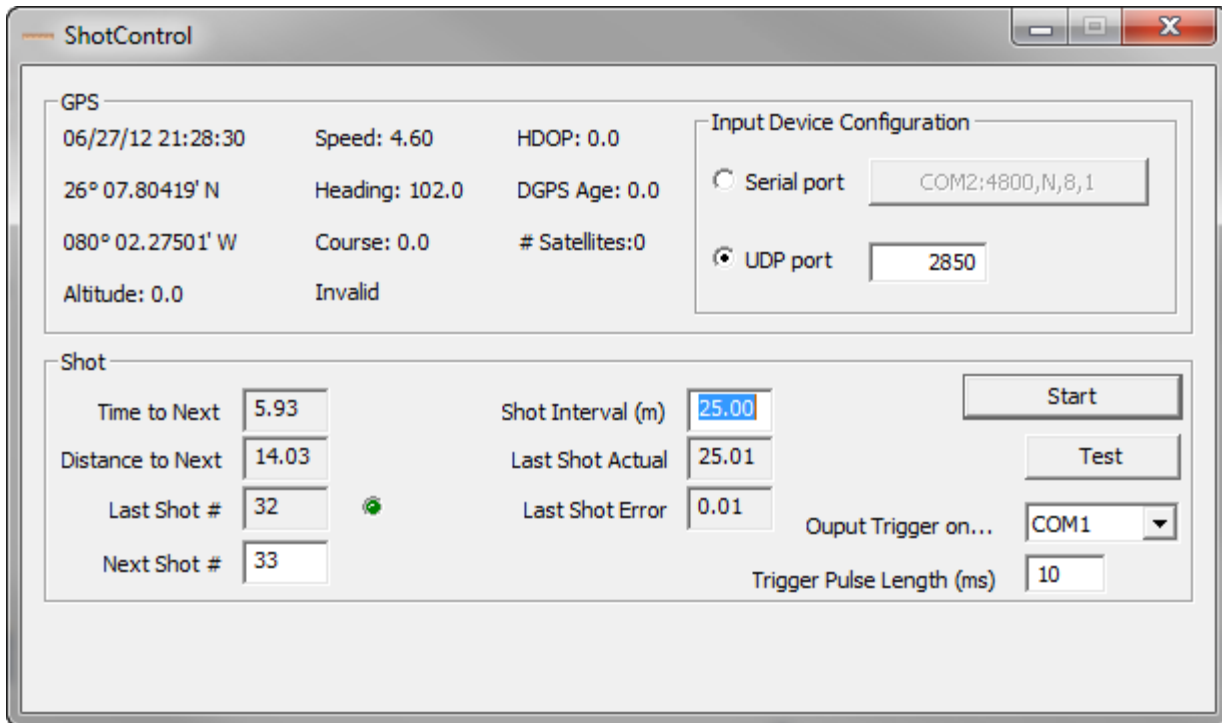


Table of Contents

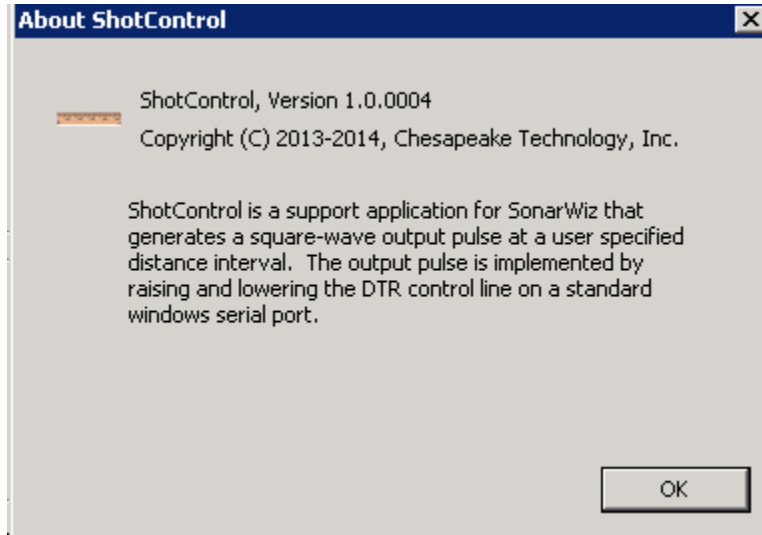
- 1 Chesapeake Technology, Inc. Shot Control Utility..... 2
 - 1.1 Summary 3
 - 1.2 GPS Interface 3
 - 1.3 Shot Numbering..... 3
 - 1.4 Interval Computation 4
 - 1.5 Trigger Generation 4
 - 1.5.1 Output Trigger Voltage Level Expectations 4
 - 1.6 Data Recording 5
 - 1.7 .GPS Output file sample..... 5
 - 1.8 .SHOT Output file sample 5
- 2 ShotControl – Licensing Details and Purchase Inventory 6
 - 2.1 Confirming Your ShotControlVersion..... 7
- 3 ShotControl – Change History..... 8

1 Chesapeake Technology, Inc. Shot Control Utility

We recent added support for varying the trigger pulse width between 1 and 10 ms. Default is 1 ms.



Current Version:



1.1 Summary

The ShotControl utility is a standalone windows application that can be used to generate square-wave trigger pulses at a user specified distance interval. The GPS position input is accepted on any standard windows serial port using any of the NMEA-0183 supported position, speed and heading data-grams. The output trigger is generated on the Data Terminal Ready (DTR) line of a standard Windows serial port. A special cable is required to carry this signal to the device being triggered. The utility records the time stamped GPS data into a user specified file with a .GPS extension and records the trigger locations into a file with the same name but a .shot extension.

1.2 GPS Interface

ShotControl requires that the GPS provide latitude, longitude, speed and heading data at a rate of at least .3Hz (once every 3 seconds). Most GPS systems can provide output rates of 1Hz. Typically, higherGPS output rates produce slightly better accuracy in the computed shot position. ShotControl accepts position data from the NMEA-0183 GGA, GLL and RMC sentences. Speed and heading are accepted from RMC, VTG. Heading may also be extracted from HDT sentences. Since the RMC sentence can provide all of the required data elements, it is recommended that all other sentences be disabled from the GPS output and only the RMC sentence be used.

1.3 Shot Numbering

Starting in March 2012, the ShotControl utility added a new control that allows the user to specify the next shot number value assigned to each new trigger event. This allows

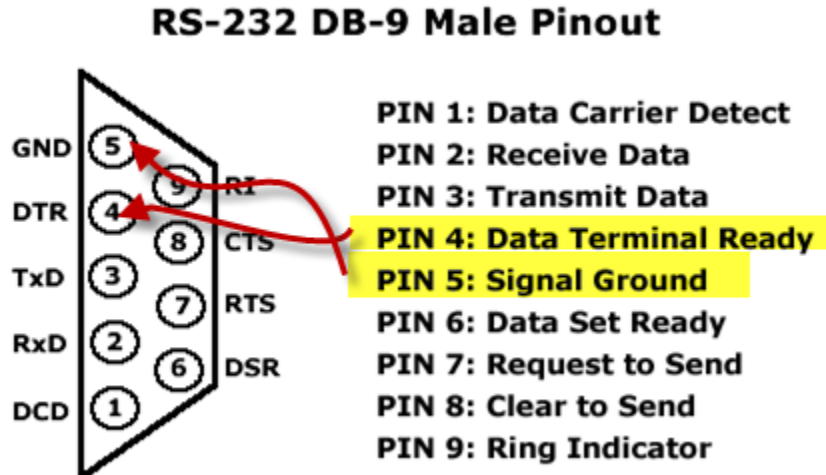
synchronization of the shot numbers from two independent systems that are being triggered by ShotControl to use the same numbers.

1.4 Interval Computation

The ShotControl utility generates the radial distance from the start position or last trigger position. ShotControl dead reckons from the start position or last received GPS position to accurately provide shot positions that fall between GPS fix locations. The dead reckoning algorithm is running at 1 kHz to compute the current position using the most recent speed and heading data from the GPS. When a new position is received from the GPS, the dead reckoning algorithm begins to compute the current position from that position so that absolute GPS position takes precedence over the dead reckoned position. The shot control algorithm is invoked when the Start button is pressed.

1.5 Trigger Generation

The trigger is generated by raising the DTR line of the selected output serial port. The DTR line is held high for 1-10 milliseconds (user configurable), and then is lowered again. The default factory set trigger pulse width is 1 millisecond. The recommended serial port cable would use a DB-9M connector on the PC side and a BNC connector on the trigger output end. Only two conductors are required: Signal Ground (Pin 5) and Data Terminal Ready (Pin 4).



1.5.1 Output Trigger Voltage Level Expectations

Since COM port hardware varies, you can expect any positive-going voltage transition within the range of RS-232 specifications on your DTR (Data Terminal Ready) pin out of the COM port, during the trigger-pulse. Some users have reported a resting voltage of -5V, going "positive" to 0V as the trigger.

1.6 Data Recording

When the Start button is pressed, the shot control algorithm is started and the user is prompted for a file name into which to store the GPS data. A position record is written into the GPS file whenever a position record is received. At the same time, ShotControl also creates a second file with the same name as the GPS file but the file extension is '.SHOT'. Each time a trigger is generated a record is appended to the .shot file. Below are samples of both file types.

1.7 .GPS Output file sample

Date,Time,Latitude,Longitude,Speed,Heading

```
03/02/2011,09:31:54.361,40.616591000000,-112.780074000000,5.50, 67.00
03/02/2011,09:31:54.369,40.616591000000,-112.780074000000,5.50, 67.00
03/02/2011,09:31:55.376,40.616601000000,-112.780042833333,5.50, 67.00
03/02/2011,09:31:55.381,40.616601000000,-112.780042833333,5.50, 67.00
03/02/2011,09:31:56.391,40.616611166667,-112.780011500000,5.50, 67.000
3/02/2011,09:31:56.400,40.616611166667,-112.780011500000,5.50, 67.00
```

1.8 .SHOT Output file sample

Date,Time,Shot,Latitude,Longitude,Easting,Northing,Speed,Heading,Requested Interval,Actual Interval

```
03/02/2011,17:31:57.263, 1,40.616616371996,-
112.779996274738,349431.79,4497722.10,5.50, 67.00,10.00,10.02
03/02/2011,17:32:02.267, 2,40.616651909567,-
112.779887549307,349441.07,4497725.85,5.50, 67.00,10.00,10.01
03/02/2011,17:32:04.270, 3,40.616686871765,-
112.779778429561,349450.38,4497729.55,5.50, 67.00,10.00,10.02
03/02/2011,17:32:09.274, 4,40.616722419738,-
112.779669506919,349459.67,4497733.31,5.50, 67.00,10.00,10.03
```

2 ShotControl – Licensing Details and Purchase Inventory

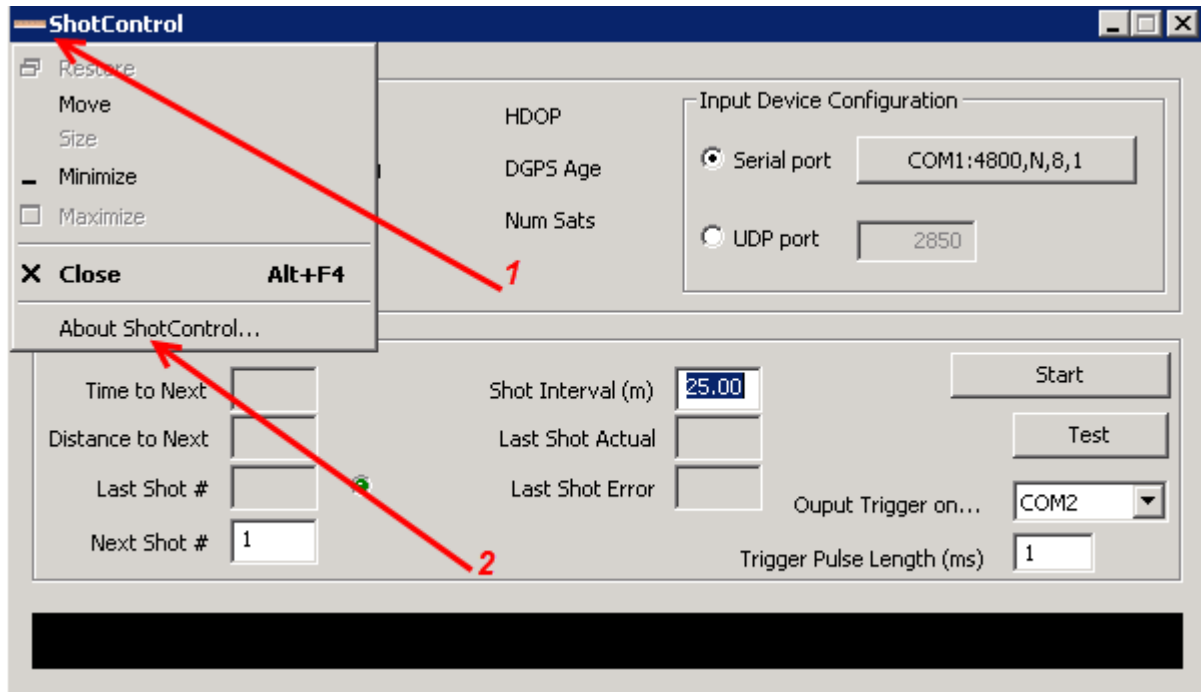
ShotControl is licensed as an add-on feature to SonarWiz. ShotControl execution depends upon the user being an existing customer, with a SonarWiz license dongle present in the PC in which ShotControl will run.

With purchase of ShotControl , Chesapeake Technology, Inc provides you with the following:

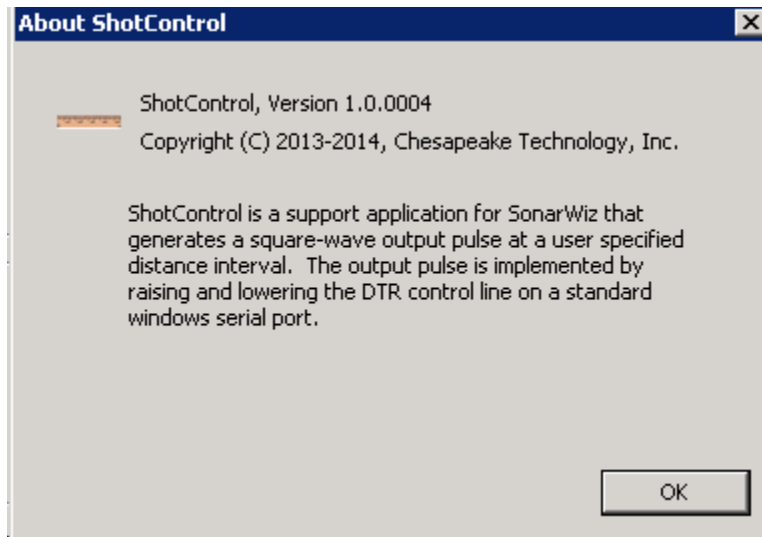
1. A download link to the ShotControl self-installing EXE file
2. Backup CD copy of the self-installing EXE file
3. One special DB9 – to – BNC cable to connect your RS-232 DB9 COM port to a BNC connector jack to supply trigger pulse.

2.1 Confirming Your ShotControlVersion

The current version is 1.00.0004, and you can see this by selecting the (1) ShotControl icon on the GUI, then selecting (2) About ShotControl, like this:



Using the current version, you should see this description:



3 ShotControl – Change History

V1.00.0004 11/14/2013 – Description in “About ShotControl” changed to reflect that the output signal is simply a square-wave pulse, rather than a TTL-level pulse. No other software changes were made, going from version 1.00.0003 to 1.00.0004. The PDF document description was changed to match the software description change.

V1.00.0003 6/27/2012 - Added support for varying the trigger pulse width between 1 and 10 ms. Default is 1 ms.

V1.00.0002 3/23/2012 - Added the "Next Shot #" edit control so users can sync the shot number between two different systems.