MWT Installation Guide

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1. Acquire the component installers. Please note that the version numbers specified below are the minimum requirements; while using newer versions is possible, the results could be undefined where backwards-compatibility has not been maintained on the part of the responsible companies. As well, please note that the URLs provided refer to external websites outside of the direct control of the authors of the MWT, and so may change. However, sufficient information is provided such that the required files are locatable.
    1. The National Instruments (NI) Vision Acquisition package, available through their website (http://joule.ni.com/nidu/cds/view/p/id/1099/lang/en). The MWT uses version 8.6 of this software. As of this writing, the downloaded file is called 'VAS860.zip.'
    2. The NI LabView runtime engine, available through their website (http://joule.ni.com/nidu/cds/view/p/id/1244/lang/en). The MWT uses version 8.6.1 of this software. As of this writing, the downloaded file is called 'LVRTE861STD.EXE.'
    3. The NI Vision runtime engine, available through their website (http://joule.ni.com/nidu/cds/view/p/id/1131/lang/en). The MWT uses version 8.6.1 of this software. As of this writing, the downloaded file is called 'VisionRTE861.zip.'
    4. The NI IVI compliance package installer, available through their website (http://www.ni.com/ivi/ivi_prod.htm). The MWT uses version 3.3.0 of this software.
    5. The Measurement Computing (MC) Universal Library, available through their FTP server (ftp://ftp.measurementcomputing.com/downloads/MCCDaqCD/). The specific version number is unavailable. As of this writing, the downloaded file is called 'mccdac.exe.'
    6. The Tektronix AFG3000 series Labview driver, available through NI's website (http://sine.ni.com/apps/utf8/niid_web_display.download_page?p_id_guid=005994E37F5B2318E0440003BA7CCD71). The MWT uses version 3.1 of this driver. The NI site refers to this as “Tektronix tkafg3k Signal Generator.” As of this writing, the downloaded file is called 'tkafg3k_setup.exe.' Select the option for LabView, rather than for LabWindows or any variant.
2. Get any needed camera files. Some camera files can be found under the National Instruments product advisor page (http://www.ni.com/devzone/advisors/, then click “Industrial Camera Advisor”). Other camera files (generated with the NI Camera File Generator to support the preferred cameras listed on the MWT Bill of Materials) are available under the downloads section of the MWT sourceforge page (https://sourceforge.net/projects/mwt/). Currently, the available camera files include:
    1. Silicon Imaging 3170M, filename; si-3170m.icd
    2. Dalsa PT 04M30, filename; Dalsa_PT_4M30.icd
3. Get the MWT software
    1. The MWT executable is available as a ZIP archive from the downloads section of the MWT sourceforge page (https://sourceforge.net/projects/mwt/).
4. Execute the installers. Note that the installers must be executed in the correct order as some rely on others already existing on the system. Executing them out of order should not corrupt the system, but will add to the installation time.

The most recent version of this document is available at https://sourceforge.net/projects/mwt/files/mwt/1.1.0%20Release/documentation/MWT_Installation_Guide.pdf/download

1. Run NI Vision Acquisition installer. This will install the NI-IMAQ/IMAQdx interfaces.
    1. Extract both folders from the archive. Please note that failure to do this will result in an unnecessary extension to the installation time, but will not break the install.
    2. Select destination directories for the NI files.
    3. Accept the default installation options, unless you know you will either use or not use a specific component.
    4. Accept the license agreements for each of the three packages that will be installed.
    5. The files will now install.
    6. At some point in the installation, you may be prompted for a "second disk." This "disk" is the second folder in the archive you downloaded.
    7. If you are using an Ethernet, Firewire, or any other camera type that requires the IMAQdx interface to communicate, run the NI License Manager to activate the IMAQdx license. The license is included with many NI products (CameraLink cards, Vision Builder package, etc.) or can be purchased. This software can be purchased from NI from their website (http://sine.ni.com/nips/cds/view/p/lang/en/nid/12892)
    8. At this stage, any installed NI acquisition hardware connected to the computer should be recognized and have their drivers installed.
2. Run the NI LabView runtime engine installer.
    1. This is a self-extracting Archive installer. Accept the default destination directory, or entire a destination directory if you prefer.
    2. Once the decompression has completed, a message dialog will be displayed. Select "OK" and the installer will immediately commence.
    3. Select Next.
    4. Optionally specify a custom installation location, or accept the default, and select Next.
    5. Select Next, accepting all the components to be installed.
    6. Accept the License Agreement.
    7. Finally, select Next and the desired files will be installed.
3. Run the NI Vision runtime engine installer.
    1. This is a standard ZIP archive. Decompress the archive to a temporary directory.
    2. Execute "setup.exe" located within the newly created directory.
    3. Select Next
    4. Enter the requested user and serial number information, if available. This software can be installed as an evaluation version, but it will cease to function (and the MWT with it) 15 days after installation.
    5. Select Next, accepting the defaults for components to be installed.
    6. Accept the License Agreement and select Next.
    7. Select Next, and the desired files will be installed.
    8. After the installation, you will be prompted to activate the Vision runtime license. If you have a Vision runtime license, you can activate the Vision runtime now or at a later time by running the NI License Manager (which is installed along with the NI Vision runtime) and following the instructions. If you do not have a Vision runtime license and are using an evaluation version for fewer than 15 days, you will need to find and accept an evaluation license dialog box every time you start the MWT. The MWT will fail to work unless it has a valid Vision runtime license (either purchased and activated, or

activated within the time limit in evaluation mode).

4. Run the IVI installer. This is a driver and VI pack that creates a standard interface for various vendor's components. The IVI package is required for the Tektronix AFG installer.
    1. Select Next
    2. Accept the default installation directory for the NI IVI components or change it as desired.
    3. Accept the default installation directory for the standalone IVI components (or change it). Specific components can be selected or deselected for installation at this step, but the defaults will do.
    4. Accept the three license agreements.
    5. Installation will commence and complete, and require a restart when it has finished.
5. Install the Measurement Computing installer. During this step, the necessary sub-VIs for managing the counter card are installed. You must install the counter card sub-VIs even if you do not have a counter card installed or do not plan on using it. The MWT requires the sub-VIs in all cases since it uses them to figure out whether a card is available.
    1. After starting the Measurement Computing installer program, a choice of programs to install will appear. The default options are correct. Select install.
    2. The Measurement Computing installer will now trigger an installer for the Universal Library. Accept the default installation directory and initiate the installation.
    3. The Measurement Computing installer will then trigger an installer for the Tracerdaq program suite. Again, accept the default installation directory and then finish the installation.
    4. Finally, the MC installer with begin the installation of the Universal Library for LabView. Again, the default installation directory is fine. Note that this installer may fail due to not being able to find an installation of LabView. This is completely fine, and expected. The failure of this installer does not impact the rest of the system in any way.
    5. If DirectX 9.0c has never been installed before, the Measurement Computing installer with trigger a DirectX installer. This software is required for the Tracerdaq suite.
    6. While you will not be prompted for this during the installation, if a counter card is installed you must calibrate it before the first run of the MWT by running the Measurement Computing InstaCal software (wait until after this installation has finished).
    7. A restart of the computer will be required.
6. Run Tektronix AFG installer. This is the final stage in installation, and makes available the function generator control sub-VIs. Again, the MWT requires these sub-VIs even if no Tektronix AFG is used.
    1. After initiating the installer, accept the license agreement presented.
    2. The default installation directory will be presented; it cannot be changed. Select next to trigger the installation, which will complete on its own.
7. Decompress the MWT executable archive. This folder can be placed at any convenient location on the hard drive; it is not required for it to be in a specific location.

5. Test the camera.
    1. Start the Measurement and Automation Explorer.
    2. Select the interface and then camera you are using from the menu tree on the left.

3. If your camera is not displayed as the correct type, change its camera file.
    1. Camera files must be located in the same directory. By default, this directory is Documents and Settings\All Users\Shared Documents\National Instruments\NI-IMAQ\Data\
    2. Camera files can be changed using NI's Measurement and Automation Explorer. By default, under Microsoft Windows OSes, it's shortcut is located under Start Menu – Program Files – National Instruments.
    3. In the Configuration panel, locate the installed camera.
        1. For IMAQdx cameras (such as GigE and Firewire), they are located under Devices and Interfaces – IMAQdx. For IMAQ cameras (such as Base and Full CameraLink), they are located under Devices and Interfaces – IMAQ. There will be an entry for every camera attached to the system.
        2. Locate and right click on the misidentified camera.
        3. Under this context menu, locate the correct camera file under the Camera menu. Alternatively, you can specify a camera file using the Open Camera option.
4. Place a sample under the camera and make sure the image is in focus and has no defects due to problems with data transfer; these usually show up as snow, diagonal lines, or a peculiarly patterned image.

6. At this point, the MWT should be completely usable. It is advisable to perform a series of tests to confirm the components are working.
    1. Start the MWT.
    2. Select “Raw” image display type and confirm the camera focus and alignment. If a biological sample is available, once the camera is in focus and aligned, stop the MWT, place the sample, and then restart it while viewing the Fixed image display type. You can then adjust the parameters until the worms (or other moving objects) appear to be segmented (i.e. marked in black) sufficiently well.
    3. If a MC counter card is installed, its behavior can be checked by turning all three stimulus types on, setting a 1 second onset delay, 1 second, fixed, interval, with 20 events.
    4. Enter an Experiment Duration of 21 seconds.
    5. Select a data directory and output prefix. These are not intended to contain real data, merely to check the instrument. Upon entering this information, the green “Go” button should become active.
    6. Press “Go” to start the instrument.
    7. The indicator LEDs for all three relays should flash red after 1 second, every second, for 20 seconds. If power has been connected to the stimulus delivery systems, each system should also activate at the same intervals and timings.
    8. After 21 seconds, the instrument should stop itself. There should be output files with the prefix entered in the directory entered.
7. (Optional) Install Choreography, the analysis program for Multi-Worm Tracker output. The output of the MWT is a set of text files, so Choreography is not required (but may be useful). Choreography can run on any platform that Java runs on—it need not be on the same computer as the MWT. Installation instructions for Windows platforms are described below.
    1. Install Java, if it's not already installed.
        1. Open a command prompt and type “java -version” (without the quotes). If the command

says that Java version 1.6 or greater is installed, you do not need to install Java again.
    2. Download the most recent JRE (or JDK if you prefer—if you don't know what this means, get the JRE) version from http://java.sun.com/javase/downloads/index.jsp.
    3. Run the installer, accepting the license agreements and default installation directories.
    4. Verify that this worked by typing "java -version" in a command prompt.
2. Download the Chore.jar file from the Kerr lab Sourceforge page at https://sourceforge.net/projects/mwt/. Place the file wherever is convenient, such as the directory where the MWT is located.
3. Verify that Choreography runs.
    1. In a command window, type "java -jar Chore.jar -?" and you should see a list of instructions on how to run the program.
    2. If the Chore.jar file is not in the same directory that the command window lists, you will either need to change that first in the command window or use the full path. For example, if Chore.jar is in a folder called MWT on the C drive, one would type "java -jar C:\MWT\Chore.jar -?". Alternatively, one could type "java -jar ", then drag the Chore.jar icon into the command window (which automatically enters the full path), and then finish typing the " -?".

8. The Multi-Worm Tracker is now installed and ready for use.

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