QTech Irrigation Management

## Irrigation Network On-Farm Analysis

The QTech Irrigation Management Software (QIMS) is a windows application suite used in conjunction with the IPC Manager to configure (schedule) and control fixed set Irrigation Point Controllers (IPC). The software provides integration with Irrigation Network Controller (INC). The INC maintains regular polling cycles of the IPC network it is monitoring, so collecting IPC status data and developing a historical view of the IPC's operation and state.

A user friendly interface allows visualisation of the system. At a glance the user can review the status of the IPC network via the QTech Irrigation Dashboard. From the Dashboard the user can drill down into the INC operational state as well as each IPC and see its current status.

The QIMS software system is delivered on an Intel NUC mini PC. The NUC is the point of access to the Irrigation control system. It is connected to the INC via the USB interface, with the INC being the communications Gateway to the IPC's. Remote off farm access to the NUC is via the internet.

The system component parts;

- **Irrigation Network Controller (INC):** This is a permanently installed and powered device that is used to monitor and record the state of each IPC in a system. It can also configure and test IPC's.

- **Intel™ NUC Mini PC:** Intel NUC mini PC, small application server for the QIMS software and connection to the INC.

- **Irrigation Management Software:** Windows software application that is used to monitor and control the IPC's operation via, the INC.
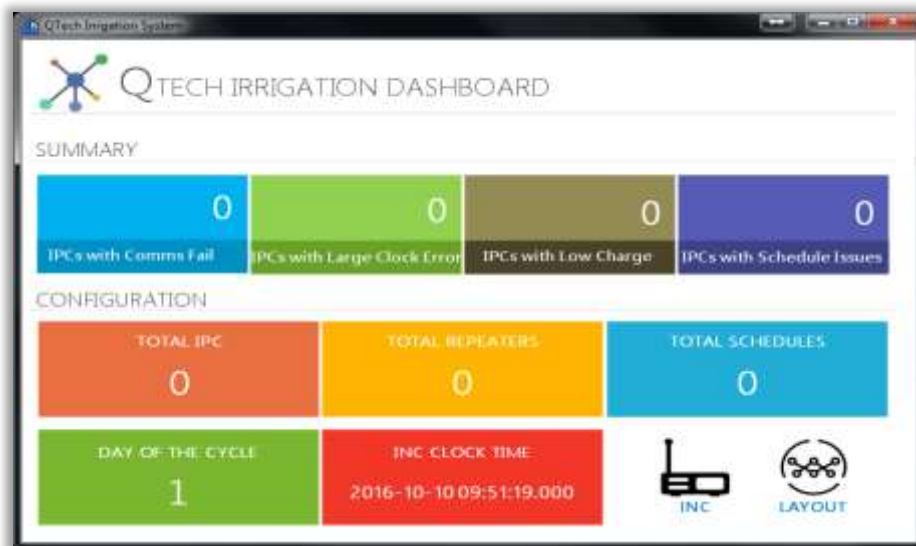
Irrigation Management Software

Irrigation Dashboard

The Irrigation Dashboard is the center of the QIMS application, it provides at a glance the status and state of the IPC irrigation network. We can see if there are any individual IPC's;

- failing to communicate
- with clock errors
- with low batteries
- with schedule issues

We can quickly see what day we are in of the operating schedule and current system time.

From the Dashboard we can drill down into the INC properties and the Irrigation Network layout.


Irrigation Layout - Logical

The irrigation Layout provides us with two levels of visualization of the Irrigation system.

Firstly we see a logical layout that displays the IPC's (as circles) as configured and installed by lateral. Each lateral can be labelled (see IPC Manager) and that label is displayed above each logical box.
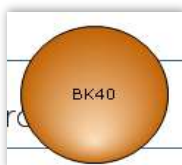
The circular IPC Status Indicator will enlarge when you hover the mouse over it and display the IPC label.

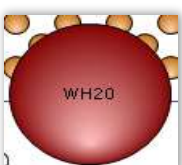The colour of the circular IPC Indicator identifies the known system.

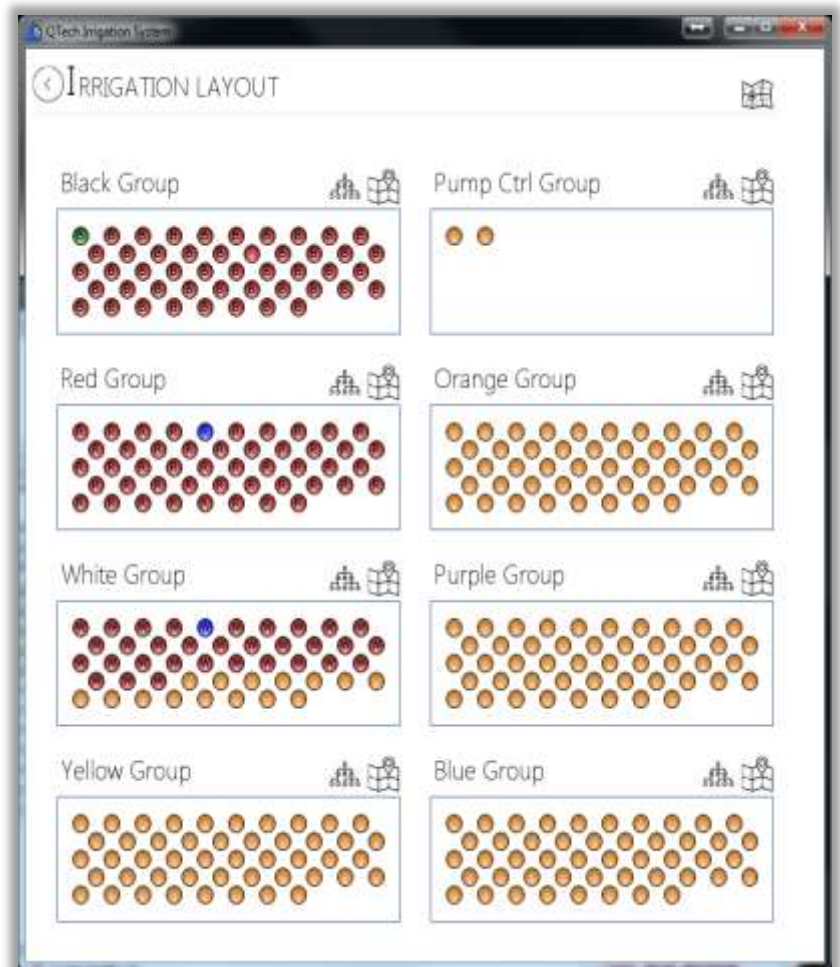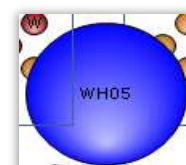- Green - IPC with Good Comms and no Battery Charge issue and no Clock issue
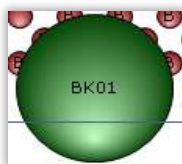
- Orange –IPC with either a battery issue or has a clock error or the IPC is uninitialized

- Red - IPC with missed last scheduled communication

- Blue – IPC is currently irrigating

Mouse clicking on the indicator will display the IPC status and properties form.

IPC Status / Properties

Down the left hand panel of the form the IPC properties are detailed;
- **IPC Name**
- **Serial Number**
- **Comms Mode**
- **Radio Network Channel**

Down the right hand panel of the form the IPC status is shown. This is as current as the last successful communications poll to the IPC.
- **Charge** – by clicking on the charge icon a graph / trend will display showing the battery charge movement.
- **Comms Status** – tells us if the setup IPC is actively communicating or failed.
- **Clock Error** – tells us if the IPC clock is out of sync with the INC.
- **Hops** – tells us the number of hops that it takes to communicate with the INC.
- **Poll Time** – tells us that last valid time and date of a successful communications poll.

Irrigation Layout - Topographical

The second level of Irrigation Layout of visualization is a topographical display.

If the Irrigation design has been provided with a geospacial layout and the GPS co-ordinates of each IPC's position is available then QIMS can display this.

Clicking the Map icon at the right hand end above each sub-lateral logical layout box will display the topographical layout of that lateral. As for the logical layout you can hover over any IPC and click for the status and properties form.
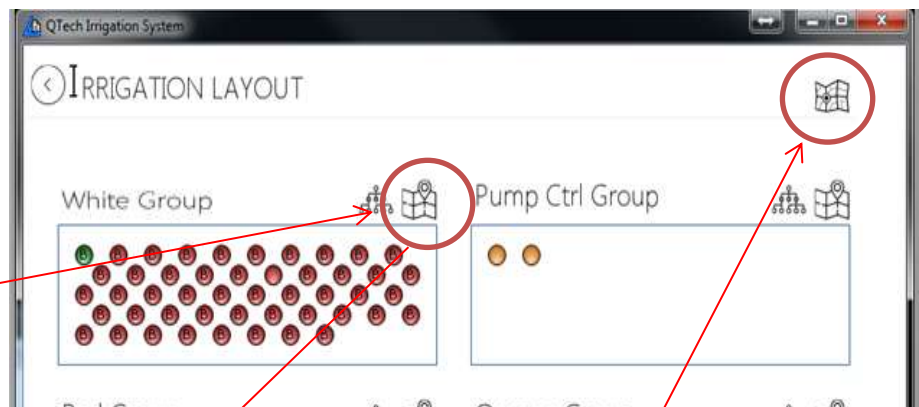
Clicking on the Map icon at the top right hand side of the Irrigation Layout form will display the system wide topographical layout. In a large system this layout can become confused due to screen scaling hence breaking it down to a manageable display per sub-lateral.
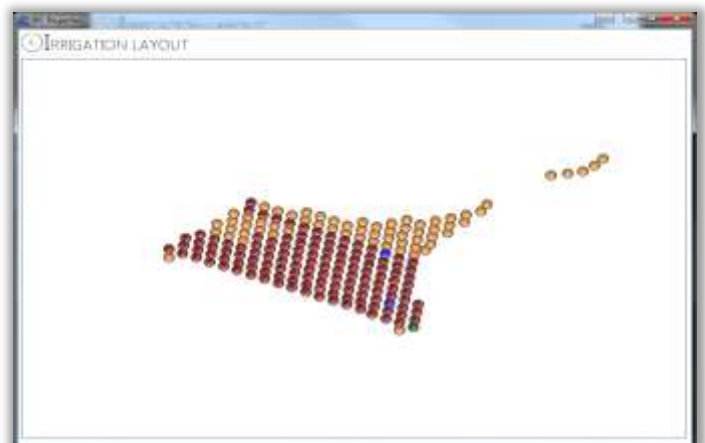
Irrigation Group Commands

To the left of the Map icon above each logical sub-later box is the Irrigation Group Command icon. This brings up a control form that allows the initiation of commands specific to the sub-lateral group of IPC's.

From the form we can Inhibit the operation of the block of IPC's in that group. We are able to request the Status of the IPC and send a Schedule or group of Schedules.

An IPC valve can be turned On and Off.

INC Properties and Status
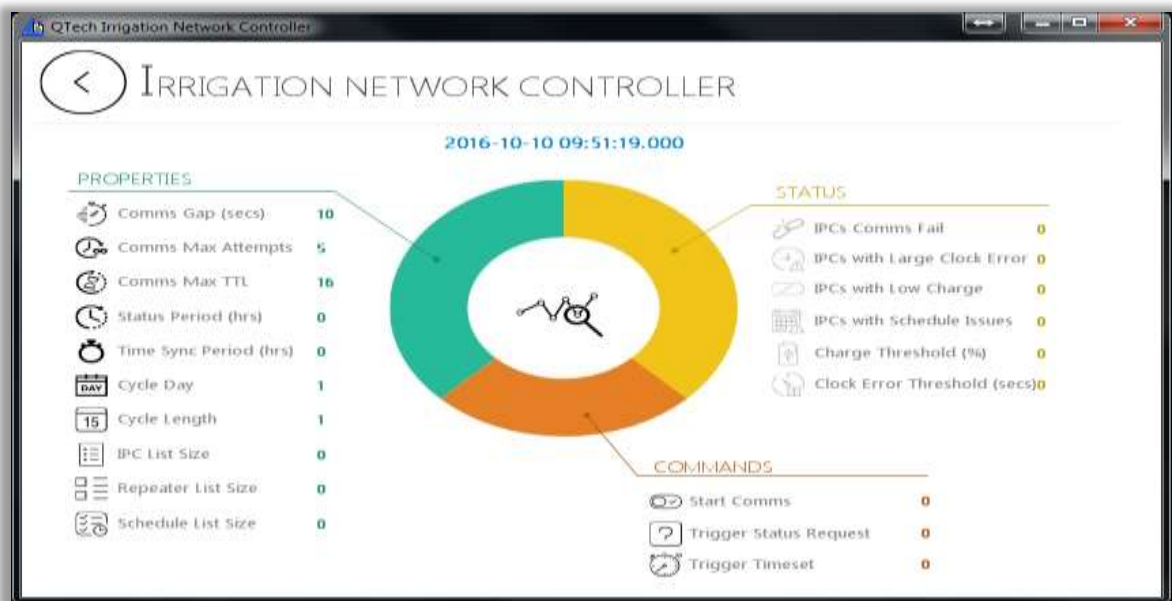
When we drill down to the INC we can view the configured properties of the INC so the system setting can be viewed quickly and easily via the PC application.

The INC status detail listed down the right hand side of the form reflects the status as displayed on the Dashboard screen

In addition there are several INC commands that may be initiated from the form also.

The INC is a permanently installed and powered device that is the gateway used to monitor and record the state of each IPC. The INC actively communicates (via background polling) with the installed IPC's across the mesh radio network or via direct communication with geographically located Repeaters. The INC logs its communication with the IPC's and their last known status; such as last valid Poll, Battery state, Clock Error.

The INC interacts in real time with QIMS passing through the communications where the data is logged into a database for display and reporting, providing a more extensive visual operational analysis of the IPC network and their state.

The INC may function in standalone mode where status information is only retained in a summary form. In standalone mode the user will operate the INC via the resistive touch sensitive mono-colour OLED graphical display, From the INC you can manually trigger communications with a specific IPC, where you can send a schedule (revised or otherwise), control the valve / solenoid, initiate a status request. System configuration files, POD list, Schedule lists come from the IPC Manager application as they do for the EP3.