Appendix G. DDS Interval Monitoring

Centurion V1.44 Build #0006 (and later) support a new method of traffic data collection called ***Interval Data***. Interval Data is different from other types of data collection in the following ways:

- Instead of polling or downloading the collected data from the traffic counter after the data collection period has ended, the traffic counter itself uploads the data it collects automatically to the *Diamond Data Server* (or "DDS"). DDS is a secure cloud storage server maintained by Diamond Traffic Products for its customers.
- Traffic counters do this data upload (also called "pushing the data") to the DDS using a built in cellular data modem inside the counter.
- How often the traffic counter uploads or pushes its data to the DDS is controlled by Centurion. Typically, data is pushed every 15 minutes. However, this can be as short as every 5 minutes or as long as once per day.
- There is never a time that a user has to poll the counter or import data. It is all handled automatically by the counter and Centurion. The basic process is as follows:
    - Start Centurion.
    - Select the "DDS Interval Data Monitor…" function.
    - Enter in your customer information and details about which counters are collecting data for you.
    - Click the "Start Monitoring" button.

  From this point, data will automatically begin appearing in the Centurion database and, optionally, can also populate an SQL Database.
- Note that Interval Data is much less power consuming and uses less data traffic than having a traffic counter connected to the network permanently. This makes it suitable for battery or solar power traffic counters, and will function with a less expensive cellular data plan.

Interval Data monitoring was originally created for Diamond's Parking Lot monitor system. However, it has excellent application for other users who want semi-real time data.

Diamond supports Interval Data Monitoring from the following traffic counter platforms:

Internal Iris Modem:

- Phoenix, Unicorn, Pegasus
- Omega X3
- TT-200

External Iris Modem Standalone:

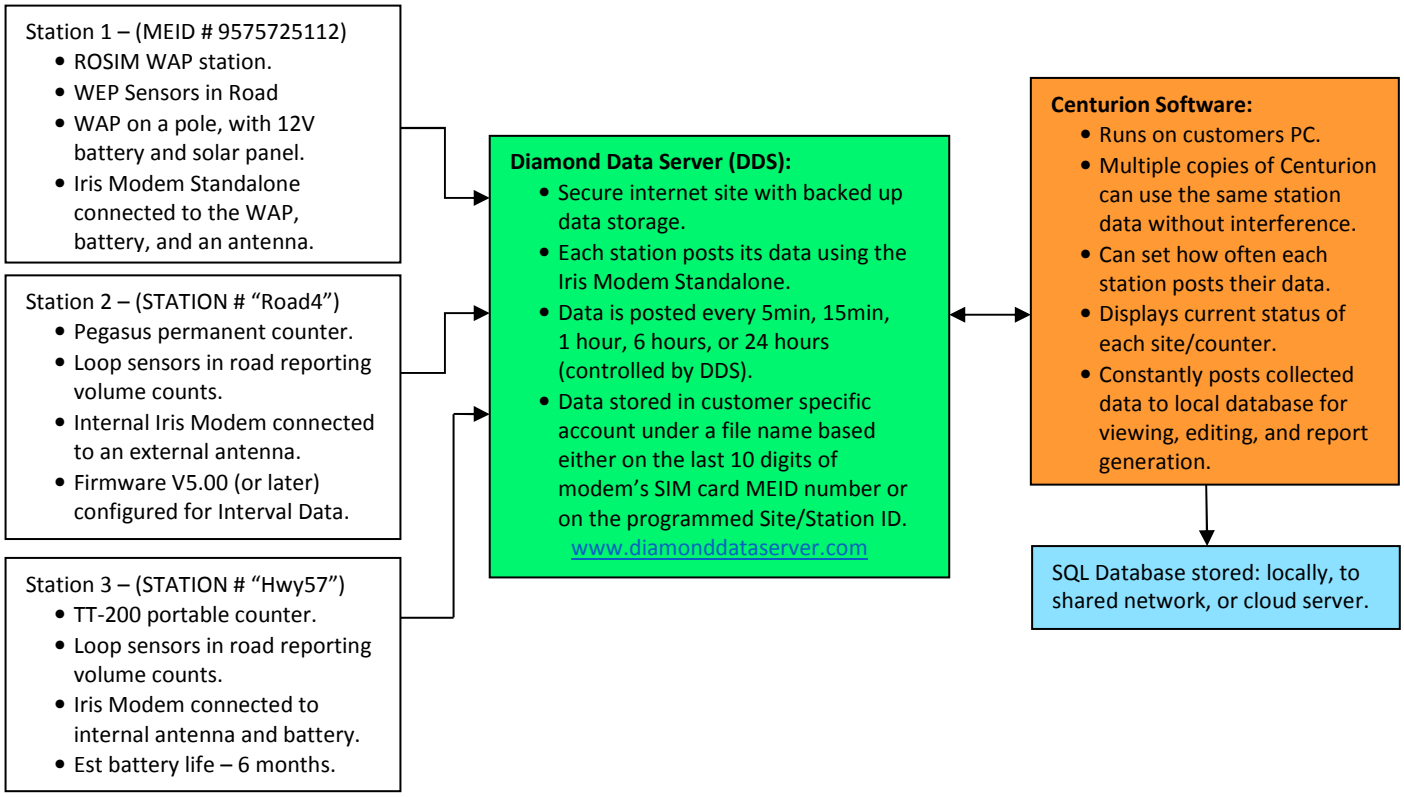
- ROSIM WAP Device with external Iris Modem Standalone.

Any of these counters, when combined with an Iris Modem, can be set to push Interval Data. Contact Diamond for more information on setting up your own Diamond Data Server account and configuring your traffic counters to work with Interval Data Monitoring.

Interval Data with the Diamond Data Server:

Interval data is “pushed” to the Diamond Data Server on an interval basis to a specific customer account. Centurion will then poll that data from the Diamond Data Server, update its local database as well as an SQL Database, and display various status information.

Flowchart of how Interval Data to the DDS works with the different devices:

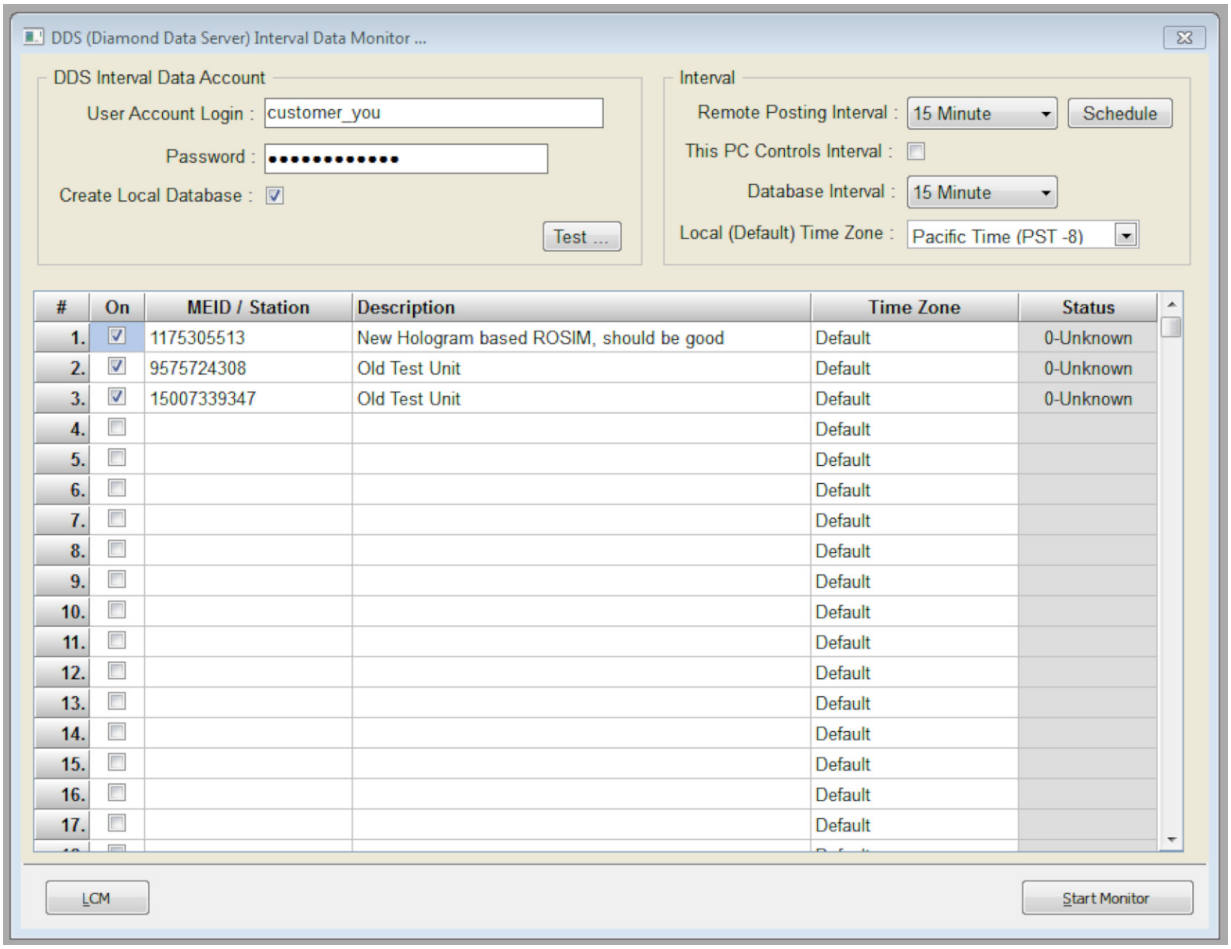


In the above diagram, the “Stations” on the left represent physical installations of traffic counters (like a ROSIM WAP station, a Pegasus permanent site, or a TT-200 portable site). Each station collects its data according to the desired interval specified by the DDS. When that amount of time has elapsed, the station powers on the Iris Modem and updates the DDS with the current data in a secure customer specific location on the server, available only to that customer, at the specified interval length.

The Diamond Data Server holds all posted data permanently. When the customer runs Centurion on their PC and opens the DDS Interval Data Monitor function, it will link to the server using the customer’s account access and download all newly posted data. This new data will be posted to the local database maintained for each station. You can also optionally simultaneously create an external SQL type database of the data. As long as the Centurion DDS Interval Data Monitor is running, newly posted data will be downloaded. If Centurion is stopped, it can be restarted anytime and it will pick up where it left off automatically with no loss of data.

Interval Data Monitor - Configuration

To start using the DDS Interval Data Monitor, go to the DDS menu and select “DDS Interval Data Monitor…”. A screen similar to the following will appear:



The following settings are available:

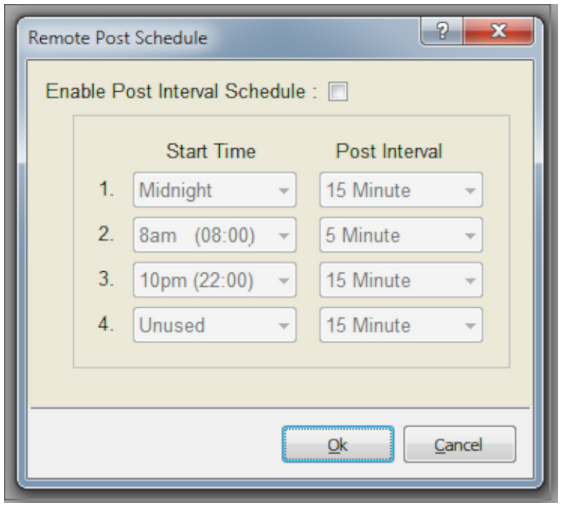
DDS Interval Data Account:

1) **User Account Login** – The login name for the customer account for Interval Data. Note that this is NOT the same as your DDS Account for regular server access (it is a unique account name for Interval Data only). All account logins start with “customer_” and then are finished with the specific account name that Diamond will provide all of its customers. IMPORTANT: The account login is case sensitive, so be sure to enter in exactly what Diamond has indicated you need for your account access.
2) **Password** – The password for the login specified above. Like the Account Login, the password is case sensitive.
3) **Create Local Database** – If checked (the default), Centurion will create a local database containing all the data collected from the stations. This database is created in real time as data comes in, so there is no need to separately import data at a later time. NOTE: This MUST be checked if you want to also create an SQL database and have it “match” the Centurion version (see below).
4) **“Test” Button** – Click this button to test your login and password. You can try up to 5 times before Centurion requires you to restart the program.

Interval:

5) **Remote Posting Interval** – The interval you want the stations to report data to you. By default, this is set to 15 minutes. However, you can change it to 5 min, 1 hour, 6 hour, or 24 hour. Note that the stations can't respond to a change in the interval until they next post, so there is usually a delay between changing this value and seeing a change in the stations posting.

6) **"Schedule" Button** – Click this button to show a settings window allowing you to define a schedule of data posting intervals. For example, you could do 1 hour from midnight to 6am, 15min from 6am to 5pm, then back to 1 hour at 5pm.



1. **Enable Post Interval Schedule** – Check this box to enable the setting up a schedule of posting times and interval lengths.
2. **Start Time** (1, 2, 3, 4) – Enter in the starting time for each interval length. ALWAYS go from earliest to latest (i.e. midnight, 8am, 8pm). Note that you can use one, two, three or all four entries.
3. **Post Interval** (1, 2, 3, 4) – The length of the data posting interval at the specified time.

7) **This PC Controls Interval** – Check this box if you want this specific computer to be in charge of the remote posting interval. For most customers, they will always check this box. However, if multiple copies of Centurion are logging in to the same account, then only ONE computer should be in charge of the data posting interval lengths.

8) **Database Interval** – This is the interval length you want the database to use. In order for database reports, exports, and other functions to work smoothly, it is best to use just one interval length and not to have variable interval lengths during the day inside the database. Centurion has a very sophisticated system of matching up each station's posted start time and length of interval data to a specific interval inside the database.

   For example: Suppose you have the stations posting their data at 15 minute intervals from 8am to 8pm, and 1 hour all other times. This is a common setup for stations, because it saves power at night time when traffic is likely light or non-existent.

   However, this kind of a setup will make reports very hard to interpret. If you wanted a 15 minute style Basic Volume Report, all of the data collected at night that was 1 hour would not look right on the report. Centurion solves this problem by always using a fixed length database interval regardless of the length of the posting interval. The software will intelligently spread out longer period counts (such as 1 hour) across several database periods (such as 15 minute). In general, you should set the database interval to the smallest remote posting interval you are using, or to the shortest period of time you would ever care about in a report (most likely 15 minutes).

   Finally, the stations don't wait for the start of an even period before collecting data. They collect data immediately upon powering up. This means the station data won't always line up exactly at the start point of each interval, and Centurion must process the station data in such a way that is correctly spread across one or more database intervals. For example, if the station was turned on at 4:36, then the first 15 minute period will run from 4:36 to 4:51. Centurion always uses aligned intervals, so it will have 15 minute intervals from 4:30 to 4:45, and 4:45 to 5:00. The data coming in will be processed so that 8 minutes of it go into the 4:30-4:45 interval, and the last 7 minutes go into the 4:45-5:00 interval. Centurion automatically handles all the details of this processing so no user intervention is required.

9) **Local (Default) Time Zone** – This is an important value for matching up your computer to the data coming in from the stations. Make sure you have set this value to the time zone your computer is currently operating in.
In addition, this setting becomes the time zone for any station you don't specifically enter in a time zone for.

Table of Stations:

10) **On** – Check this box to enable this specific station. You can enable/disable stations at any time, which makes maintaining the table of stations easier.

11) **MEID** / **Station** – If you are using a ROSIM device, you must enter the last 10 digits of the SIM Card MEID number of the Iris Modem Standalone. If you are using any other kind of traffic counter (like a Pegasus, TT-200, or Omega X3), then you can enter in the unique Site ID programmed into the counter. For ROSIM setups, this number should be written inside the lid of the box containing the WAP and the modem, or you can contact Diamond for help identifying the MEID number of your modem.

12) **Description** – Text description of the station. Usually, customers enter in the location or other descriptive info about the location (i.e. "West Entry" or "Portal #7"). Note that the first 30 characters of this description will automatically be put into "Info Line 1" and the second 30 characters will be put into "Info Line 2" when the database is create for the station.

13) **Time Zone** – If the station has a time zone different than the one of your computer, select it here. Otherwise, leave the station time zone setting at "default".

14) **Status** – This shows the current state of the station. There are seven possible states:

State	*Description*
0-Unknown	Initial state before the software has been able to determine the actual status of the station.
1-No DDS File	Cannot find any data on the Diamond Data Server for this station and/or this MEID number. This likely indicates that either the station has not successfully linked to the network, or that you have incorrectly set the station MEID number.
2-No Data	A file was found on the Diamond Data Server, but it did not contain any valid data.
3-No New Data	This message indicates that there is data on the DDS for this station, but the last posted data is old (not new or current data). Sometimes this state will appear when you first start the system and should be ignored unless it stays this way for several posting intervals. If it stays on "No New Data" for a long time, then it means that something has gone wrong and the station has apparently stopped posting data to the server. This could be a power failure, network link failure, or some other problem that has shut the site down. NOTE: If you are using very long intervals (like 1 or 6 hour) and then switch to shorter intervals (5 or 15 minute), this message may appear if you shut down the software and then later restart it. This is because the software can't tell what interval the station thinks it is at. In this case, simply wait for at least as long as the longest interval length before assuming that something is wrong with the site.
4-Sensor Check	Indicates that data is present and current, but Centurion isn't sure yet if the counter is reporting new data to the modem. Wait at least one posting period before believing that this indicates a possible problem with the site.
5-No Sensor	This means that the Iris Modem is reporting data to the server, but the traffic sensor is NOT reporting new data to it. The likely cause is that the sensor (such as a ROSIM WAP) has shut down or malfunctioned for some reason.
6-GOOD!	This is the most common status and indicates that everything is working as follows: • Data is present on the Diamond Data Server. • The data is current. • The traffic counter is reporting activations to the Iris Modem. If all is working, all stations should report GOOD status.

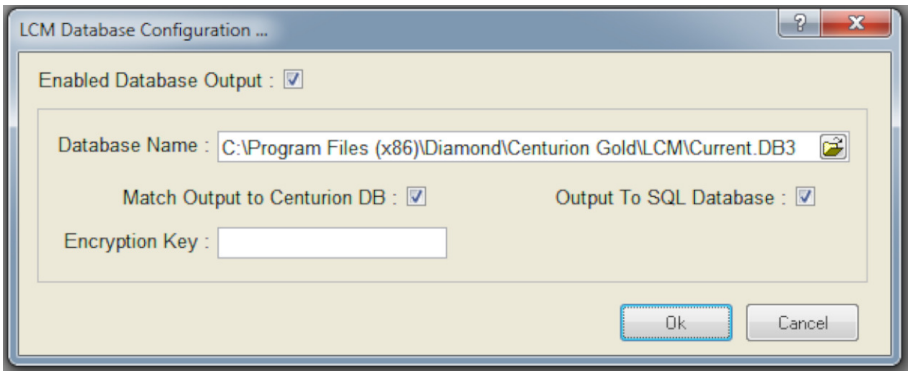
"LCM" Button- Live Counter Monitoring SQL Database:

Click the "**LCM**" button at the bottom of the setup screen to open a new window that allows you to configure the Text or SQLite database creator. The SQLite database is a lite version of SQL, and can be interpreted by most SQL programs and databases. The Text format is simply a text file containing all the downloaded data from the field devices.

If you choose to create a SQLite database, the program will create a unique *Table* for each station and then post to that table data as it comes into the system containing the following record types:

Field Name	*Type*	*Description*
Id	INTEGER	Row ID number (PRIMARY KEY)
EpochTime	BIGINT	The Epoch Time that this period of recording starts (will always be to the nearest minute). EpochTime is the number of seconds since 00:00:00 Coordinated Universal Time (UTC), Thursday, 1 January 1970.
Interval	SMALLINT	The length (in minutes) of this period of recording.
Lane1 Lane2 Lane3 Lane4 … Lane48	SMALLINT	Number of vehicles crossing the Lane 1 through Lane 48 sensor during this interval.

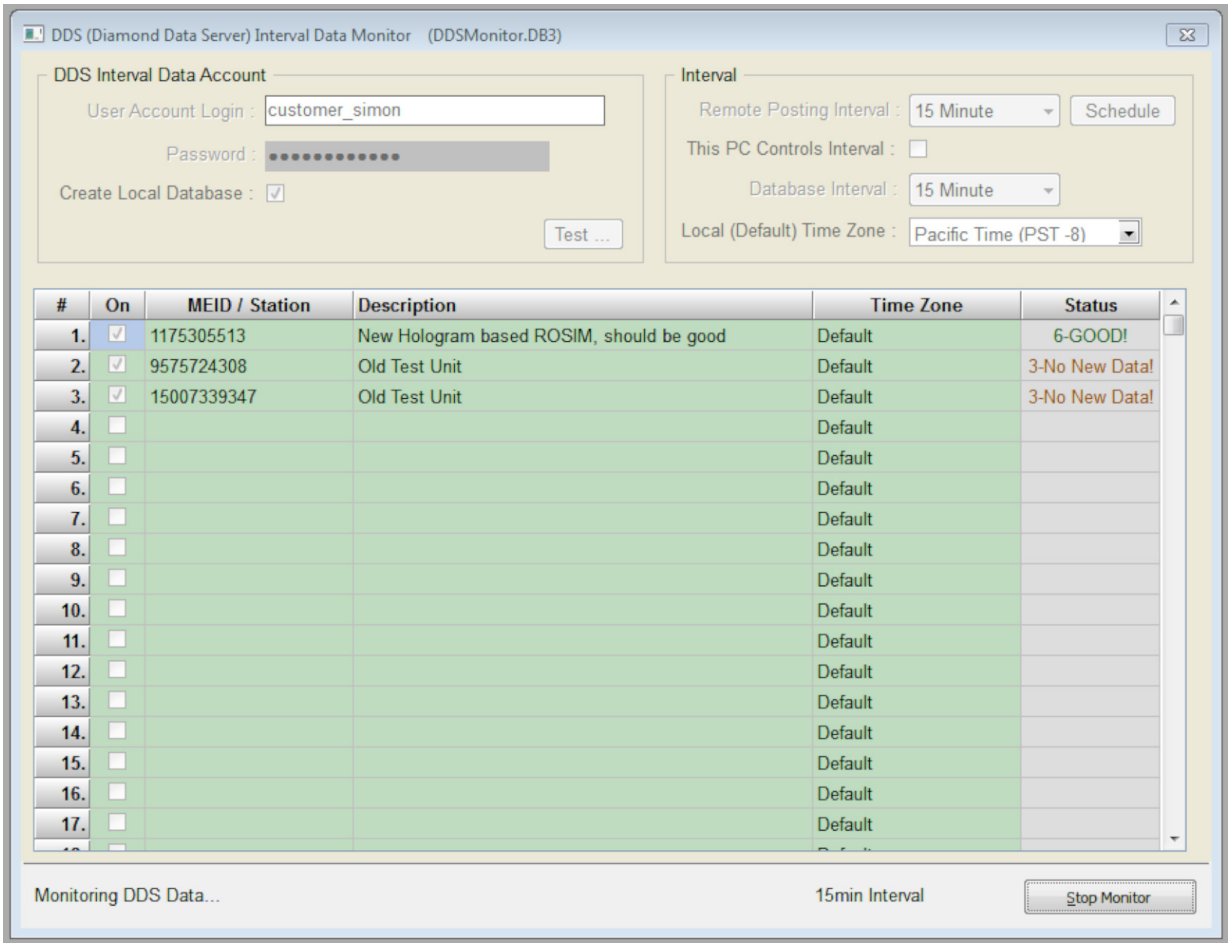
After clicking the LCM button, the following window will appear:



1) **Enable Database Output** – Check this box to enable outputting data to either a SQLite or Text database.
2) **Database Name** – The file name holding the database. This can be a local file, a network drive file (for multi-user access), or even a cloud server file for access across multiple domains.
3) **Match Output to Centurion DB** – This is an important option which, when checked, causes the SQLite database to match the Centurion database in using fixed interval lengths (i.e. all intervals are the same length such as 15 minutes). If this box is not checked, then the SQLite database will use whatever interval and start time the data came in as, which can vary in both interval length and be a time not synced to an even 15 minute (or whatever selected) period.
   You MUST also create a local Centurion database (selection on previous screen) in order to use this option!
4) **Output to SQL Database** – If checked, the data is output to a SQLite database. If unchecked, a simple text file is created. Most users will want the SQLite style database output.
5) **Encryption Key** – If left blank, no encryption of the data is implemented. Otherwise, enter in the encryption key you want to use. Any users wanting to access the SQLite database must also know this key in order to view or otherwise access the data.

Interval Data Monitor – Active Monitoring

Once the setup is complete, click the “Start Monitor” button to begin actively polling data from the server. Once this button is clicked, the screen will change to show something similar to the following:



Active monitoring is shown by all the data lines changing to a background of green. In addition, no changes can be made to the configuration while this mode is running.

The bottom of the window shows a status line which indicates the current activity of the system. This line can be checked to see what is currently being done.

When you want to stop monitoring, simply click the “Stop Monitor” button or close the window.

Time and Date Concerns with Interval Data:

To insure that data is correctly marked in the database, Centurion relies on UTC (Coordinated Universal Time) for all data from Interval counter stations. In other words, all the data it gets from the Iris Modems will be marked in UTC time, which is typically 4-8 hours ahead of local time in the U.S.

This makes two things very important:

1) Insure that your PC’s clock is correctly set! This is critical so that Centurion can determine when new data is expected from the stations. If the PC clock is wrong, then Centurion won’t poll the data from the Diamond Data Server at the correct time and problems can occur. It is recommended that you enable automatic syncing to an internet time source on your PC.
2) The second important factor is to make sure you set the time zone correctly on the DDS Setup screen both for your local machine and for each station. Many users will be located only in one time zone, but larger setups may have stations reporting from more than one time zone.