Appendix H. DDS/Cloud Storage Server

Starting with Centurion V1.43 Build #0002 support was added for using the ***Diamond Data Server*** (aka "DDS"). Centurion V1.45 Build #0010 has added more comprehensive support for the DDS and made it ideal for use as part of a regular traffic data gathering system.

What is the DDS?

The Diamond Data Server, or "DDS", is an internet web site and data storage/processing site located in the internet cloud at www.diamonddataserver.com. It has many uses, but this section of the manual will primarily deal with how the DDS is used with Centurion to view, import, process, and report to the user the status of their counters and data files.

How does traffic count data get to the DDS?

The most common method is for the customer to have one or more traffic counters which "push" their data to the DDS. This is usually done once per day by each counter, often at night, although all counters support the ability to push their data to the DDS at pretty much any time, even under direct user command. For example, on the Omega-X3 a user can press ALT+USB on the keypad to immediately push all data in the traffic counter to the DDS (handy to do on the roadside).

What exactly does "pushing" data mean?

"pushing" data is a lot like polling or downloading data from a traffic counter, except instead of having to use a program like Centurion to (a) connect to the counter and (b) download the data (a process called "polling"), the traffic counter itself is smart enough to send its data in by itself. Using pushed data is much simpler for the user because they do not have to do anything or run any program on their office PC to get the data out of the traffic counter. Instead, they simply view the data files already in the cloud when they access their computer. No polling needed!

How does the traffic counter "push" data to the DDS?

It is done using an internal or external **Iris Modem** product connected to the traffic counter. The Iris Modem is a complete cellular data modem solution from Diamond Traffic and allows users to do all the typical cell modem functions like connecting the counter to a remote computer, programming the counter, monitoring traffic remotely, and downloading data. You can even still do the traditional "polling" of data with the Iris Modem.
However, the Iris Modem also gives the traffic counter the ability to push its data to the DDS. When this feature is enabled, your data will appear in the internet cloud automatically without any need to manually poll the counter.

How do I access, view, and import the data that has been pushed to the DDS?

The remainder of this manual will describe this process in detail. It is referred to by Centurion as "Processing" DDS data (as opposed to "polling" the traffic counters). In some ways it is similar to polling, except you have the following benefits:

- All the data is safely and securely stored in the cloud under an account just for you.
- You get an automatic secure archive of your data files – the DDS keeps the data pushed to it for 10 years unless it is manually deleted by you.
- Multiple users can access the same data securely. There is no limit to the number of views, imports, or downloads of any data pushed to the DDS making it ideal for multi-user agencies.
- For sites that don't need to be online all the time, the counter can save power by just turning on the modem for the data push. This works especially well for portable counters like the Omega-X3.

Do I have to use the Diamond Data Server or can I have my own cloud storage site?

Yes, you can setup your own cloud storage site and bypass the DDS. Centurion and the traffic counters all support using a custom cloud storage server instead of the DDS. However, your server must be set up in a certain way. Contact Diamond Traffic for technical details.

Data File flow with the DDS:

It is sometimes difficult to understand the path a data file takes when being used with the DDS. The following shows the flow of a data file from a traffic counter, to the DDS "New Data" folder, to Centurion, and finally to the DDS "Archive" folder.

TRAFFIC COUNTER

It all starts when a traffic counter collects data and stores it into a data file.

At the "push" time (by default 1am), counter uses an **Iris Modem** to connect to the DDS and push a copy of the data file to the cloud storage server.

Data file sent over the air using wireless cell modem connected to the internet.

DDS

Data file is now stored in the cloud on the Diamond Data Server and shows up first in what is called the "New Data" folder. This folder is then viewed by Centurion.

Data file downloaded to PC through standard internet.

Your Computer

Centurion sees what files are on the DDS. It shows you what data files are in the "New Data" and "Archive" folders. Processing any of the data files does the following:

1. Downloads a copy to the local computer.

Your Computer

2. Marks it as belonging in "Archive" folder.

Your Computer

3. Imports it into the local database.

This is the end of the path for the data file for this copy of Centurion. It has been downloaded to the local computer, imported into the database, and archived. It can be re-processed at any time by going back to the "Archive" folder on the DDS.

Data file moved to different DDS locations using internet FTP Protocol methods.

DDS

Being marked as belonging in the "Archive" folder tells the DDS that the file is no longer new to a particular machine. Each computer has its own reference for this, so every copy of Centurion accessing the data has a chance to process the data file and move it from "New Data" to "Archive" relative to their system.

DDS

After a data file sits in "Archive" folder for the number of days specified by Centurion (90 days by default), it is automatically moved to a sub-Archive folder based on the year of the data in the file (2018, 2017, etc). This affects all computers connected to this DDS account (but they can re-process the file at any time).

DDS "Sub-Archive" Year 2018

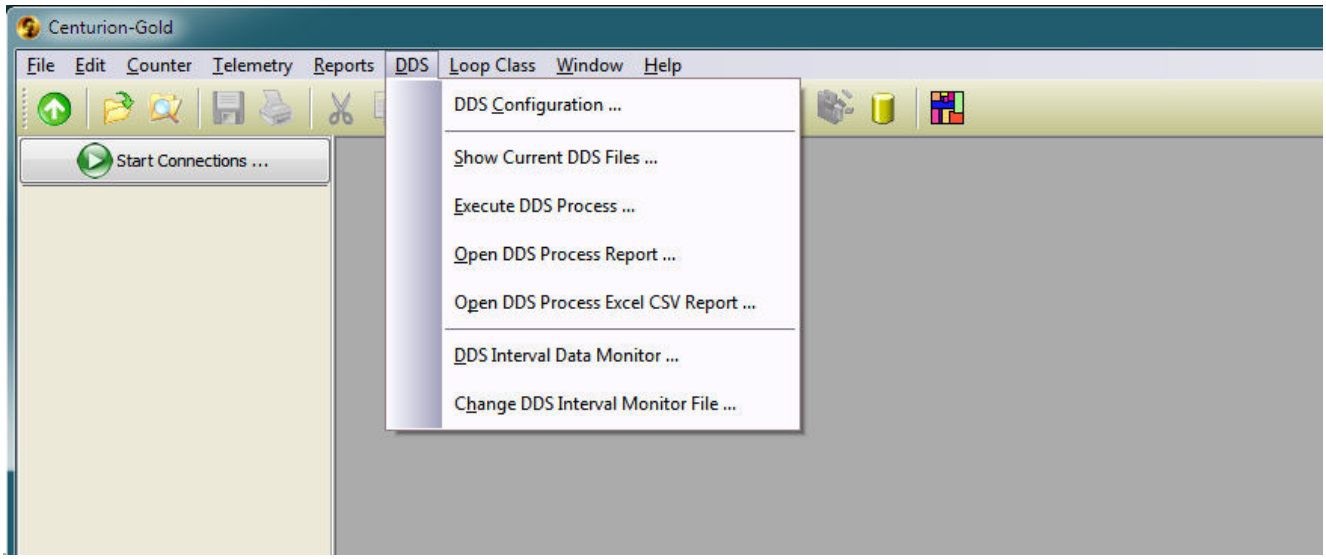
DDS "Sub-Archive" Year 2017

DDS "Sub-Archive" Year ….

The "Sub-Archive" is the end of the path for data pushed to the DDS. It will be held in these sub-Archives for up to 10 years before being automatically purged.

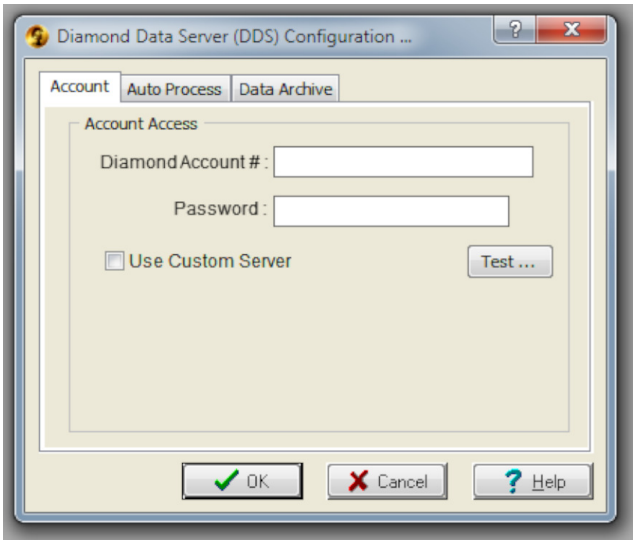
DDS Configuration

The first step to using the DDS is to configure it inside of Centurion. This process must be done before any of the other functions will work. To get started, run Centurion and look for the "DDS" menu option as shown here:



NOTE: Centurion uses the term DDS to refer to the Diamond Data Server OR any other server you have configured. If you setup the program to use your own cloud storage server, all the functionality described for the DDS will also apply to your server. Centurion works the same regardless. For the purposes of this manual, assume that "DDS" means any configured cloud storage server.

The first option "DDS Configuration…" will open the configuration dialog box as shown below:



The three tabs control the following:

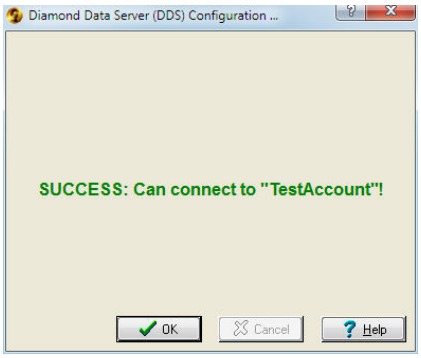
- **Account** – Sets the specific DDS account you are using, or allows you to specify a custom cloud storage server. **Test** button allows a quick test of the specified values.
- **Auto Process** – Controls the Processing function which brings new data into Centurion and generates a report when finished.
- **Data Archive** – Allows you to control automatically moving old data to the archive sub-directories on the DDS.

NOTE: The **Auto Process** tab does not appear with Centurion-Field since it cannot import data into a database. Field will also not show the DDS Process menu items (like Execute DDS Process, Open DDS Process Report, etc.

Initial Test:

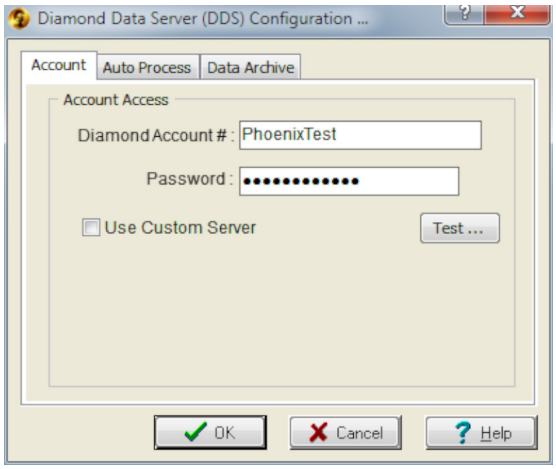
When the configuration dialog box first appears, all users should click the **Test** button BEFORE entering any values. When all values are blank, Centurion automatically tries to connect to the DDS and access a special "TestAccount" (a default account present for just this purpose).

Make sure you get the SUCCESS message (shown here) as this verifies that you have non-blocked internet access. If it fails to connect, contact your I.T. department or Diamond Traffic for additional help.

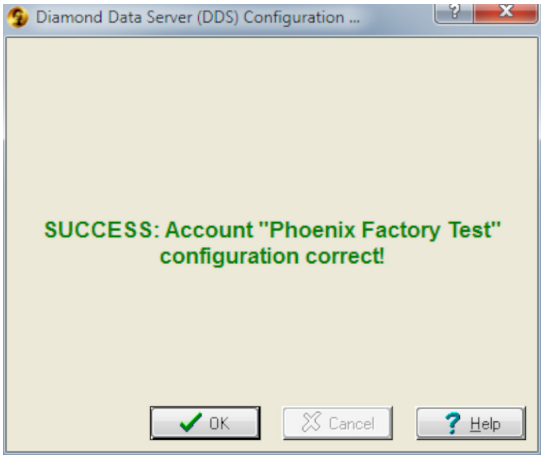


Configuring for a DDS Account:

Diamond Traffic provides a “Diamond Account #” and “Password” for all DDS users. Enter in the values EXACTLY as given by Diamond, and then click the Test button:



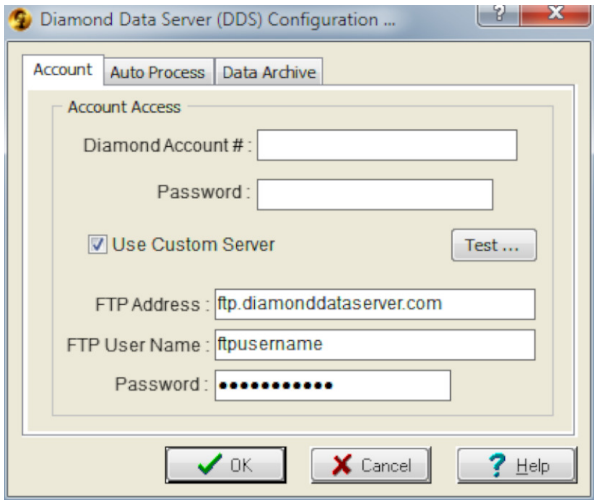
After clicking Test, the screen should show something like this:



The “SUCCESS” indicates that you have correctly configured your DDS account and are now ready to use the DDS. You can jump to the section “Show Current DDS Files” to dive right into using the DDS with Centurion, or you can review the next few sections for details on advanced options available in the **Auto-Process** and **Data Archive** tabs.

Configuring for Custom Cloud Storage Server:

As previously mentioned, you can configure Centurion to use your own cloud storage server. To do this, check the box “Use Custom Server” and the dialog box will change to show:



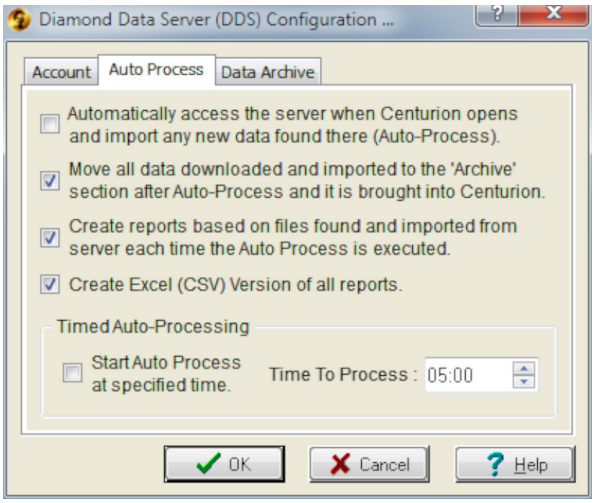
Enter in the **FTP Address**, **FTP User Name**, and **Password** that Centurion should use to access your cloud storage server. Access for the Diamond Data Server FTP is shown here as a reference for what is needed.

Note that these credentials must point Centurion to the same directory that the traffic counters have been programmed to post their data. In addition, Centurion must have FTP rights to download, rename, and delete files and directories from the site for all functions to work properly. Contact your I.T. department or Diamond Traffic for more information.

Click the Test button after entering in the FTP credentials to verify that all is functioning. Click Ok to close the window when done.

Auto Process Settings:

Click on the **Auto Process** tab to access functions related to automatically bringing in data off of the DDS and into the Centurion database ("*Process*" the data). These options allow Centurion to behave somewhat like it would in a traditional auto-polling setup, except that it works with the DDS.



- **Automatically access server when Centurion opens…** : If checked, Centurion will automatically open up a DDS connection, check for new data posted since the last time it was run, and then download and import all the new data found there.
  If the next option is also checked ("Move all data…"), Centurion will move the data it just brought into the database to the Archive section of the DDS from this computers point of view (other copies of Centurion are not affected by Archiving data here).
  Checking this option causes Centurion to immediately execute the menu option "Execute DDS Process" when it is first run (same function as the "Process" button on the **Show Current DDS Files** window).

- **Move all data downloaded and imported to 'Archive' section …:**
  If checked, all data processed by the "Execute DDS Process" function will be moved to the "Archive" section of the DDS after being downloaded and imported. It is highly recommended that this box be checked if the DDS Process function is used on this computer.

- **Create reports based on files found and imported from server …**
  When checked Centurion will create comprehensive Daily, Monthly, and Yearly DDS reports based on what files it finds on the DDS during a Process. See the "DDS Process Reports" section for more information.

- **Create Excel (CSV) Version of all reports:**
  This option causes Centurion to simultaneously create Daily, Monthly, and Yearly DDS Process Reports that are comma separted values which can be directly opened with Excel. This can be useful when customers want to use the DDS Process report for other purposes. See the "DDS CSV Process Reports" section for more information.

Timed Auto-Processing:

- **Start Auto Process at specified time**
  Check this box to tell Centurion to automatically do an "Execute DDS Process" at the time specified on the right. Note that this is ONLY active when Centurion is running, so if you plan on using this feature you must leave Centurion running at the time specified.

- **Time to Process:**
  The time you want the "Execute DDS Process" function to run. This is similar to setting up an auto-polling time, except in this case Centurion is looking for data pushed to the DDS instead of going out to download files from the traffic counter.

Data Archive Settings:

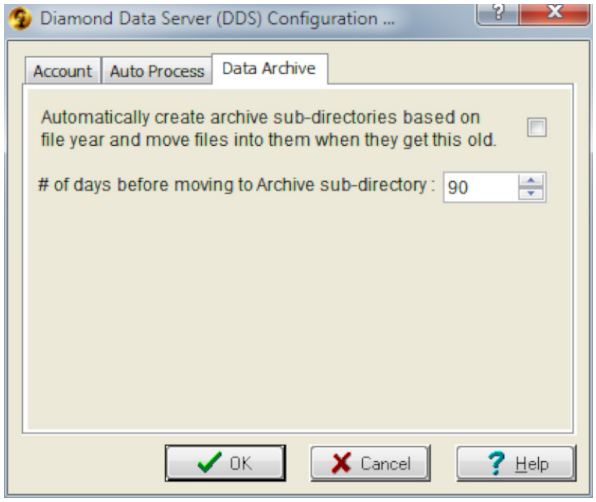
The Data Archive is a section on the Diamond Data Server which holds data that has already been processed by this computer. Archiving a data file from this computer only moves the data to the Archive folder relative to the local computer, it does not affect other Centurion users also accessing the same DDS account.

This configuration tab controls moving the files that are already in the Archive folder to what is called a sub-Archive folder. These are year specific folders of data files that has already been processed. The purpose of the sub-Archive's is to move old data out of the way and to make easier on the user to see what the current and recently imported data is. The sub-Archives are still fully accessible, but they do take a few extra mouse clicks to see if the user finds it necessary to get to them.

Data files generally follow this path:

1) They first show up in the "New Data" folder. While there, users will "Process" them with Centurion.
2) After they are Processed (which means they are downloaded and imported into the local Centurion database), they are then moved to the "Archive" folder.
3) The files stay in the "Archive" folder for the number of days specified. By default, that is 90 days. After this period of time they are moved automatically to a "sub-Archive" folder which is specified as the year of the data in the file (2018, 2017, etc.).

When viewing the Data Archive configuration tab, the following options appear:



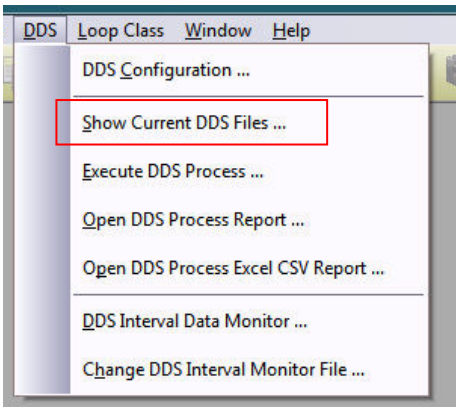
- **Automatically create archive sub-directories based on file year…** : When checked, Centurion will tell the DDS to move data files out of the Archive folder into a sub-Archive directory/folder based on the year of the data in the file.

  This is an important function to have enabled if you have a lot of data being frequently posted. The number of individual files can become very large, and the amount of time it takes Centurion to view and show the directories of data files will become intolerable unless it is organized in some fashion. This is the Centurion and DDS method of doing this.

- **# of days before moving to Archive sub-directory :** Specify the number of days you want the DDS to wait before moving a file out of the Archive folder and into a sub-Archive folder based on the year of the data. By default, it is set to 90 days.
  NOTE: Make sure this is long enough so that every possible user of the files from the "New Data" folder have had time to process them. If even one user processes a file and moves it to the Archive folder, and then this number of days passes, the file will be moved to the sub-Archive folder for ALL users (even if they have never processed the data from their "New Data" folder).

Show Current DDS Files

The **Show Current DDS Files** option is the main function users select to view and process data files stored on the DDS. To open it, click on "Show Current DDS Files…" off the DDS menu. It is also shown when clicking on "Execute DDS Process…" or if you enable a timed or automatic Process when Centurion opens.



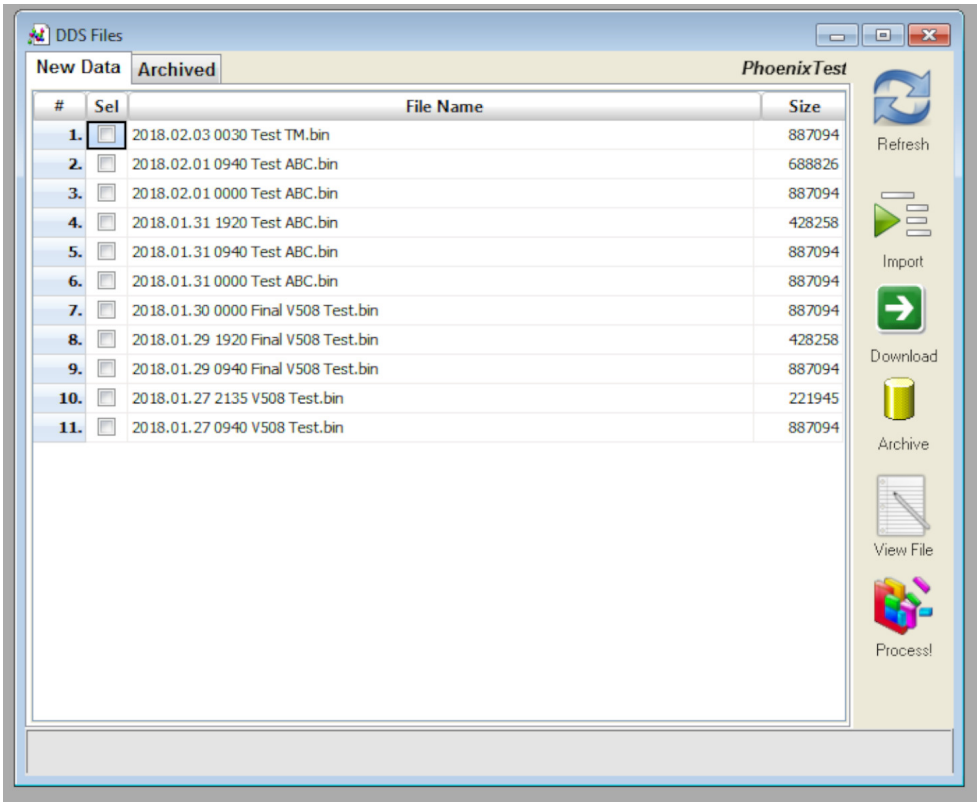
When the **Show Current DDS Files** appears it will:

a) Link to the DDS using your specified account credentials.

b) Show all files in the "New Data" folder (and allow you to change to the "Archive" folder and "sub-Archive" year folders).

c) Give you various options like Import, Download, View, Archive, and Process files on the DDS.

A typical **Show Current DDS Files** might look like this:



The top shows two folder tabs, "New Data" and "Archived". Switch between them by clicking on the tab you want to view.

The **Refresh** button will reload the current DDS file list. This can be useful if you have remote devices actively pushing data to the DDS and want to update your current view.

You can sort the view by clicking on any of the column labels like "File Name", "Size", or "#". You can also select/deselect all files by clicking on the "Sel" column label. By default, files are listed in descending date order.

Process!

This button, which appears only on the New Data folder, performs most of the tasks a typical user will want to do each time they access the DDS. Clicking it will:

1) If no files are selected (by clicking the box next the file under the "Sel" column), it selects all the files in the New Data folder. Otherwise it will use the files that are currently selected.
2) Immediately starts the download and importing of these files.
3) When complete (if "Create reports based on files found and imported from server during an Auto Process" is enabled), Centurion will then generate Daily, Monthly, and Yearly reports of the data it processed. The Daily report will automatically be displayed when processing is finished.
4) Lastly, all the processed files are moved to the Archive folder (if "Move all data downloaded and imported to 'Archive' section.." is checked) so that system is ready for the next batch of pushed data.

Process can also be done at a specified time or when Centurion first runs (see configuration).

Import

The Import button is similar to Process. Select one or more files to Import and click the button to:

1) Start the downloading and importing of a file or files.
2) Move the file to the Archive folder.

Note that importing is different from Processing in that it does not generate a report and files are always moved from New Data to Archive when complete (unless they are already in the Archive). However, you can use the Import button to bring in data from any folder or sub-Archive folder.

Download

Downloads the file or files selected and moves them to the Archive folder. Does not start the import process. The Process and Import buttons are not available in Centurion-Field (because it does not support the database), but users can use the Download function to download data off of the DDS.

Archive

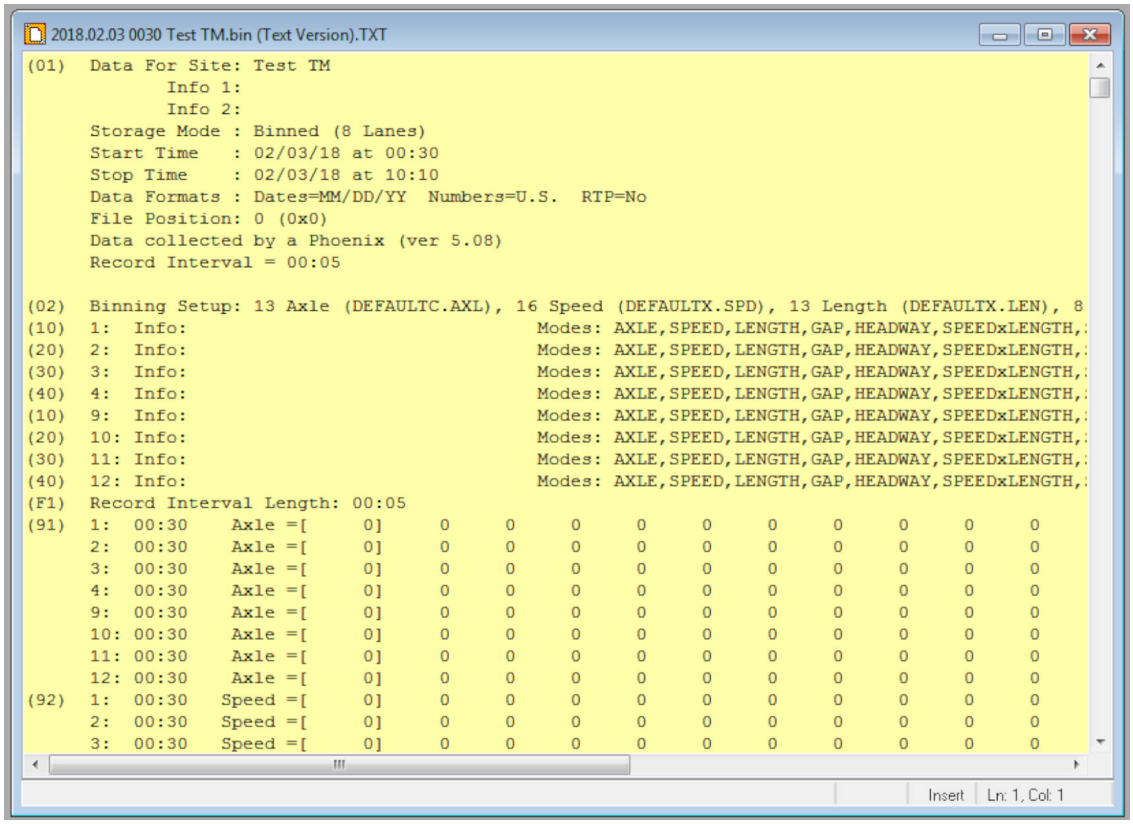
Moves the selected file or files from New Data to the Archive folder without downloading or importing them into the database. This is done automatically when you Process, Import, or Download files, but you can also do it manually using this button if there is a file you don't want to use in the other ways.

Delete

Available only on the Archive folder view, this option permanently deletes a file off of the DDS. Use this option with extreme care, *you cannot recover a file deleted using this option*.

View File

Clicking View File will call up a text file view of the binary data file. This is handy for quick checking a files contents, and is helpful especially for users of Centurion-Field, but is not usually suitable for processing the data itself. Clicking View File will show something like this:

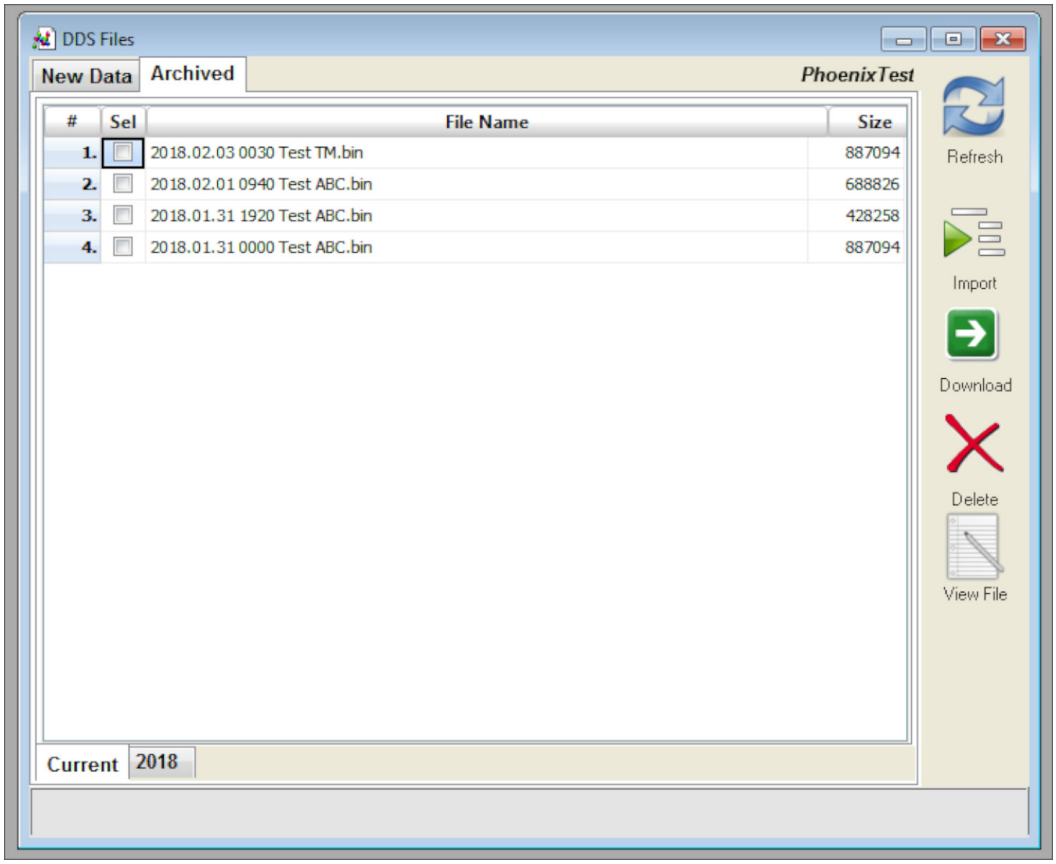


Archive Data Folder:

Clicking on the **Archived** tab shows a view of the data files in the Archive section of the DDS. These files are split into two groups:

1) Recently moved files to the Archive folder (called “Current” Archives).
2) Older data files that have been in the Archive folder for an extended period of time (by default, 90 days) and have been moved to a sub-Archive named the year of the data in the file.

A typical Archived view might look like this:



Note that the **Archive** button has been changed to **Delete** (where you can permanently delete files off of the DDS).

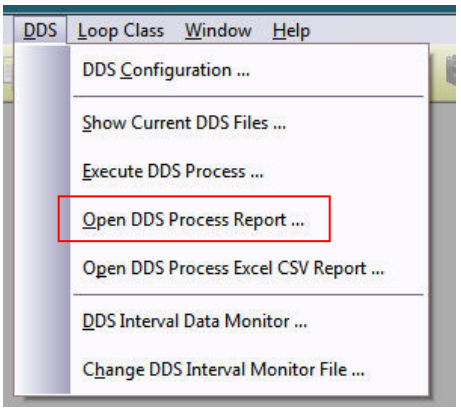
At the bottom of the view, there are the tabs for “Current” and the year “2018”. This shows that there is a sub-Archive named “2018” which contains data files from the year 2018.

Sub-Archives will appear automatically as data is moved into them and more tabs will appear as the years mount up.

Select the files you want and click on Import, Download, Delete, or View File to access the various functions. The files will stay in the Current folder until they pass the # of Days setting in the Centurion configuration to be moved to a sub-Archive folder.

DDS Process Reports

Centurion can create reports based on what files it finds and process from the DDS. The Daily report is displayed automatically after a Process is executed, and users can go back and display reports from any day, month, or year that data was processed by selecting the "Open DDS Process Report" menu item.



DDS Process Reports are intended as a guide to what data files have been pushed to the DDS and when they were processed. It also shows if there were any problems noticed with the file, along with basic information such as the type of data (PerVehicle, Class, Timestamp, etc), number of lanes, and record interval.

An example of a DDS Daily Report is shown below:

Diamond Data Server Day Process Report: 02/23/2018 - Fri

No.	Site ID	Data Date/Time	Data Type	File Size	Processed @ (bps)
1.	Final V508 Test	2018-01-29 @ 09:40 to 19:19 (Mon)	8L-B/5	887094	19:43:03 (579.8kbps)
2.		2018-01-29 @ 19:20 to 23:59 (Mon)	8L-B/5	428258	19:43:02 (301.5kbps)
3.		2018-01-30 @ 00:00 to 09:39 (Tue)	8L-B/5	887094	19:43:00 (579.8kbps)
4.	Test ABC	2018-01-31 @ 00:00 to 09:39 (Wed)	8L-B/5	887094	19:42:59 (733.1kbps)
5.		2018-01-31 @ 09:40 to 19:19 (Wed)	8L-B/5	887094	19:42:57 (739.2kbps)
6.		2018-01-31 @ 19:20 to 23:59 (Wed)	8L-B/5	428258	19:42:57 (563.4kbps)
7.		2018-02-01 @ 00:00 to 09:39 (Thu)	8L-B/5	887094	19:42:56 (1.0mbps)
8.		2018-02-01 @ 09:40 to 17:11 (Thu)	8L-B/5	688826	19:42:55 (782.7kbps)
9.	Test TM	2018-02-03 @ 00:30 to 10:09 (Sat)	8L-B/5	887094	19:42:53 (905.1kbps)
10.		2018-02-10 @ 01:30 (Sat)	TOO MANY TRIES		19:43:06
11.	V508 Test	2018-01-27 @ 09:40 to 19:19 (Sat)	8L-B/5	887094	19:43:06 (579.8kbps)
12.		2018-01-27 @ 21:35 to 23:59 (Sat)	8L-B/5	221945	19:43:05 (156.2kbps)

The report will list all sites processed from the DDS in ascending order. Each change in Site ID will alternate the background to make it easier to distinguish.

The "Data Type" column lists the number of lanes (i.e. "8L" indicates eight lanes of data), followed by the type of data collected:

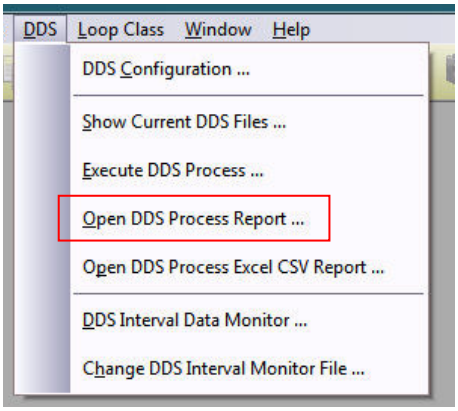
B – Binned/Classification
R – Raw/PerVehicle
C – Count/Volume
S – Sensor Data
TS – Timestamp Data
W – WIM Data
WB – WIM+Binned/Class

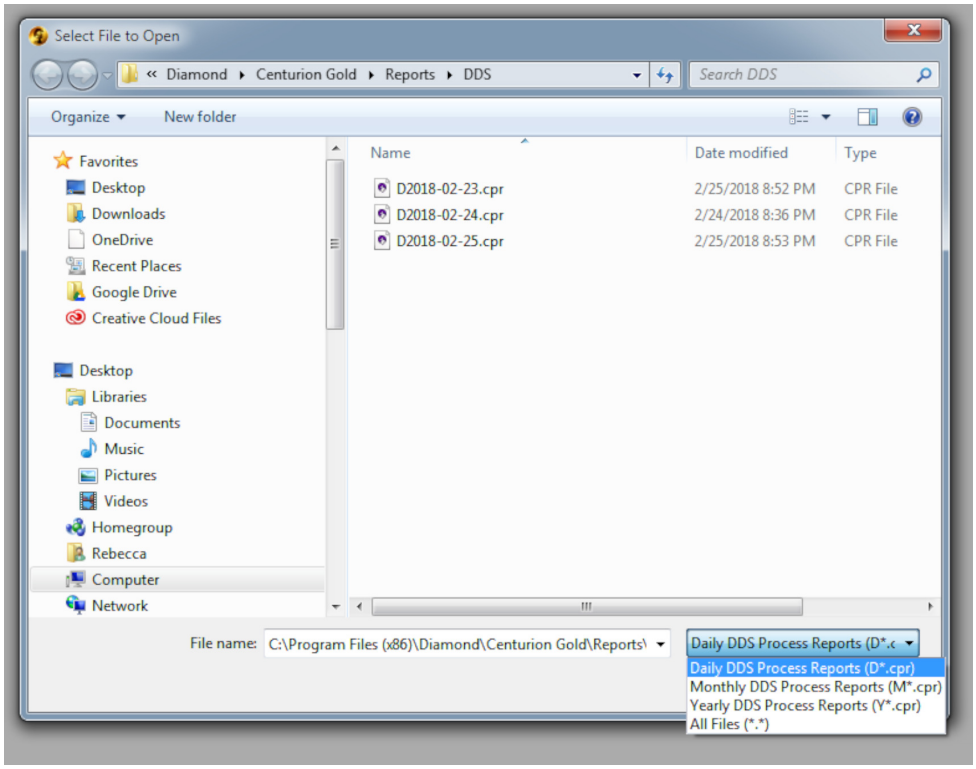
The last value under Data Type is the record interval length (i.e. a "5" here indicates 5 minute intervals).

If an entry is shown in RED (such as the "TOO MANY TRIES" shown here), this means there was a problem either with getting the data off of the DDS or in the data itself.

Monthly & Yearly Process Reports

The previous example was of a Daily Report. To open up a Monthly or Yearly report, select the “Open DDS Process Report” menu item to display the report selector which looks like this:





All Daily reports start with the letter “D” followed by the year, month, and day of the report. All reports end in “.cpr” (standing for Centurion Process Report). To select a Monthly or Yearly report, change the file type selector at the bottom right of the file selector dialog box to:

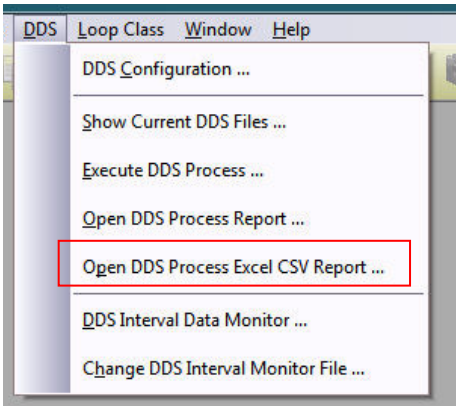
- **Monthly DDS Process Reports** – These files all start with an “M” and then the year and month of the report.
- **Yearly DDS Process Reports** – These files all start with a “Y” and then the year of the report.

Select the report you want to view and click Open. It will be displayed and all look similar to the Daily report, except they will usually be much longer as they contain all the processed files for that month or year.

DDS CSV Process Reports

If the option “Create Excel (CSV) Version of all reports” has been enabled in the DDS Configuration screen, Centurion will automatically create an Excel loadable comma separated text file version of all Daily, Monthly, and Yearly Process reports.

To open one of these, you can use Excel directly or you can select the “Open DDS Process Excel CSV Report…” menu item. Centurion will display all current CSV files it finds in the report directory and allow you to select one to open.



An example of a DDS CSV Process Report is shown below:

D2018-02-23.csv - Excel

Site ID	Start Date	Start Time	End Date	End Time	Lanes	Type	Interval	File Size	Process Date	Process Time	Rate
Final V508 Test	01/29/18	9:40	01/29/18	19:19	8	Bin/Class	5	887094	02/23/18	19:43:03	579.8kbps
Final V508 Test	01/29/18	19:20	01/29/18	23:59	8	Bin/Class	5	428258	02/23/18	19:43:02	301.5kbps
Final V508 Test	01/30/18	0:00	01/30/18	9:39	8	Bin/Class	5	887094	02/23/18	19:43:00	579.8kbps
Test ABC	01/31/18	0:00	01/31/18	9:39	8	Bin/Class	5	887094	02/23/18	19:42:59	733.1kbps
Test ABC	01/31/18	9:40	01/31/18	19:19	8	Bin/Class	5	887094	02/23/18	19:42:57	739.2kbps
Test ABC	01/31/18	19:20	01/31/18	23:59	8	Bin/Class	5	428258	02/23/18	19:42:57	563.4kbps
Test ABC	02/01/18	0:00	02/01/18	9:39	8	Bin/Class	5	887094	02/23/18	19:42:56	1.0mbps
Test ABC	02/01/18	9:40	02/01/18	17:11	8	Bin/Class	5	688826	02/23/18	19:42:55	782.7kbps
Test TM	02/03/18	0:30	02/03/18	10:09	8	Bin/Class	5	887094	02/23/18	19:42:53	905.1kbps
Test TM	02/10/18	1:30			-1	ERR:TOO MANY TRIES			02/23/18	19:43:06	
V508 Test	01/27/18	9:40	01/27/18	19:19	8	Bin/Class	5	887094	02/23/18	19:43:06	579.8kbps
V508 Test	01/27/18	21:35	01/27/18	23:59	8	Bin/Class	5	221945	02/23/18	19:43:05	156.2kbps

As shown above, the CSV version of the Process Report is very similar to the print version. However, users may prefer it as a way of tracking the site and system performance in a more computer usable way. CSV reports are generated automatically when the regular Process Report is done.

Errors are indicated by the “Lanes” column be set to “-1” and the “Type” column containing a description of the error found.