

Application Note

*Index-History Premium-Feature in AVL
Firmware 2.10.0 and Above*

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Revision History

Date	Rev.	Comments
October 2014	1.0.0	Initial version.
February 2015	1.0.1	Unnamed: PAID-FEATURES to PREMIUM-FEATURES
December 2018	1.0.2	Added BOLERO40 series as new products supporting INDEXED_HISTORY
October 2019	A	Initial Lantronix document. Added Lantronix document part number, logo, contact information, and links.

For the latest revision of this product document, please check our online documentation at www.lantronix.com/support/documentation.

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1 ABOUT THIS DOCUMENT

This application note provides information about how the INDEXED-HISTORY feature in the AVL firmware 2.10.x and higher, developed by Lantronix, works.

How to activate this PREMIUM-FEATURE, please refer the "[AppNotes_HowToActivatePremiumFeatures.pdf](#)"

1.1 What is INDEXED-HISTORY ?

FOX3-2G/3G/4G and BOLERO40 series are devices that uses the Global Positioning System to determine the precise location of a vehicle or other asset to which it is attached and to send or record the position of the asset at regular intervals or on demand. The recorded location data can be stored within the AVL unit and transmitted to a remote server at a later time. Transmitting the recorded GPS positions from a FOX3-2G/3G/4G and BOLERO40 series device to a remote server can be done in two modes: **simple** and **advanced** modes.

The **simple** mode might not be 100% accurate if the date and time of some records that are being saved are not correctly due to the mixed date/time stamps. This may happen when writing a record before having a valid GPS fix or when restarting the device and the internal time is set instead of GPS time.

Here is an example of the history data transferred in **simple** mode **without** indexed functionality.

```
$PFAL,GPS.History.GetStart

$<GPS.History.GetStart>
$history starts at 04.11.2013,08:58:17
$SUCCESS
$<end>

$PFAL,GPS.History.SetRead,04.11.2013,08:58:17-04.11.2013,09:03:00

$<GPS.History.SetRead>
$544 Bytes (0 KB) estimated for readout between start and stop time
$SUCCESS
$<end>

$PFAL,GPS.History.Push,TCP,FMT=TXT

$<GPS.History.Read>
$04.11.2013,08:58:17,1,0,50.6734136,10.9807064,449.44,0,5:Start Trip, My Position Lat: 50.6734088 Lon: 10.9807226
$04.11.2013,09:02:24,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733178 Lon: 10.9806307
$04.11.2013,09:02:27,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733192 Lon: 10.9806307
$04.11.2013,09:02:29,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733191 Lon: 10.9806301
$04.11.2013,09:02:33,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733209 Lon: 10.9806299
$04.11.2013,09:02:35,1,14,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733210 Lon: 10.9806298
$04.11.2013,09:02:37,1,14,50.6733301,10.9806293,449.29,0,5:POI, My Position Lat: 50.6733210 Lon: 10.9806300
$04.11.2013,09:02:40,1,0,50.6733301,10.9806293,449.29,0,5:POI, My Position Lat: 50.6733225 Lon: 10.9806308
$readout completed
$SUCCESS
$<end>
```

The advanced mode with indexed history, which belongs to the PREMIUM-features, adds an extra line to each TCP packet showing the number of history records transmitted to the server (see *example below marked in red*). That means each record stored into the history is identified by an index which increments itself until cleared again by using the PFAL command "*\$PFAL,GPS.History.Clear*". This mode provides significant flexibility by letting you read/download the stored history records by indices. The user software on the remote server will process and store the data transmitted by FOX3-2G/3G/4G and BOLERO40 series and then can request using the

corresponding PFAL command other history data from the FOX3-2G/3G/4G and BOLERO40 series with higher indices that are still not received by the server.

Here is an example of the history data transferred in **advanced** mode **with** indexed functionality.

<p>\$PFAL,GPS.History.GetStart</p> <pre> \$<GPS.History.GetStart> \$history starts at 04.11.2013,08:58:13, index 1 to 16 \$SUCCESS \$<end> </pre>
<p>\$PFAL,GPS.History.SetRead,2-9</p> <pre> \$<GPS.History.SetRead> \$544 Bytes (0 KB) estimated for readout between start and stop index \$SUCCESS \$<end> </pre>
<p>\$PFAL,GPS.History.Push,TCP,FMT=TXT</p> <pre> \$<GPS.History.Read> \$04.11.2013,08:58:17,1,0,50.6734136,10.9807064,449.44,0,5:Start Trip, My Position Lat: 50.6734088 Lon: 10.9807226 \$04.11.2013,09:02:24,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733178 Lon: 10.9806307 \$04.11.2013,09:02:27,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733192 Lon: 10.9806307 \$04.11.2013,09:02:29,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733191 Lon: 10.9806301 \$04.11.2013,09:02:33,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733209 Lon: 10.9806299 \$04.11.2013,09:02:35,1,14,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733210 Lon: 10.9806298 \$04.11.2013,09:02:37,1,14,50.6733301,10.9806293,449.29,0,5:POI, My Position Lat: 50.6733210 Lon: 10.9806300 \$04.11.2013,09:02:40,1,0,50.6733301,10.9806293,449.29,0,5:POI, My Position Lat: 50.6733225 Lon: 10.9806308 \$history index 2 to 9 // additional line with different indices is added to each TCP packet when sent to the server \$readout completed \$SUCCESS \$<end> </pre>
<p>\$PFAL,GPS.History.SetRead,All</p> <pre> \$<GPS.History.SetRead> \$1052 Bytes (1 KB) estimated for readout complete history \$SUCCESS \$<end> </pre>
<p>\$PFAL,GPS.History.Push,TCP,FMT=TXT</p> <pre> \$<GPS.History.Read> \$04.11.2013,08:58:13,1,0,50.6734113,10.9807010,452.23,0,5:Start Initialisation \$04.11.2013,08:58:17,1,0,50.6734136,10.9807064,449.44,0,5:Start Trip, My Position Lat: 50.6734088 Lon: 10.9807226 \$04.11.2013,09:02:24,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733178 Lon: 10.9806307 \$04.11.2013,09:02:27,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733192 Lon: 10.9806307 \$04.11.2013,09:02:29,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733191 Lon: 10.9806301 \$04.11.2013,09:02:33,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733209 Lon: 10.9806299 \$04.11.2013,09:02:35,1,14,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733210 Lon: 10.9806298 \$04.11.2013,09:02:37,1,14,50.6733301,10.9806293,449.29,0,5:POI, My Position Lat: 50.6733210 Lon: 10.9806300 \$04.11.2013,09:02:40,1,0,50.6733301,10.9806293,449.29,0,5:POI, My Position Lat: 50.6733225 Lon: 10.9806308 \$04.11.2013,09:03:08,1,14,50.6733415,10.9806293,450.84,0,5:POI, My Position Lat: 50.6733289 Lon: 10.9806409 \$history index 1 to 10 // additional line with different indices is added to each TCP packet when sent to the server \$SUCCESS \$<end:1383556085949> </pre>

```

$PFAL,GPS.History.Push,TCP,FMT=TXT
$<GPS.History.Read>
$04.11.2013,09:03:11,1,14,50.6733278,10.9806239,452.08,0,5:POI, My Position Lat: 50.6733285 Lon: 10.9806418
$04.11.2013,09:03:14,1,14,50.6733415,10.9806293,450.84,0,5:POI, My Position Lat: 50.6733288 Lon: 10.9806437
$04.11.2013,09:03:17,1,14,50.6733415,10.9806293,450.84,0,5:POI, My Position Lat: 50.6733297 Lon: 10.9806445
$04.11.2013,09:03:34,1,14,50.6733415,10.9806293,450.84,0,5:POI, My Position Lat: 50.6733393 Lon: 10.9806558
$04.11.2013,09:03:36,1,14,50.6733551,10.9806347,449.59,0,5:POI, My Position Lat: 50.6733424 Lon: 10.9806575
$04.11.2013,09:03:39,1,14,50.6733525,10.9806624,449.84,0,5:POI, My Position Lat: 50.6733477 Lon: 10.9806599
$04.11.2013,09:08:01,1,14,50.6733816,10.9807118,442.01,0,5:Stop Trip, My Position Lat: 50.6733844 Lon: 10.9807136
$history index 11 to 17 // additional line with different indices is added to each TCP packet when sent to the server
$readout completed
$SUCCESS
$<end>

$PFAL,GPS.History.SetRead,04.11.2013,08:58:17-04.11.2013,09:03:00
$<GPS.History.SetRead>
$544 Bytes (0 KB) estimated for readout between start and stop time.
$SUCCESS
$<end>

$PFAL,GPS.History.Push,TCP,FMT=TXT
$<GPS.History.Read>
$04.11.2013,08:58:17,1,0,50.6734136,10.9807064,449.44,0,5:Start Trip, My Position Lat: 50.6734088 Lon: 10.9807226
$04.11.2013,09:02:24,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733178 Lon: 10.9806307
$04.11.2013,09:02:27,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733192 Lon: 10.9806307
$04.11.2013,09:02:29,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733191 Lon: 10.9806301
$04.11.2013,09:02:33,1,0,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733209 Lon: 10.9806299
$04.11.2013,09:02:35,1,14,50.6733187,10.9806293,447.74,0,5:POI, My Position Lat: 50.6733210 Lon: 10.9806298
$04.11.2013,09:02:37,1,14,50.6733301,10.9806293,449.29,0,5:POI, My Position Lat: 50.6733210 Lon: 10.9806300
$04.11.2013,09:02:40,1,0,50.6733301,10.9806293,449.29,0,5:POI, My Position Lat: 50.6733225 Lon: 10.9806308
$history index 2 to 9 // additional line with different indices is added to each TCP packet when sent to the server
$readout completed
$SUCCESS
$<end>

```

Lantronix FOX3-2G/3G/4G and BOLERO40 series with activated INDEXED-HISTORY will offer fleet managers:

- The history entries are assigned by index and not by date/time only. Thus, the implementation in the server becomes easier, when the server application polls the history records based on index.