

**TECHNICAL ASSOCIATES—BLADEWERX**

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**TBM-IC-BW Ion Chamber**

# **Ion Assistant User's Manual**

# IonAssistant User's Manual

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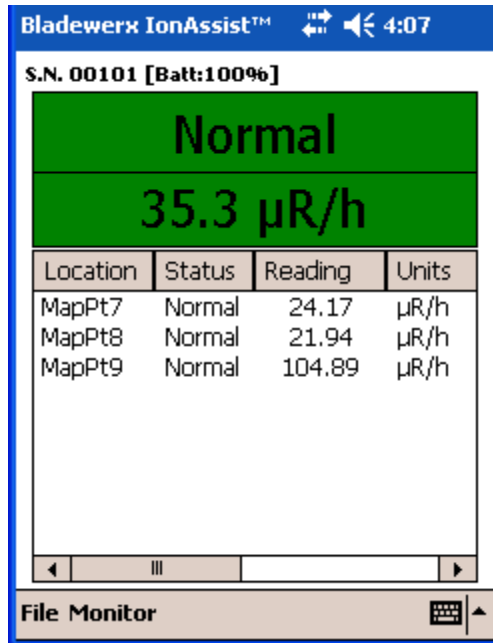
## Overview

The Bladewerx IonAssistant software used in the TBM-IC-BW is a full-featured instrument control and data-logging application implemented on the Microsoft Windows CE (PocketPC) platform. The software provides for parameter editing of calibration values and reading display format, as well as alarm settings. A simple menu system and dialog boxes provide the user interface to parameter settings. Controls consist of a touch-screen and stylus, along with an On/Off switch and three special function buttons.



Data-logging features consist of automatic logging of readings to a comma-delimited-text file based on a user-defined interval, or manual logging with the location field supplied by user-supplied text, optional bar-code scanner, or RadMap index.

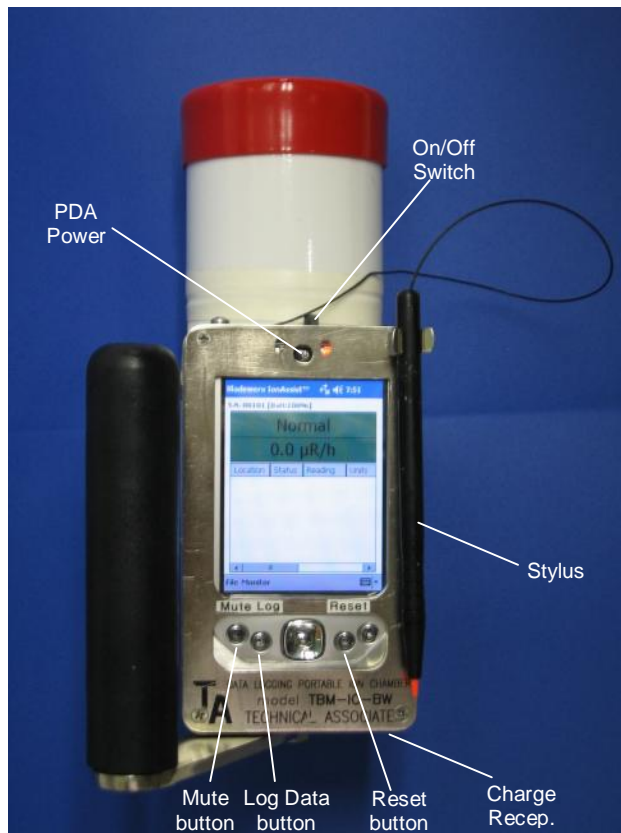
The optional radiation-mapping supports the universally-accepted DXF-format of CAD drawings as the basis for the mapping displays. Instrument reading data is added to the DXF file and saved for later analysis.



The display screen normally shows the current reading and status, battery level, and a list of the data-logging entries. The color-coded meter readings give immediate indication of an alarm status and/or displayed range.

## Instrument Controls

There are several buttons and switches on the TBM-IC-BW which control aspects of the operation and data-logging which are referred to throughout this manual. The photo below shows the switches and controls and identifies their functions.



**PDA Power**—this button turns on power to the integrated PDA.

**On/Off Switch**—this switch turns on/off power to the TBM-IC-BW electronics and counting circuitry.

**Stylus**—this is detachable to be used on the touch-screen.

**Charge Recep.**—this socket is used by the AC Adapter to charge the TBM-IC-BW internal battery.

**Reset button**—this button resets the instrument reading average to zero and clears any latched alarms.

**Log Data button**—this button initiates a data-logging function. If RadMap Mode is disabled,

the button calls up the Location text box where the user can enter the location of the survey, or using the optional bar-code reader, can scan the bar code which will automatically enter the coded text of the location. If RadMap Mode is enabled, this button will display the RadMap and allow the user to select the location on the map—or, if pressed again, will hide the RadMap and return to the normal display.

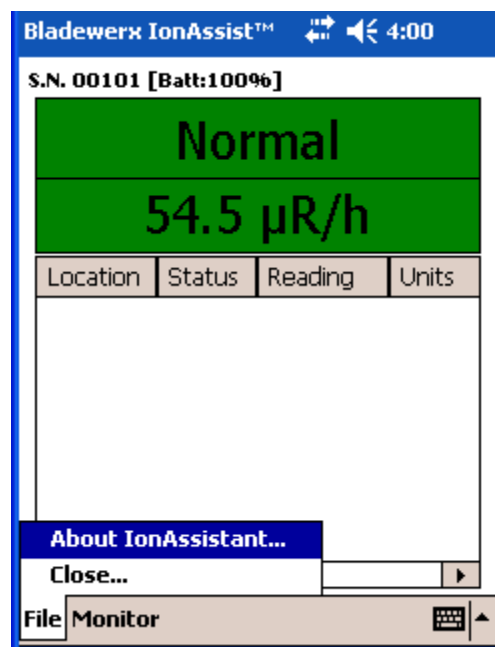
**Mute button**—this button silences or re-enables the audible clicker, which annunciates the count rate.

## Menus and Dialogs

### IonAssistant Menus

The IonAssistant menu consists of a File menu and a Monitor menu.

#### File Menu



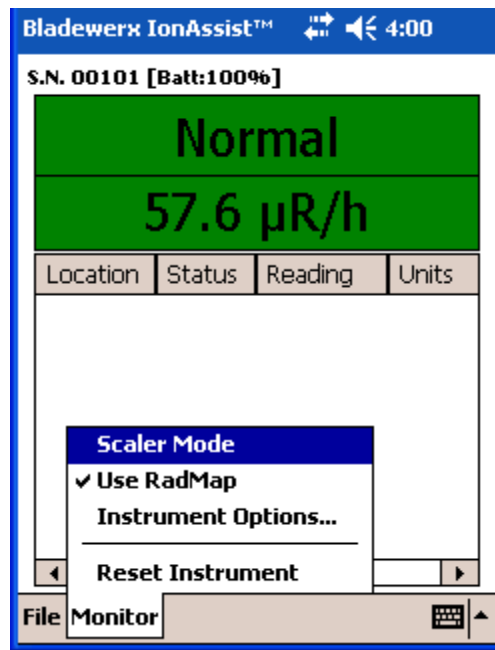
The File menu consists of two items:

**About IonAssistant**—this item displays a dialog listing version and copyright information.

**Close**—this item closes the IonAssistant program and exits to the Windows operating system. Under normal circumstances, exiting the application is not recommended.

## Monitor Menu

The Monitor menu consists of four items:



ratemeter or scaler modes.

**Scaler Mode**—this item selects between Ratemeter mode and scaler mode. Scaler mode provides for fixed count time readings and ratemeter mode consists of continuous readings with a fixed response time.

**Use RadMap**—this item selects the RadMap feature. When unselected, the Location dialog will appear when the Log button is pressed. When selected, the Log button will activate the RadMap so the user can select the reading location.

**Instrument Options**—this item calls up the parameter editing dialog.

**Reset Instrument**—this item causes the reading to be reset to zero in either



## Instrument Properties Dialog

The Instrument Properties dialog provides access to viewing and editing instrument parameters. It consists of three tabs of settings: System settings, General settings, and Alarm settings. The three pages of parameters are covered below.

### System Properties Tab

Bladewerx IonAssist™ 4:01 ok

**System Properties**

Serial No: 101

Response Time (sec): 15

Step Change Factor: 5

Logging Freq (mins): 60

Scaler Count (secs): 10

System General Alarms

File Monitor

**Serial No**—lists the instrument serial number. This setting is not user-editable.

**Response Time**—this value sets the instrument response time, defined as the time (in seconds) for the reading to go from 10 to 90% of final value following a step change in the field. (not currently implemented)

**Step Change Factor**—this value defines the deviation from steady state conditions, required to override the Response Time setting and update the display immediately with the value of the instantaneous reading. The Factor is the number of standard deviations from the average reading that the instantaneous reading must exceed to cause the step

change. (not currently implemented)

**Logging Freq**—in Ratemeter Mode, this value defines the logging frequency for automatic logging of readings to the log. A value of zero disables the automatic logging

**Scaler Count**—in Scaler Mode this value defines the fixed count time (in seconds) of a scaler reading. It has no effect in Ratemeter Mode.

## General Properties Tab

Base Units:	<input type="text" value="R/h"/>
Min. Prefix:	<input type="text" value="micro"/>
Max. Prefix:	<input type="text" value="-----"/>
Cal. Constant:	<input type="text" value="0.001"/>
Dead Time:	<input type="text" value="0"/>
Fixed Bkg:	<input type="text" value="0"/>
Count Scaling:	<input type="text" value="1"/>

**Base Units**—this parameter specifies the base units displayed by the instrument. It can be any meaningful unit of measure, but should not usually contain any units prefix (e.g. micro, milli etc.) since these are automatically added by the program.

**Min. Prefix**—this multiplier defines the smallest units prefix to be automatically applied to the displayed reading.

**Max. Prefix**—this multiplier defines the largest units prefix to be automatically applied to the displayed reading.

**Cal. Constant**—this multiplier is applied to the average count rate in CPS to produce the unscaled reading in the base units. The base units reading is then

scaled with the appropriate prefix multiplier to produce the prefix-scaled display reading. The Cal. Constant should be specified in units of Base Units per CPS (e.g. R/h/cps).

**Dead Time**—this value is the detector/electronics dead time (in  $\mu\text{sec}$ ), following the detection of a count, before the detector/electronics are capable of detecting another count. The software will use this value to correct the reading for very high count rates.  
*Note Dead Time is not typically used in ion chamber instruments*

**Fixed Bkg.**—this value is defines a “background” level (in base units) to be subtracted from the gross count rate to produce the net reading.

**Count Scaling**—this value is used to scale the input count rate to account for electronics scaling (e.g. divide-by-two counters). It is not typically used in ion chambers.

## Alarm Properties Tab

Bladewerx IonAssist™ 4:02 ok

Alert Alarm: 10 High Alarm: 50

Low Count Fail Time (mins): 10

Over-range Limit (cps): 1000

Latching Alarms

System General Alarms File Monitor

**Alert Alarm**—this value defines the rate above which the instrument will go into *Alert Alarm* status. The value should be entered in Base Units (e.g. R/h).

**High Alarm**—this value defines the rate above which the instrument will go into *High Alarm* status. The value should be entered in Base Units (e.g. R/h).

**Low Count Fail Time**—this value defines the number of minutes of operation allowed with no counts received before setting the *Low Count Fail* status.

**Over-range Limit**—this value defines the maximum count rate allowed before failing the instrument. It is typically set to a value where the dead-time compensation error becomes greater than 10%.

**Latching Alarms**—this setting, when active, will cause the instrument to remain in the alarmed state even though the reading may fall back below the alarm threshold. Only an Instrument Reset command will clear a latched alarm.

## Instrument Operation

Turn on the instrument (On/Off switch and PDA Power). If the display is not already showing the IonAssistant screen, you will need to manually start the application. From the “Windows Today” screen shown below, tap the Start button and select IonAssist from the Start Menu.



Normally, the user need not close and exit the IonAssistant application, but can turn off the power and PDA without exiting. In some cases, after a PDA reset or to install new software, the manual start will be necessary.

Once the IonAssistant program is running, the meter will display readings and used for scaler counts or ratemeter readings.

### Data-Logging

Depending on the data-logging mode, pressing the Log button will present the Location dialog, or the RadMap. Completing either screen with either start a scaler count (Scaler Mode), or record the current ratemeter reading (Ratemeter Mode). The data point is always logged to the comma-separated-value (\*.csv) file according to the following example:

```
Time, Mode, Count Time, Status, Reading, Units, Location, RadMap
39385.67059028,R, 30,Normal, 24.167,µR/h,MapPt7,Bldg-5009.dxf
39385.67113426,R, 30,Normal, 21.938,µR/h,MapPt8,Bldg-5009.dxf
39385.67152778,R, 30,Normal, 104.892,µR/h,MapPt9,Bldg-5009.dxf
39385.65436343,R, 30,Normal, 31.2271,µR/h,MapPt4,Bldg-5009.dxf
39385.65454861,R, 30,Normal, 35.6362,µR/h,MapPt5,Bldg-5009.dxf
39385.65503472,R, 30,Normal, 4.26397,µR/h,MapPt6,Bldg-5009.dxf
```

The fields are described as follows:

**Time**—this value specified a Microsoft Excel format that represents the number of days since December 30, 1899 at midnight (including fractional days). This format is defined by Microsoft as follows:

The **DATE** type is implemented using an 8-byte floating-point number. Days are represented by whole number increments starting with 30 December 1899, midnight as time zero. Hour values are expressed as the absolute value of the fractional part of the number. The following table illustrates this.

Date and time	Representation
30 December 1899, midnight	0.00
1 January 1900, midnight	2.00
4 January 1900, midnight	5.00
4 January 1900, 6 A.M.	5.25
4 January 1900, noon	5.50
4 January 1900, 9 P.M.	5.875

If the log file is imported as text into Microsoft Excel, the Time column can be formatted as a Date or Time field and the conversion will be done automatically.

**Mode**—this field is either an “R” for Ratemeter Mode, or an “S” for Scaler Mode.

**Count Time**—this is the Scaler Mode count time. Ignore if using Ratemeter Mode.

**Status**—this field can be one of the following:

- Normal
- Overrange
- High Alarm
- Alert Alarm
- Low Count Fail

**Reading**—this field displays the reading in the units specified in the Units field. *Note: If autoscaling prefixes are used, the units of successive readings may not be the same.*

**Units**—this field describes the reading units.

**Location**—this field describes the location where the reading was taken. It is either entered manually by the operator, a scanned bar code location, or a point number on a RadMap. RadMap locations are automatically generated and are denoted by the string “MapPtxx” where “xx” is the RadMap Index (1, 2, 3,...). The index is incremented after each log and reset to 1 at the start of a new day (at midnight).

**RadMap**—this field identifies the RadMap marked with the Location code in the previous field. A new RadMap DXF Layer is created for each day a data point is logged.

## Radiation Mapping Configuration and Operation

IonAssistant RadMap Mode allows the software to display and append to DXF-format CAD files. DXF is an evolving but backward-compatible file format developed by Autodesk Corporation as a Drawing eXchange Format with other CAD applications. Most facility architectural drawings can be readily saved in the DXF format, the read and displayed by the IonAssistant program. Simply copy the DXF files to the Secure Digital (SD) memory card in the PDA and the files will be listed for selection in the Change Map... dialog.

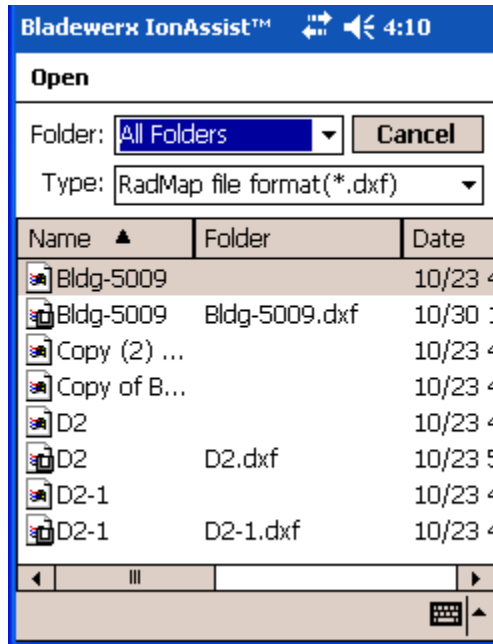
Before porting the drawings to the PDA, you may wish to mark the intended survey locations on the DXF files. In the following example, suggested survey locations have been marked with small magenta circles before saving the file to the SD Card.

Once the drawing files have been copied to the SD Card, re-insert the card in the PDA and select *RadMap Mode* from the *Monitor* menu.



Press the **Log** button. If a map is already defined, the map will be loaded and displayed (maps may also be copied to the PDA memory in the My Documents folder). If a map is displayed, tap the **Change Map...** button on the screen. If no map was previously selected, the map selection dialog will already be displayed.

*NOTE: The last selected map is always saved on exiting the Ion Assistant program so that when the application is run again, the last used map will be re-loaded automatically.*



The map selection dialog shown lists all available maps—both those in internal memory, as well as those on the SD Card.

To select a map, simply tap on the map filename and that map will become the current map. The full map will be shown in the window, although details may be too small to view.

You can use the *Zoom In* button to zoom into sections of the map so that details become visible.

You can pan or shift the map by dragging the stylus (or dragging the tip of your finger) across the map until the desired section of the map is displayed.

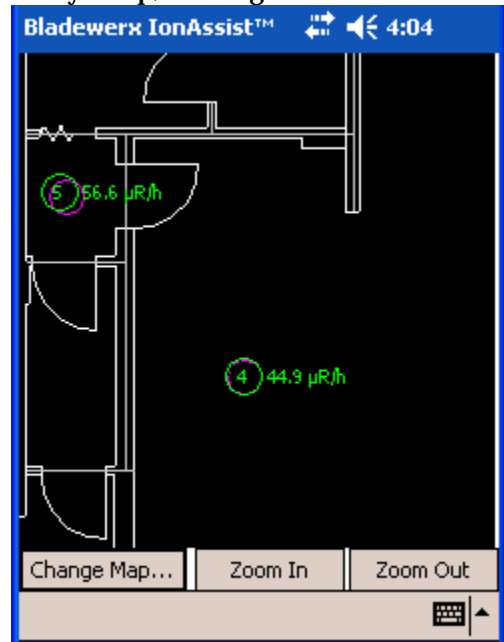
### Selecting log points on the map

Once the portion of the map is displayed where the survey location is to be performed (or has been performed), tap-and-hold the stylus at the location you wish to place the reading. You will see a series of dots circle the stylus tip, then a green circle drawn on the screen at the placement point.

If Scaler Mode is selected, the map will be hidden and the meter displayed while the scaler count timer counts down to zero. On completion of the scaler count, the scaler reading and units will be added to the map at the location marked, however, you will not see this until you re-enter the map by pressing the **Log** button.

If Ratemeter Mode is selected, you will see the ratemeter reading displayed immediately next to the circle.

The Log Index will be displayed inside the circle to allow association with the MapPtxx entry in the log file.



### DXF File Modifications

When the IonAssistant program adds a log entry to the map, it modifies the associated DXF file. A new DXF Layer is added to correspond to the current day and the log

readings placed on that layer. For instance, if the survey was performed on 1 November 2007, the layer named Survey\_20071101 would be created and all data logged that day would be added to that drawing layer.

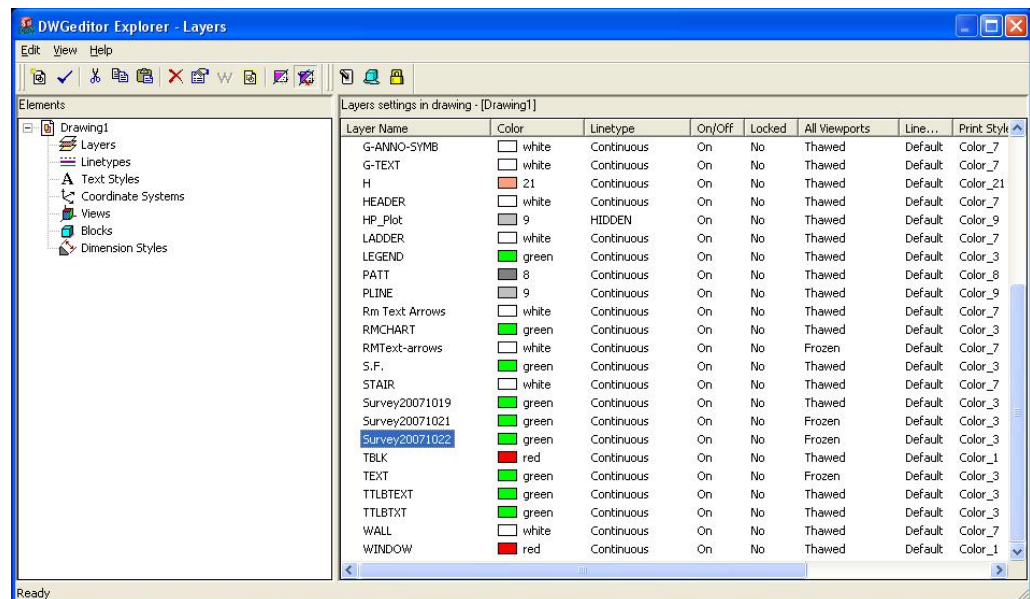
To prevent clutter on the maps, the IonAssistant software hides the survey points from previous days when displaying the map so that only the current day's points are shown.

When all log points on a map have been completed, the map must be resaved to the SD Card or internal memory. Selecting a new map (*Change Map...* button) will do this.

### Viewing the RadMap Information

After saving the RadMap DXF file to the SD Card, the SD Card can be removed and the modified map viewed on any desktop computer with CAD software or a DXF Viewer software.

Be sure to examine the list of drawing layers and make the survey layer(s) of interest visible (Thaw or On), and those layers not of interest hidden (Freeze or Off).



A free DXF Viewer can be downloaded from the Internet at the following link:

<http://www.solidworks.com/pages/products/edrawings/viewer.html>



