as positional samples would be taken faster.

Finish creating the TDD with the other features and attributes needed for your project. Save it to your project directory. Upload it to the TSCe.

Note: The newest versions of Trimble Pathfinder Office (2.90 as of November 2002) use Microsoft ActiveSync system for uploading and downloading the dictionaries and data to and from the TSCe.

