

1. Office Components

1.1. Datastation / Basestation

A datastation (also called basestation, radio base) wirelessly receive data from data loggers installed in field/greenhouse production areas via radio communication. The data is then downloaded to a computer via a software program and can be visualized.



Figure 2. Datastation (Courtesy of Decagon Devices Inc.)

Datastations may differ in their area of influence (working radius), communication mode and data storage capacity. For example, the datastation (Figure 2) provided by [Decagon Devices, Inc.](#) (Pullman, WA) can collect data wirelessly from up to 80 data loggers within a radio range of typically 1-3 miles and has a capacity of storing up to 36,000 packets of data (Decagon Devices, 2014). Data needs to be periodically downloaded from the datastation to a computer via [Datatrac software](#) (Decagon Devices, Inc., Pullman, WA) before the old data is overwritten when the datastation storage space is utilized in full. The download frequency can range from every couple of hours to months, depending on the number of nodes and their measurement intervals. This data download process can be automated when the Datatrac software continuously runs on a computer.

The radio base (Figure 3) provided by [Mayim, LLC](#) (Pittsburgh, PA) has similar working radius as Decagon's basestation. However, data is automatically downloaded to a computer via the associated Sensorweb™ software program (Mayim, LLC, Pittsburgh, PA).



Figure 3. Mayim LLC datastation

1.2. Antenna

Datastations are equipped with an antenna that can be extended outwards (Figures 2 and 3). The height and positioning of this antenna is important for proper communication with data loggers. Direct and unobstructed line of sight is ideal for good communication. When nodes are installed in operations with varying topographies between production blocks and the farm office (example, when low lying spots /valleys exist on a farm), or when an object is blocking the direct line of sight between the node and base station, the antenna needs to be raised on a mast, with an extension cable. A height of 20-30 feet typically extends the range of the basestation to a 2-3 mile radius from the farm office.

1.3. Computer and Software

As mentioned previously, data is downloaded to a computer from the data / basestation and into the database of a software program (e.g. Datatrak or Sensorweb™). The sensor data is then ordered and graphically displayed (see [Using Datatrak Software module](#)). A desktop/laptop computer can be used for this purpose.

1.4. Repeater

Repeaters are devices that can be used to aid communication between data loggers and basestation when a direct communication between the two cannot be achieved, by raising the basestation antenna. Repeaters can be deployed in such scenarios and can act as a link by collecting data directly from nodes and transferring it to a datastation.

Decagon Devices, Inc. provides the Rm1 repeater (Figure 4) which can also be used for real-time connection to Em50R data loggers (e.g. using a laptop in a farm vehicle), in addition to being used as a repeater in a wireless system. The Rm1 can be also used to connect to data loggers and configure node name, date and time, measurement interval, and port sensor assignment. (Decagon Devices, 2014).



Figure 4. Rm1 Repeater (Courtesy of Decagon Devices Inc.)