Working with GPX route files for G-864 and other Geometrics Magnetometers

Recent Geometrics magnetometers use route files, in GPX, KML, and other formats, to describe mapped or marked surveys. Various tools – the Survey Manager route designer, online designers, desktop software, etc., can generate different flavors of these files. This document describes the flavor of GPX file used by G-864 and provides a simple recipe for transforming files generated in one on-line tool, into the flavor used by G-864.

These other tools are helpful when creating routes that are not in the rectangular format that is the output of Route Designer.

Here is the content of a simple GPX file as created by Survey Manager Route Designer, and as used in survey routes:

```
<gpx
version="1.1"
creator="SurveyManager">
  <extensions><class>Lat/Lon</class></extensions>
 <rte>
  <rtept lat="37.40044300" lon="-121.88912830">
   <type>start</type>
  </rtept>
  <rtept lat="37.40057764" lon="-121.88911353">
   <type>mark_target</type>
  </rtept>
  <rtept lat="37.40062252" lon="-121.88910861">
   <type>mark_target</type>
  </rtept>
  <rtept lat="37.40066740" lon="-121.88910369">
   <type>end</type>
  </rtept>
 </rte>
</gpx>
```

It includes a route (marked by the <rte> and </rte> tags) and individual marks (<rtept>) denoting the start of line, mark in the line, and end of line, with latitude and longitude data for each mark, and a <type> tag for each mark.

<u>Survey Manager accepts only GPX files with this basic structure</u>.

You can always generate a file with this standard structure by using Survey Manager Route Designer.

Here is the content of the same route in a GPX file created by one popular on-line generator, gpxgenerator.com:

```
<?xml version="1.0"?>
<gpx version="1.1" creator="gpxgenerator.com">
<wpt lat="37.40044300" lon="-121.88912830">
    <ele>102.34</ele>
    <time>2021-11-08T23:39:31Z</time>
</wpt>
<wpt lat="37.40057764" lon="-121.88911353">
    <ele>109.52</ele>
    <time>2021-11-08T23:39:38Z</time>
</wpt>
<wpt lat="37.40062252" lon="-121.88910861">
    <ele>107.38</ele>
    <time>2021-11-08T23:39:49Z</time>
</wpt>
<wpt lat="37.40066740" lon="-121.88910369">
    <ele>109.28</ele>
    <time>2021-11-08T23:39:53Z</time>
</wpt>
</gpx>
```

Note the differences:

1. Some changes in the header info: We don't care about this.
2. No <rte> and </rte> tags at beginning and end.
3. Instead of <rtept>, this file has <wpt>
4. No <type> tag within each waypoint.

Using NotePad, or another simple text editor, we can change this file into a compliant file, as follows:

1. Type the <rte> and </rte> files into the beginning (almost) and end (almost) of the file.
2. Use Notepad's replace-all feature to change "wpt" to "rtept"
3. Add a new "type" tag to every point, as follows:
    a. Replace-all "</time>" with
        "</time><type>mark_target</type>"
        Note that this keeps the original "time" tag intact.
4. In the first rtept only, replace "mark_target" with "start"
5. In the last rtept only, replace "mark_target" with "end"
6. Save, making sure that it has a .gpx extension

The new content of the file is as follows:


```
<?xml version="1.0"?>
<gpx version="1.1" creator="gpxgenerator.com">
<rte>
<rtept lat="37.40044300" lon="-121.88912830">
    <ele>102.34</ele>
    <time>2021-11-08T23:39:31Z"</time><type>start</type>
</rtept>
<rtept lat="37.40057764" lon="-121.88911353">
    <ele>109.52</ele>
    <time>2021-11-08T23:39:38Z"</time><type>mark_target</type>
</rtept>
<rtept lat="37.40062252" lon="-121.88910861">
    <ele>107.38</ele>
    <time>2021-11-08T23:39:49Z"</time><type>mark_target</type>
</rtept>
<rtept lat="37.40066740" lon="-121.88910369">
    <ele>109.28</ele>
    <time>2021-11-08T23:39:53Z"</time><type>end</type>
</rtept>
</rte>
</gpx>
```


This GPX file can be imported in SurveyManager and used in G-864 to collect mapped or marked survey data.