Integrator Release Notes for OpenCNC 6.2

OpenCNC Product Descriptions

OpenCNC Pro - This version supports 5-10 axes of simultaneous motion. The United States government prohibits export of this product to any country that is not on the approved export list for controlled technology. Violating this law can result in large fines and imprisonment. To ensure compliance with this law, you must obtain prior written approval from MDSI before you can ship this product outside of the United States or Canada. This product cannot be exported to Mexico without first obtaining an Export License.

OpenCNC Plus - This product is limited to four axes of simultaneous motion. Unlike OpenCNC Pro, you may export this product to most, but not all, countries in the world. However, to assure compliance you must obtain prior written approval from MDSI before you can ship this product outside of the United States, or Canada.

OpenCNC Demo - This is the demonstration version of OpenCNC. It can run most machine logic, but cannot run an actual machine. The Demo version is not to be used as a development system. It has the following features and limitations.

- **The Demo version** runs on Windows XP, 2000, NT, ME, and 98 Second Edition.
- This product does not require Venturcom RTX or a dongle to run.
- Maximum interrupts are 100 per second.
- Does not support I/O or hardware interrupts.

Operating Systems and Minimum Requirements

- Windows NT - Service Pack 6a or Windows 2000 - Service Pack 2 (or latest)
- 128 megabytes RAM (256 megabytes recommended). Memory chips in the PC must all be the same size (i.e. do not use a 128 meg chip and a 32 meg chip in the same PC). MDSI highly recommends that you only use memory chips from the same vendor. During Windows 2000 testing we discovered several OpenCNC startup problems that were directly related to the memory in the PC.
- Intel Pentium Processor - 300 MHz or above including Celeron, and PII, PIII, and P4 processors
- Intel manufactured motherboard
- At least 1 gigabyte hard drive for Windows NT, 5 gigabytes for Windows 2000.
- CD-ROM Drive

Known Software Limitations

Withdraw/Recover feature - When the machine operator activates a withdraw cycle before the entire tool and/or fixture offset is interpolated into the machine position, any offset amount not interpolated into the machine position will be applied during the first recover move requested by the machine operator.

If immediate tool and fixture offsets are active, the offset is interpolated into the machine position during the first motion command following the activation of a tool and/or fixture offset. If deferred tool and fixture offsets are active, the offset is interpolated into the machine position during the first motion that commands the offset axis following the activation of a tool or fixture offset. In the rare event that a withdraw is initiated during these initial machine movements, the first recover move may not be expected by the machine operator.

If the amount of the offset that has not been interpolated exceeds the maximum offset change allowed during the withdraw cycle, OpenCNC will generate an error.

The withdraw feature does not behave in this manner if the withdraw is requested after the offset is fully interpolated into the machine position. Contact the MDSI hotline if you are uncertain how this issue affects your use of the control's withdraw feature.

To set up the withdraw feature to ensure the safest operation, you should set the Tune file variables shown below. These settings will restrict the size of the allowed offset during a withdraw and limit the speed of the recovery moves.

```
jsRetraceFeed[0]        20 in/min      # Specifies infeed rate for Retrace moves
jsWithdrawRtFeed[0]     25 in/min       # Specifies infeed rate for withdraw return moves
jsWithdrawFdLast[0]      5 in/min       # Specifies infeed rate for last withdraw return move

defTLOffChgMax          0.05 in        # Sets Maximum Tool Offset Change During Retrace/Withdraw
defFixOffChgMax         0.10 in        # Sets Maximum Fixture Offset Change During Retrace/Withdraw

defTlLenWrOffMax        0.10 in        # Sets Maximum Tool Length Wear Offset to .1 in
defTlRadWrOffMax        0.10 in        # Sets Maximum Tool Radius Wear Offset to .1 in
```

Upgrading from Windows NT to Windows 2000

Users upgrading an OpenCNC system from Windows NT to Windows 2000 have three options. Only the first is totally supported by MDSI and Microsoft.

- The recommended option is to add a new hard drive to the computer and do a clean install of Windows 2000 on the new hard drive.
- The second option is to install Windows 2000 on a blank partition of the current hard drive. This option is discouraged since having an NT and 2000 partition on a single hard drive is not fully supported by Microsoft and MDSI did experience some failures during installation testing.
- Upgrading a partition from NT to 2000 is not supported by MDSI due to the inconsistencies in the Windows directory structure after the upgrade has occurred.

RTX Installation Numbers

The MDSI installer automatically enters the RTX customer ID and License Key numbers during the installation. However, they are provided below in case you need them during the install.

Windows NT

- Customer ID number**: 38943**
- RTX Runtime License Key: **3868124004**

Windows 2000

- Customer ID number**: 38943**
- RTX Runtime License Key: **2013554323**

MDSI Installation Wizard

The MDSI Installation Wizard automatically runs when you insert the OpenCNC CD in your computer. This wizard will guide you through the installation process by making sure you install the software in the proper order. The general installation order is listed below.

- Install the OpenCNC Integrator Documentation on your development computer. To install the documentation, press the MDSI Tools button and select the MDSI Integrator Documentation. Once the documentation is installed, select **Programs>MDSI OpenCNC>MDSI Documentation** from the Windows Start menu to view the documentation.
- Make sure you have the latest Service Pack for the installed operating system.
- Install the RTX software and then install OpenCNC.
- Install any of the MDSI or 3rd Party Tools that your application requires.
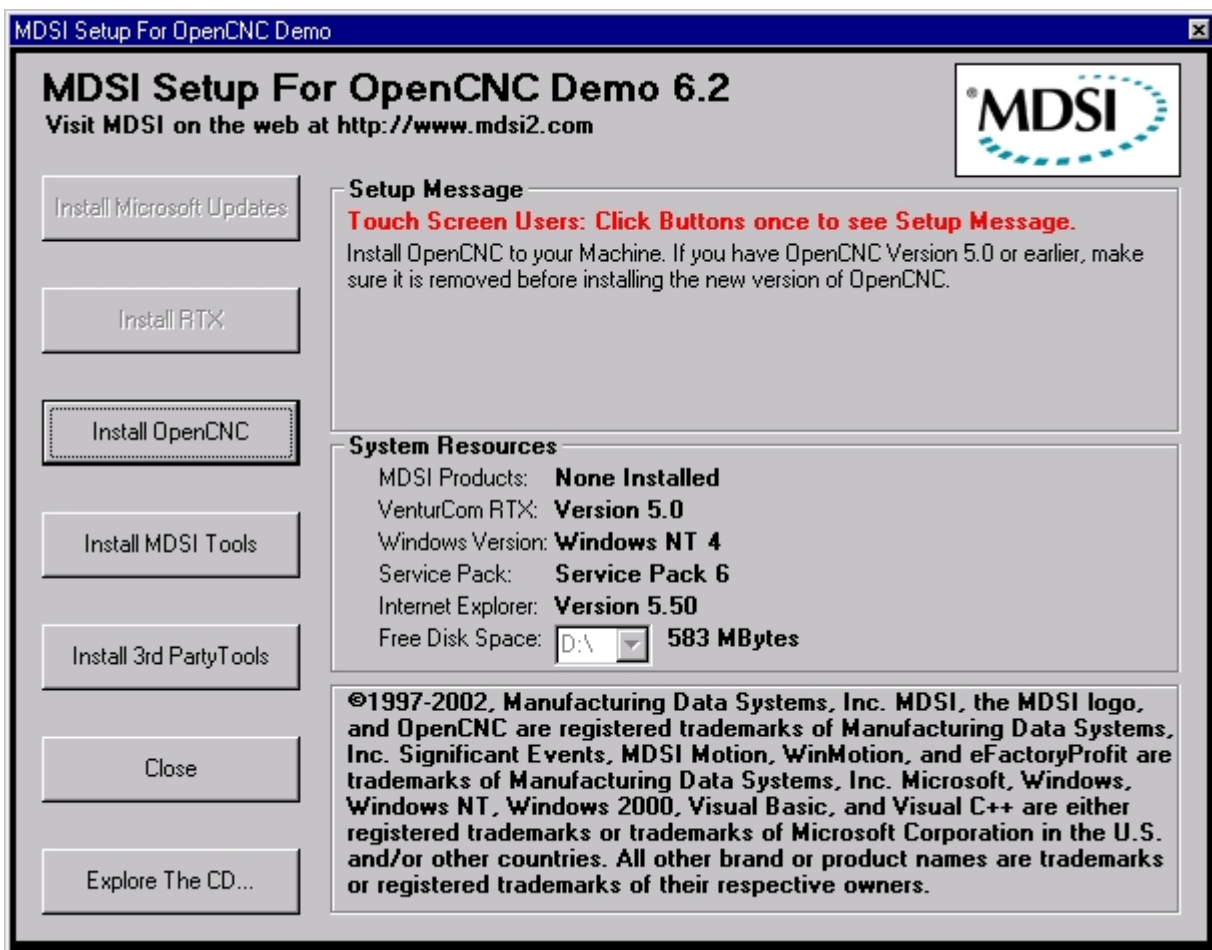
Documentation and Online Help Improvements

- VARs, OEMs, and End-users can add their own HTML based documentation that can be viewed from MDSI Help.
- MDSI documentation has been converted to HTML and has been reorganized and split into small sections to make it easy to locate and search for topics.
- MDSI has developed a documentation browser called MDSI Help. This program provides searching and browsing capabilities that will help you find information about the MDSI software quickly.
- Printed manuals will no longer be available from MDSI.
- The MDSI documentation now supports both OpenCNC and WinMotion (MDSI's motion control software product). Some topics in the documentation describe both products.
- Users of Windows NT must install Internet Explorer 5.0 or later to use MDSI Help. IE5.5 is included on the MDSI CD. Users of Windows 2000 will not have to install IE5 since it is a standard part of the operating system.
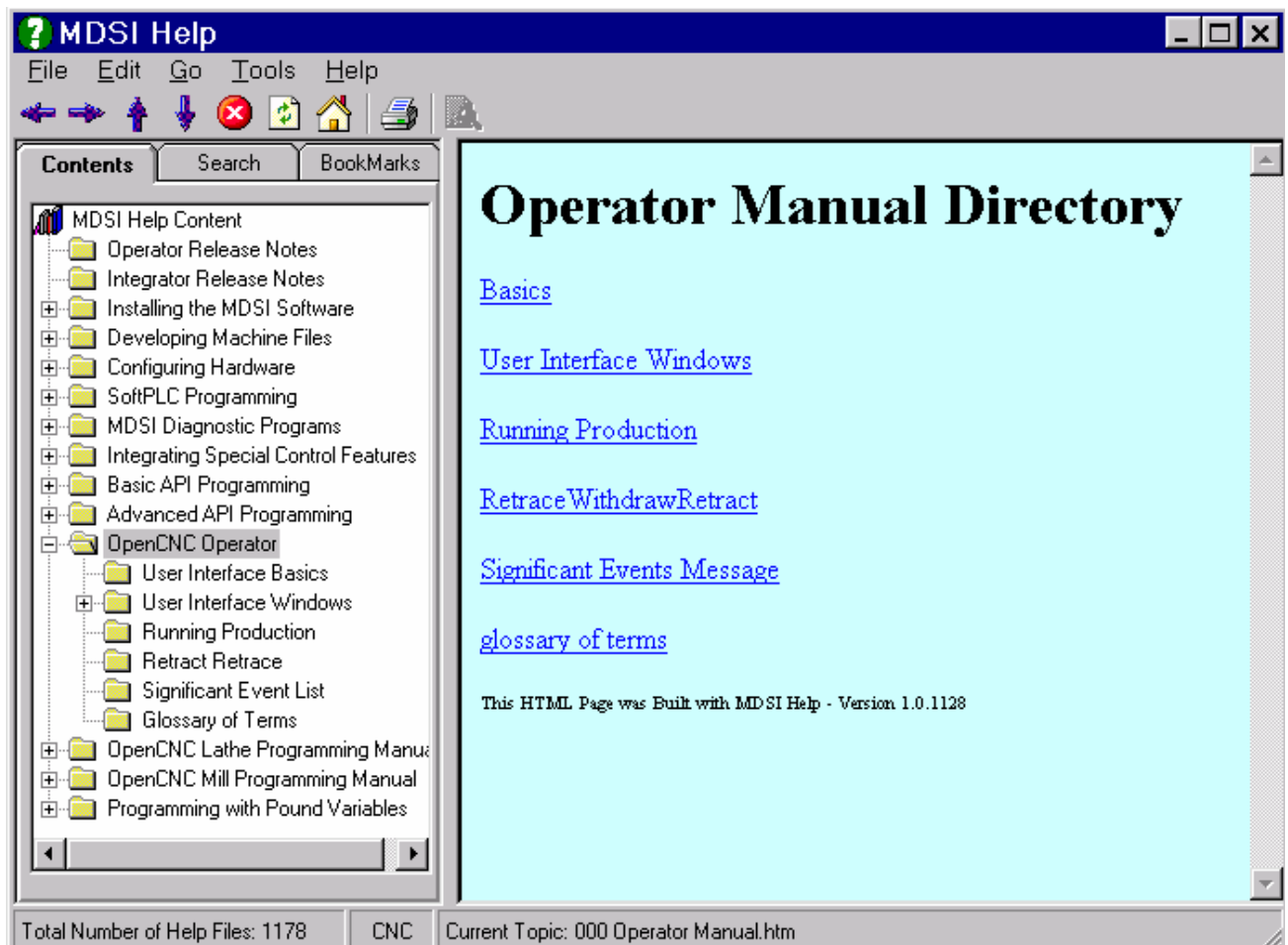
New Hardware Support in OpenCNC 6.2

- Ethernet I/O - Support for Automation Direct 205 and Terminator I/O and Opto22 Ethernet I/O.
- Yaskawa Mechatrolink digital network
- Support for Acess I/O Watchdog Timer Card with Sensoray 626 board

New Software Features

- Improved winVar program.
- Improved support for 5 axes machines by separating the rotary axis fixture compensation and RTCP (rotary tool compensation) features. This allows machines which use RTCP to also use fixture offsets. This release also expands the number of 5 axes machine configurations that are supported by OpenCNC.
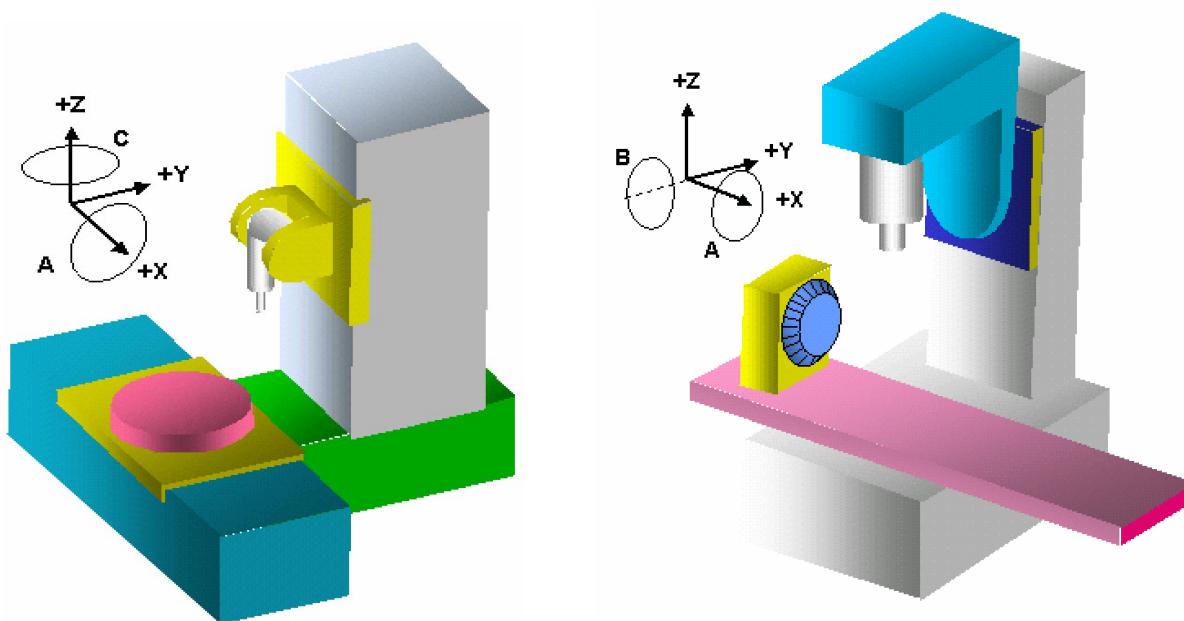
- Move and Size control added to all user interface windows. This tool helps touch screen users easily move and resize windows when no mouse is available. This window can be selected from the MDSI icon in every OpenCNC window.
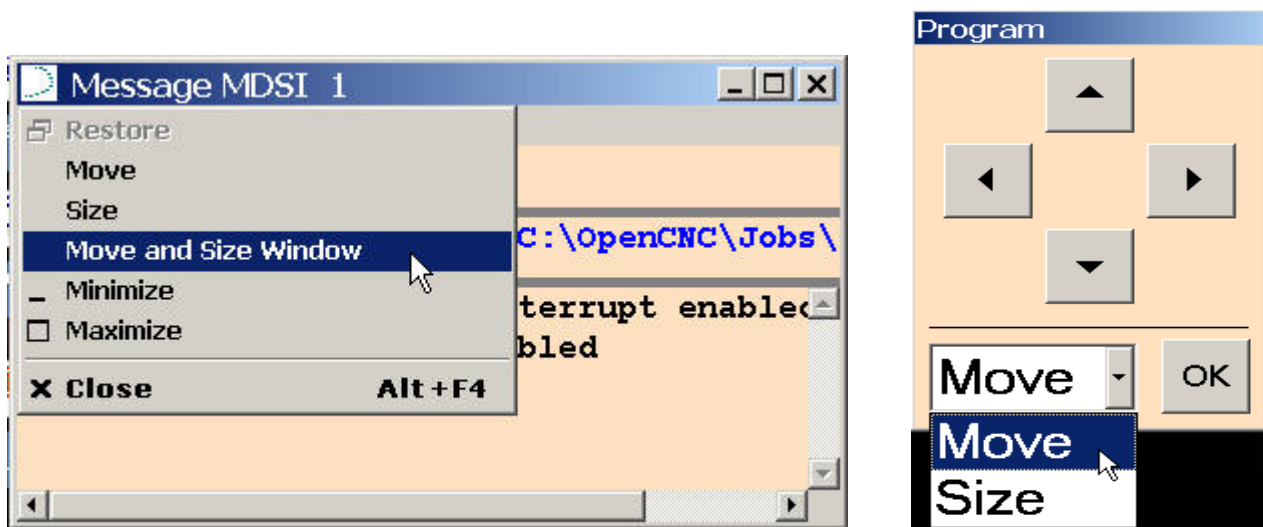
- Added option to winProg, winOff, and winFix to allow the use of the standard Windows NT/2000 file browser in the part program, tool offset and fixture offset windows. Also added ability for the file browsers to specify which file extensions to display in winProg, winOff, and winFix.

- Added feature that automatically deletes old Significant Event files after a specified number of days.

- Added capability of creating new MDSI variables by reading an ASCII text file at startup. This feature lets an API programmer add variables to the system without having to add them into the ISaGRAF project.

- New ISaGRAF C-functions strRead( ) and strWrite( ) to allow the PLC to read and write to a new OpenCNC string variable array mStrVariables[]. There are 100 elements in this array.

- **OpenCNC Update Program:**
  - o The OpenCNC update program will update the paths for non-OpenCNC applications as long as the application is found in the Machines directory.
  - o If a user drags a machine shortcut over the update program, the shortcut will be updated in addition to the machine files. Note that the user still has to select a .men file since the program won't know where the machine files are located from the shortcut alone.
  - o The update program will automatically copy winGen.exe to winGen2 (3, 4,etc).exe and winProg.exe to winProg2 (3, 4,etc).exe if they appear in the .men file. This is a convenience for the user who has multiple versions of winGen or winProg running.

- **Probe Cycle: Additions and Enhancements:**
  - New cycles:
    - Automatically locate datum block center. User does not have to indicated datum block every time it is mounted on table. This cycle can also determine the radius of the probe stylus.
    - Find Center between Two Parallel Lines in XY Cycle (S7): New cycle created to touch in XY plane at programmed angle and distance on either side of the start point.
    - Probe sphere (S6) and report radius and center coordinates.
    - Added macro to allow 5 axis machines to probe in A0 or A90 orientation.
  - Datum Cycle (S0): Added Significant Event of auxiliary axes positions for each datum touch. XYZ positions were already recorded.
  - Probe Find Surface Edge Cycle (Fixture Offset; S1-S6): Altered cycle so that if no offset code (e.g. E0 or no E) is programmed in macro call, the position of the probing axis is recorded in machine and part coordinates while the other axes are recorded in part coordinates only.
  - Improved probe cycles to output probing results as Significant Events. Added Tune file variables to specify whether the Significant Events are output.

Improved Functionality

- Separated peck drill (G83) and peck drill with chip break (G73) into unique G code cycles.

- Modified OpenCNC's threading algorithm to improve threading performance at low spindle speeds.

- The MDSI software now flags an error if a duplicate symbol appears in the Symbols file.

- The dwell time specified by a P value for a tap cycle is now always specified in seconds, even during IPR mode.

- Items in the .men file's Shutdown group are no longer run if the machine is already stopped. (They are still executed when stopping the machine, but not exiting winMenu.)

- winJobAdmin now disables the File>Load menu in Run mode.

- Added following error plot to winFeShow. This allows the following error trace to be graphed by itself. (As opposed to just appearing as an envelope around position or velocity.) Added a -noferr argument to remove this feature.

- The DIOS_STOPS message will now be sent to the PLC (if enabled by defDiosStops) before the Sequencer stops the spindle by zeroing spRPMValue[ ]. This allows the PLC to capture the current RPM and stop the spindle before the Sequencer clears spRPMValue[ ], sets the SEQR_RPMZ bit and waits for it to clear.

- Changed the software to output a CSCHECK (Cycle Start Check) message when Cycle Start is pressed while MDI, withdraw, or retrace modes are active.

- Improved MDI mode to eliminate errors when OpenCNC is shut down.

- Renamed microcommand MC_SETIPRMODE to MC_SETFEEDMODE.

- Renamed variable jsIprMode[] to jsFeedMode[].

- Allow user to program a spindle speed of 0. Previous versions generated an error when S0 was programmed.

- Allow winGen commands NOSELECTONFLAG, ONLYSELECTONFLAG, NOSELECTONSEQ, CMP, NOCMP, CONFIRM and AXISUNLOCK to display multi-line messages. All lines appear in one text message in the command, but multiple lines are separated by "\n". If the "\" character is required in the message, it must be entered as "\\". The following command will display a 2 line message:

    NOSELECTONFLAG(mRunMode,
    "CANNOT CHANGE TOOL WHILE RUNNING\nSELECT MANUAL MODE FIRST");
    The lines displayed in the message window are:

    CANNOT CHANGE TOOL WHILE RUNNING
    SELECT MANUAL MODE FIRST

Documentation: New Topics and Improvements

- Added PID loop documentation including Integrator (I gain) documentation
- Improved compensation capabilities for 5 axes machines.
- Improved part program probing descriptions for mills and lathes.
- Hardware documentation - each hardware board and fieldbus supported by MDSI has its own complete section in the documentation.
- New online help using the MDSI Help program.