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Introduction
The PCDMonitor program is a small utility that captures events generated from PC-DMIS and creates a text display of the event data. The events captured are limited to the display of feature measurements and dimensions from part programs that are executed. The PCDMonitor program can broadcast this data for display by other programs such as the PCDMonitorRemote program. The goal is to have a system where the measurement of feature points for large parts or fixtures can be visually observed by the operator and results displayed on a portable device like a tablet in place of a large screen monitor.

The PCDMonitorRemote program can be run on GNU/Linux, OS X, Windows, and suitable Android devices. The PCDMonitor program is only suitable for Windows since PC-DMIS only works on this operating system.

The PCDMonitor and PCDMonitorRemote programs communicate through an Ethernet connection. In order for this to function both ends must be reachable through an TCP/IP connection.

PCDMonitor Overview
The PCDMonitor program captures the event data from PC-DMIS during normal use of the software. For example, when a part program is opened or closed an event message is sent from PC-DMIS and will be displayed by the program. When a program is running the feature measurement and dimension events are captured and displayed. Examples of the different types of results are shown in figure 1 and figure 2.

![Figure 1: PCDMonitor program showing the results of the measurement of a point. The reported T value is calculated based from the feature nominal, actual, and IJK vector.](image)
Figure 2: PCDMonitor program showing the display of a dimension when executed by PC-DMIS. The format of the dimension depends on the type.

The display of features includes additional information that may be relevant to the user. For example, the measurement of a vector point will also display the profile deviation (T value) which is not calculated at the feature level by PC-DMIS.

The PCDMonitor program has the following options:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Power Symbol]</td>
<td>Start or stop the monitoring of events from PC-DMIS. The background color indicates the state where grey is off, green is running, red for error, and yellow for idle. See Connection Modes section for more details.</td>
</tr>
<tr>
<td>![Toggle Symbols]</td>
<td>Toggle button to enable or disable broadcasting of data.</td>
</tr>
<tr>
<td><strong>IP Address</strong>: &lt;ANY&gt;</td>
<td>The range of TCP/IP addresses that can be used for the remote monitoring program and the port address. Port Number: 2112</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
</table>
| Font Size:      | Slider for setting the size of the displayed font.

**Connection Modes**

Starting with version 2.0 of the PCDMonitor program the connection button is split into two different modes. It is, for example, no longer necessary to have PC-DMIS running prior to pressing connect and it is no longer necessary to disconnect if PC-DMIS is closed. This also keeps all remote connections active if PC-DMIS is restarted.

This is achieved by using different connection modes. The PCDMonitor program watches the state of PC-DMIS and when it detects it has been closed or is currently not running it will automatically go into an idle mode. When PC-DMIS is started it will be detected by the PCDMonitor program at which time it will automatically reconnect and return to the normal operation mode.

**PCDMonitor Broadcasting to Remote Devices**

When the option to broadcast measurement data is enabled the PCDMonitor program will watch for connections on the indicated port number within the specified range of TCP/IP addresses. When a connection is established to a remote device it will begin to receive all the data that is displayed by the PCDMonitor program.

The format of the transmitted data is pre-defined by the PCDMonitor program and is sent as text with a single ‘\f’ character transmitted at the end of every display block. The remote program is expected to clear the previously received data when ‘\f’ is received. Data that is transmitted by the remote program is currently ignored.

**PCDMonitor Troubleshooting**

There are a few situations that may be encountered when running the PCDMonitor program:

**Error PC-DMIS is not running**

In order to access the events PC-DMIS must be running first. This is necessary so that the proper version can be identified and used.

**Error CoCreateInstance: Status 0x800702e4**

If PC-DMIS is running with administrative privileges then PCDMonitor must also run with the same elevated permissions. If the privileges are mismatched then this error is reported. The complete description of this error from Windows is *The Requested Operation Requires Elevation*.

**Error CoCreateInstance: Status 0x80080005**

If PC-DMIS is running with user privileges then it may not be accessible by other users depending
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on the security policy. This error will take up to 120 seconds to be returned to the program.

An example of a server error as reported on Windows 7 x64 event logs:

Event Log:

Unable to start a DCOM Server: (ECA6CD05-7A02-480D-9B75-E6C5680B215D). The error: "740"

Happened while starting this command:
C:\Program Files (x86)\WAI\PC-DMIS 2012 MR1\PCDLRN.exe -Embedding

There are two solutions to this:

1. Run both PC-DMIS and PCDMonitor with administrator privileges.

2. Change the DCOM permissions of the PC-DMIS Automation Server to allow users to access the software. This is set through the Windows Component Services section of the control panel. Essentially this software is configured to not allow other users to access it.
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PCDMonitorRemote Overview

The PCDMonitorRemote program is a utility that displays the data transmitted by the PCDMonitor program. This utility can be run on any computer or device provided it has a reachable TCP/IP connection to the computer running the PCDMonitor program. The PCDMonitorRemote program can run on any supported OS.

Figure 3: PCDMonitorRemote program running on a Galaxy Tab4 with an Android operating system.

The PCDMonitorRemote has the following options:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start or stop the monitoring of events from PC-DMIS. The background color indicates the state where grey is off, green is running, red for error, and yellow when waiting for a connection to complete.</td>
<td></td>
</tr>
<tr>
<td>IP Address:</td>
<td>The TCP/IP address and port number for the computer running the PCDMonitor program.</td>
</tr>
<tr>
<td>Port Number:</td>
<td></td>
</tr>
<tr>
<td>Font Size:</td>
<td>Slider for setting the size of the displayed font.</td>
</tr>
</tbody>
</table>
In addition to these controls the Android Menu Key will show or hide the toolbar. The settings toolbar is always visible unless hidden by pressing the menu key.

The Android menu key is to the left of the home button. On OSX the command key performs the equivalent function.

Android APK Installation

The Android version of the PCDMontorRemote program has been self-signed and can be loaded without using the Google Play Store or other remote installation utility. To install this program it is necessary to place the APK file on the device and click on it to install.
## Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 6, 2017</td>
<td>1.0</td>
<td>New Program</td>
</tr>
<tr>
<td>Feb 10, 2019</td>
<td>2.0</td>
<td>- Added ability automatically connect and monitor PC-DMIS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Previously closing PC-DMIS required restarting PCDMonitor.</td>
</tr>
<tr>
<td>Feb 15, 2019</td>
<td>2.1</td>
<td>[bug fix] Closing PCDMonitor crashed with active connections.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Added status messages and separate status message display.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Extended formatting options for features.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Reduced amount of information broadcasted.</td>
</tr>
</tbody>
</table>