Logosol Wafer Handling Control Center

Logosol Wafer Handling Control Center (LCC for short) is a powerful utility intended for ease of use with Wafer Handling robots systems and prealigners. It contains several modules:

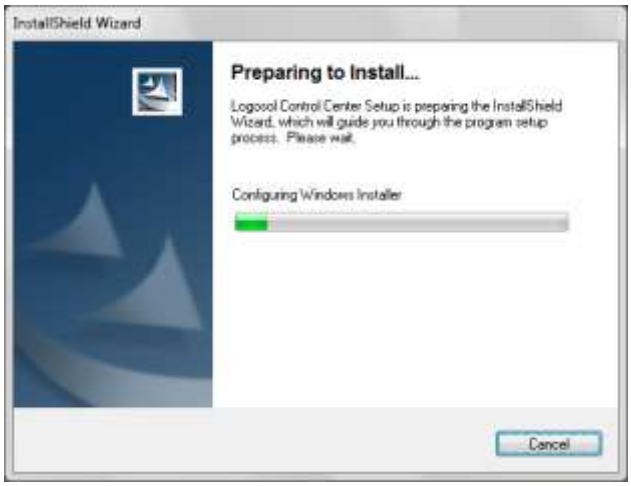
- Terminal emulator
- Station parameters editor
- System state, Axes positions, Input/Outputs state and control
- Error state browser
- Commands sequencer
- File transfer module

Note: The term "controller" will be used throughout this chapter when referring to either robot or prealigner connected to Logosol Control Center.

1.1 .Installation and initial set-up

LCC installation program can be downloaded Logosol, Inc. website at http://www.logosolinc.com. Before starting installation, make sure that all previous versions of Logosol Control Center (or similar utilities) are closed, and un-installed. Use "Control Panel -> Add or Remove programs" Windows wizard, or shortcut placed on the "Start Menu" to remove it.

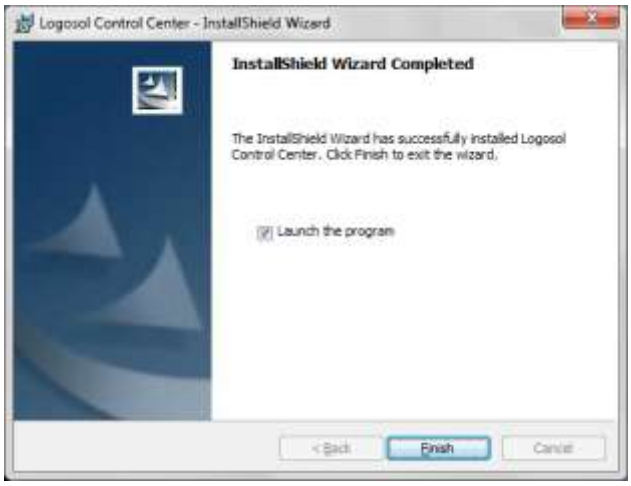
Logosol Control Center (LCC) is installed using Windows Installer file called LccSetup.exe. After starting the setup program RccSetup.exe, a series of installation dialogs appear.



Press "Next" to proceed to next screen, or "Cancel" to terminate installation.

Change "User Name" and "Organization", if necessary. Default values are taken from Windows Installation. Select which users you would like to provide with shortcut icons for this product. Click "Next" to continue

If you want to change the installation folder, click on "Change…" then select new installation folder. Click "Next" to accept currently shown installation folder and continue.



When installation is complete, the confirmation dialog will be displayed. Click on "Finish" to dismiss the dialog. LCC is installed!

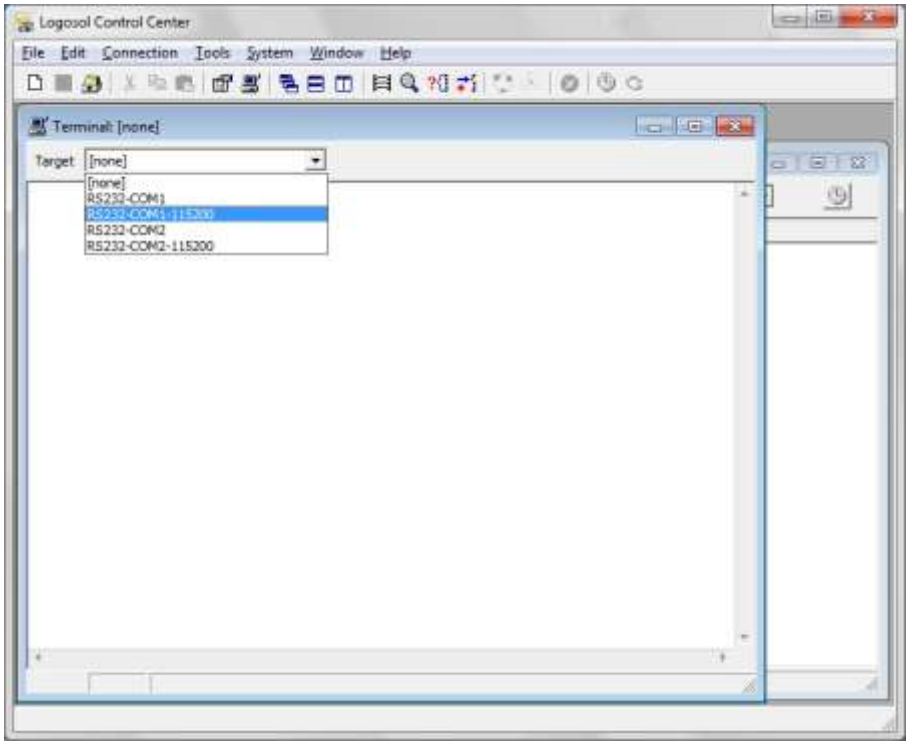
Following files and folders are created into installation directory ("C:\Program Files\Logosol, Inc\Logosol Control Centre\" by default, denoted here by [InstallDir]):

`[InstallDir]` `LcCentre.exe, RobotRef.ini, PrealRef.ini`	Installation directory contains LCC' executable (RcCentre.exe), and files containing Command Reference information.

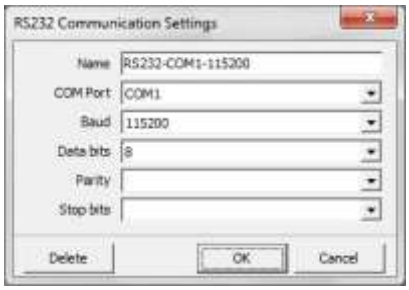
After installation, four communication profiles are created for connection to controllers, with following settings. By default, controllers are shipped for connecting at 9600bps.

RS232-COM1	Serial port: COM1, 9600bps, 8 bits, 1 stop bit, no parity
RS232-COM1-115200	Serial port: COM1, 115200bps, 8 bits, 1 stop bit, no parity
RS232-COM2	Serial port: COM2, 9600bps, 8 bits, 1 stop bit, no parity
RS232-COM2-115200	Serial port: COM2, 115200bps, 8 bits, 1 stop bit, no parity

When started, LCC shows last used applets (if this was selected on "Preferences" dialog), or an empty desktop. The toolbar provides for access to some of most used functions, as well as some standard Windows application shortcuts. The F9 function key (small red button) invokes STP command on the controller, and can be used as an emergency stop button. Applet buttons on the toolbar will select same applet if it is already running (e.g. pressing "Terminal" button twice will not open two terminal applets). If more applets of the same type have to be started simultaneously, subsequent applets must be started from the main menu (e.g. Connection | Terminal).



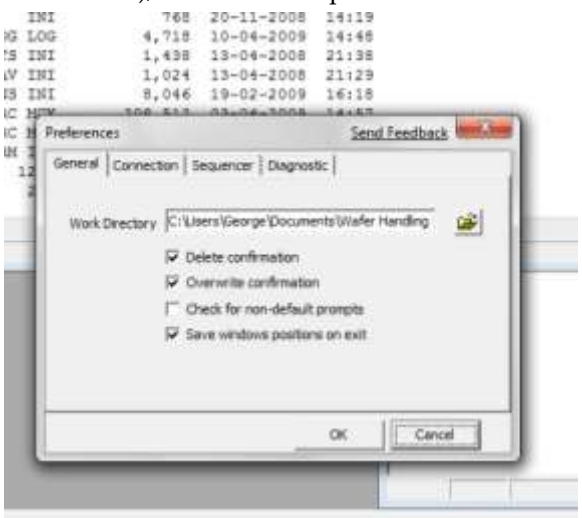
LCC provides for simultaneous connection to several controllers using different serial ports. Each applet operating on a controller has a "Target" selection box to choose required communication setting. Different applets (e.g. terminal window and file manager) can operate on same serial port as long as they use same connection settings (that is, as long as they are using same target).



If another communication profile has to be set up using different communication port (e.g. laptop with USB serial adapter at COM3), following steps have to be performed:

- Create new connection for communication to robot: Connection | New | RS-232
- Enter some descriptive name, e.g. "COM3-Robot-9600". COM port should correspond to PC communication port where WHR robot is connected to, like COM3, Baud should be set to 9600, Data Bits – 8, Parity – None, Stop bits – 1. Press OK to save these settings.

When connection is changed, LCC tries to detect the type of controller it is connected to (e.g. robot or prealigners). If the connection parameters are wrong (e.g. baud rate is wrong, or communication port is inaccessible), it could take up to ten seconds for the request for change to time-out.



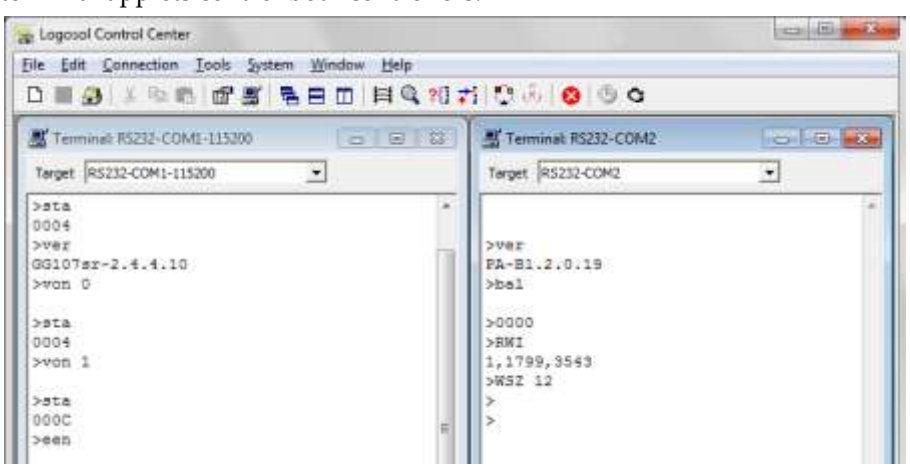
It is recommended to create a folder on the host computer where to store robot related files, and make this folder the "Working Directory" in Tools | Preferences dialog. Information from Preferences dialog is stored in system registry. File Manager applet will start at this folder, making future file management easier. By default, working directory is set to installation folder.

If a "Default connection" is specified in "Preferences" dialog, each applet will start by opening this target. If this functionality is used, and the controller does not respond, it could take a long time for LCC to become responsive when an applet is started.

When using multiple applets with same target, care must be taken with applets which update data regularly. It is not recommended running more that one applet which updates regularly, since data requests can overlap, and corrupted data could be displayed.

1.2 Terminal emulator

The "Terminal" applet can be used in day-to-day operation and maintenance of the controller. If multiple controllers are connected to different serial ports (e.g. a robot on COM1 and a prealigners on COM2), terminal applets control both controllers.



Commands can be entered on the terminal by keyboard, or they can be pasted using standard Microsoft Windows® shortcut Ctrl-V. Ctrl-C shortcut should not be used, since this shortcut is interpreted by the connected controller, and can cause errors. Use right-click, Copy command, or Edit | Copy menu item.

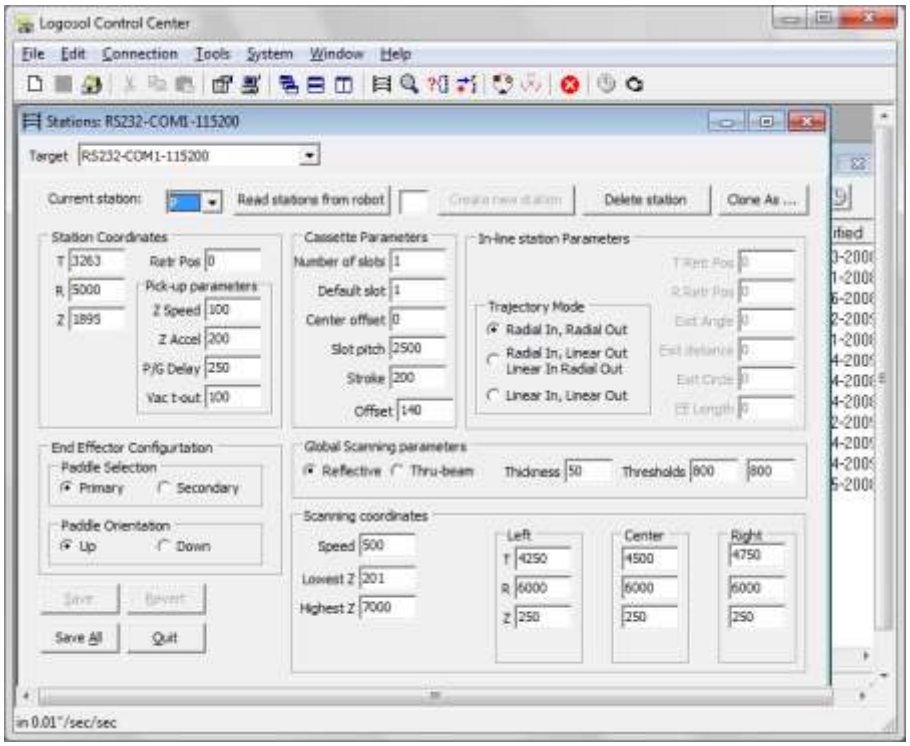
All commands sent, and all responses received, can be logged to a local disk file using Logging function. Logging is enabled from File | Logging | Start function, and is disabled from File | Logging | Stop function. Local disk file is updated regularly, but it is normal for last couple of lines to be missing from the file during logging.

1.3 Stations editor

This applet provides for following functions:

- Editing of "live" stations residing into robot controller, or stations.ini file
- Direct editing of station coordinates, retract positions, inline parameters and wafer mapping parameters
- Creating new and deleting of existing stations, making copy of stations
- Saving stations back to the robot, and to robot permanent memory

This applet is invoked from Tools | Station menu, or by clicking the "Stations" icon on the toolbar. Depending of number of the stations currently defined, and communication speed, this applet could take relatively long time to respond after target is changed. Screen layout is adapted to actual robot configuration (e.g. dual-arm, track-based etc).



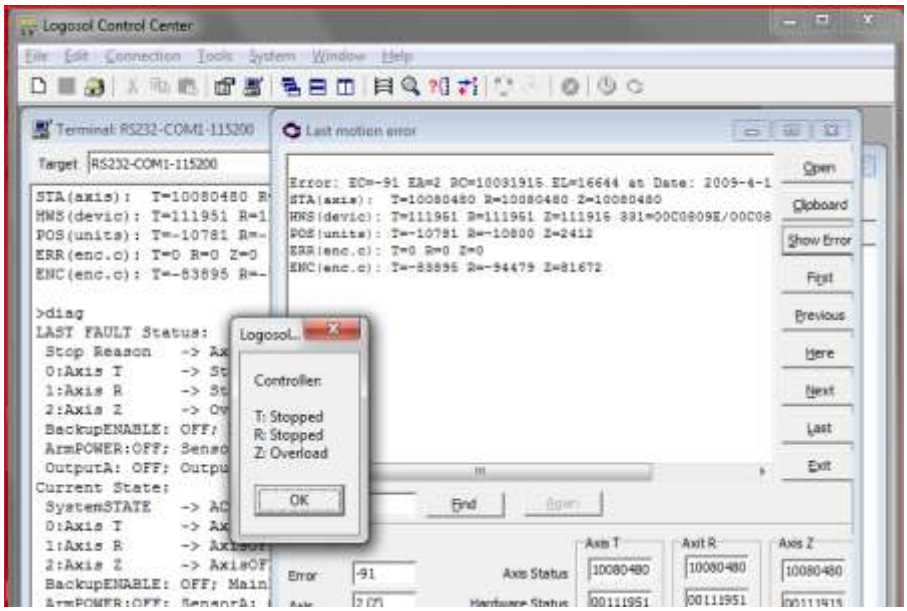
If station enumeration command ENS_ is supported on the controller, stations are read from the controller as needed. If this command is not supported (on some really old robot firmware), or "Read stations from robot" is clicked, all stations are first pulled up from the controller. "Read stations from robot" re-reads causes execution of RSP_ robot command, and any changes made to stations and not saved will be lost.

"Save" button saves currently edited station only, while "Save All" saves back all stations to the robot, and executes SSP_ command on the controller to save them permanently.

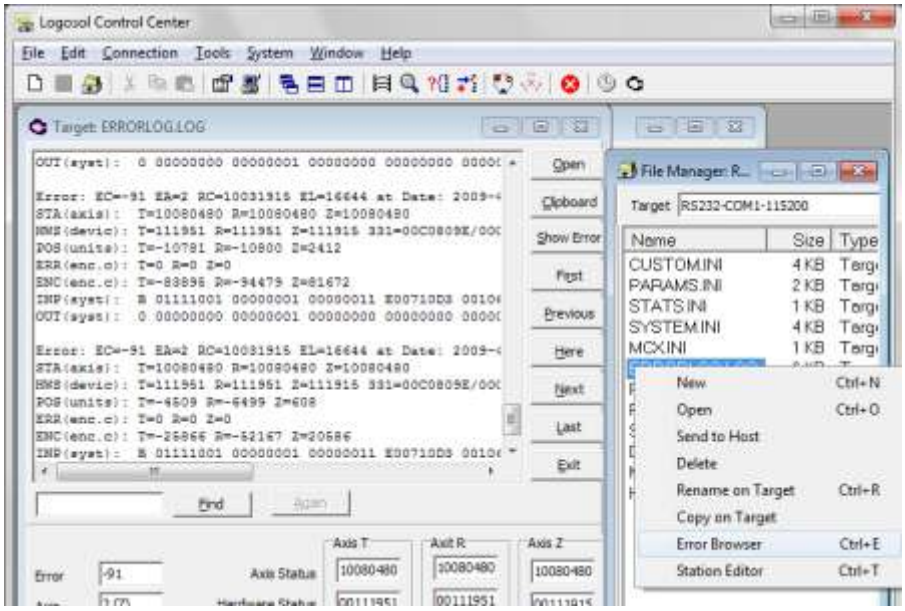
"Copy station" button requests a name of a station (new or existing) where current station parameters are to be copied to. If the destination station already exists, a confirmation will be requested.

1.4 Error log browser

One of most difficult tasks in day-to-day operation of the controllers is determining the reason for motion stop. DIAG command can help while diagnosing last error, but it is of no help when an error log has been downloaded and cause for stop is being looked for.

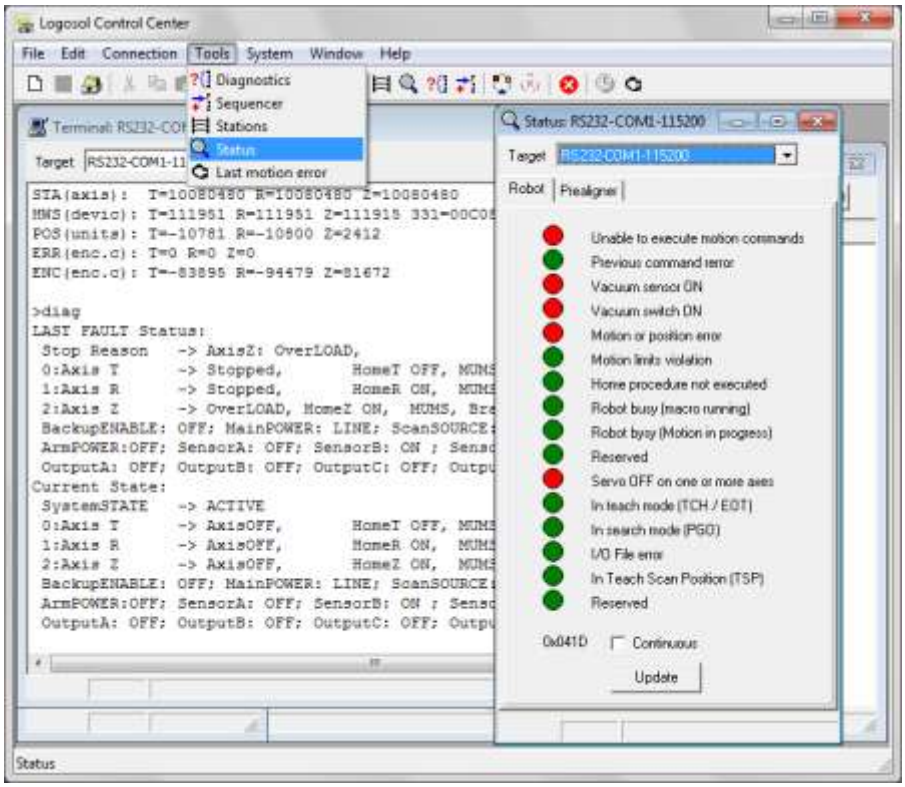


When executed while connected to a controller, Error Browser applet will show result from EST command. It can be executed also from File manager applet, by loading local or controller' errorlog.log file. In that case, buttons on the right can be used to navigate through the errors. Placing the cursor over a status field will show text description of that status, while pressing "Show Error" button will open a window with error description.



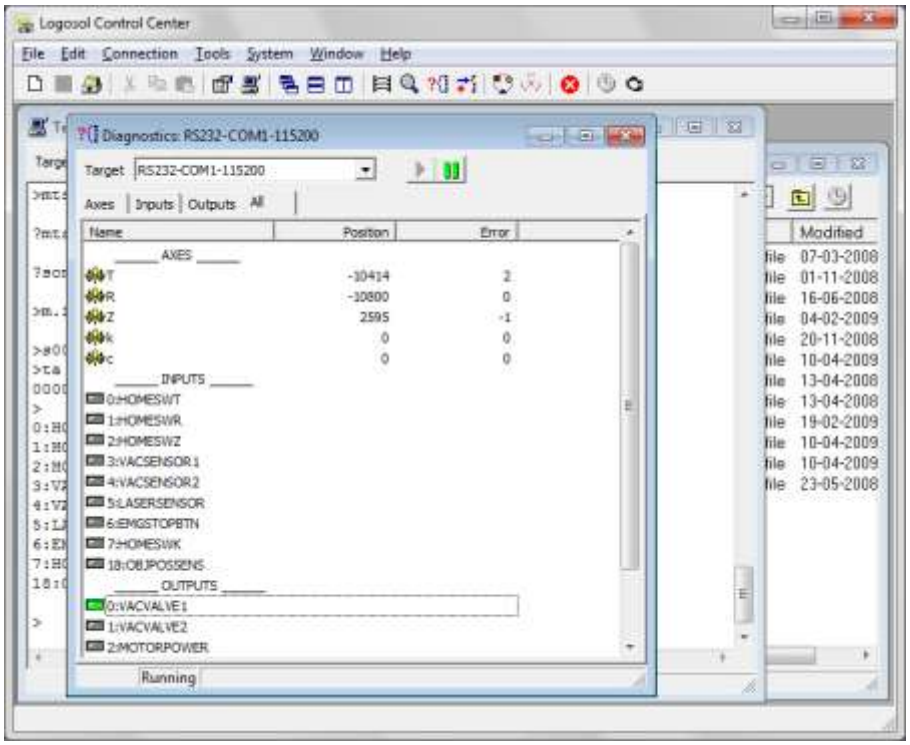
1.5 Current system status

Current controller status (as reported by STA command) can be obtained from System Applet, by clicking on Tools | Status.



Selecting “Continuous” checkbox will cause LCC to request status information from the controller on regular interval, as defined in “Preferences” dialog. Clicking on “Update” button will request a single update.

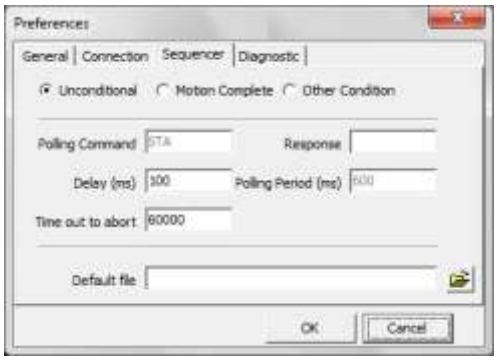
Current axes positions, position errors, input and output states can be obtained from Diagnostics applet, by clicking on Tools | Diagnostics menu item. Double-clicking of an output will toggle its state from ON to OFF and vice-versa.



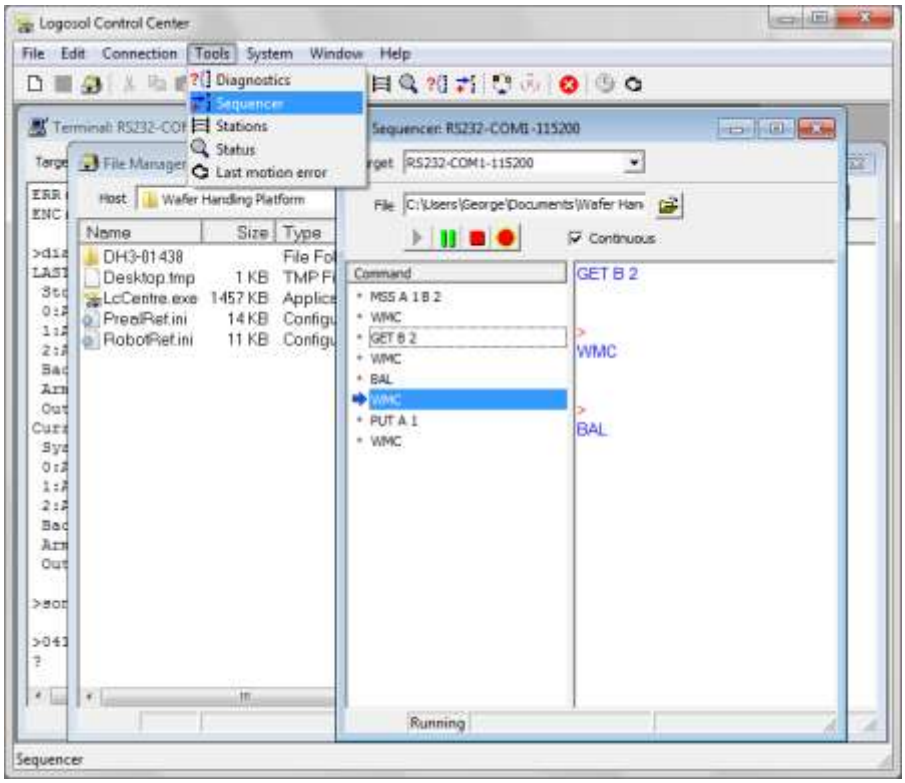
Data displayed by Diagnostics applet is updated continuously on regular interval, unless “Pause” button is pressed. System state is updated next time “Run” button is pressed.

1.6 Commands sequencer

A simple commands sequencer is provided, allowing for continuous command execution by the controller. Through a setting in “Preferences” dialog box, the sequencer can be set to execute next command immediately (that is, as soon as the prompt has been received), to wait for motion complete, or to wait for specific command to return specific response. The time between commands, the time between polling commands, and the time out to abort the sequence, and polling command can be configured as well.



In unconditional mode, commands are executed immediately. This can cause problem in designing a sequence of commands which do not finish with return of the prompt (e.g. move commands MVA/MVR, wafer handling commands GET/PUT/MSS, etc). In that case, “Wait for motion complete” command WMC can be executed after command which needs time to be executed.



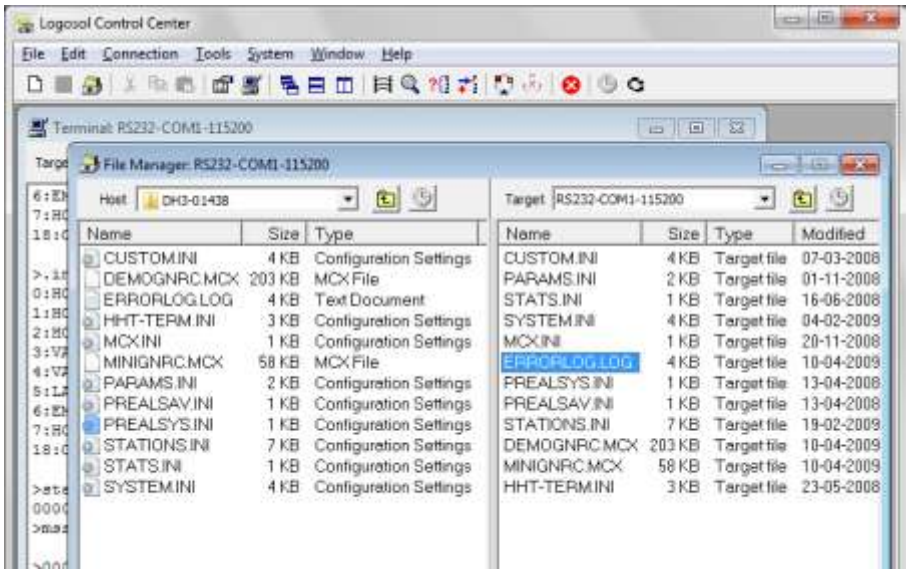
"Start" button starts the sequencer, "Pause" buttons stops it, or advances it one step. "Stop" button stops the sequencer (but leaves any background motion intact), while "Abort" button stops the sequences, and issues STP_ command to target controller.

1.7 File management

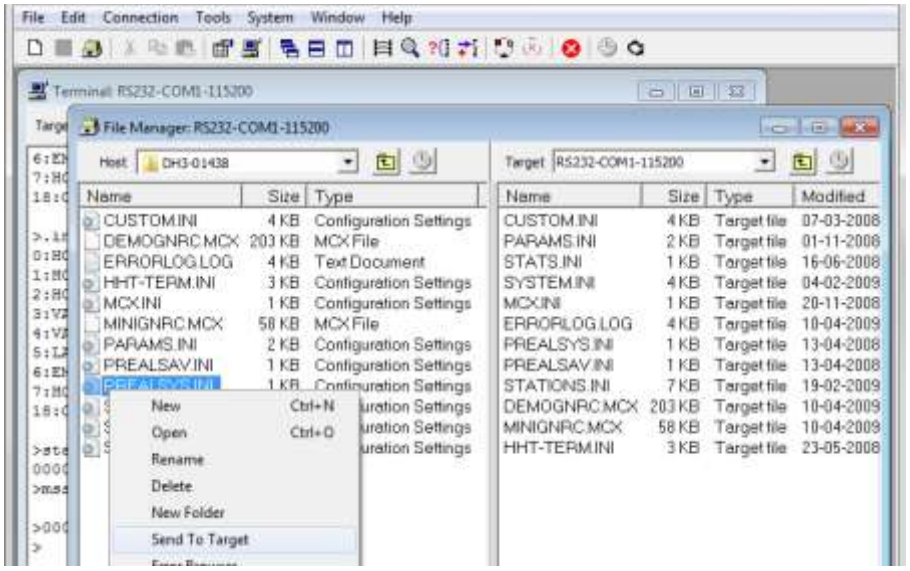
Each controller keeps the information in MS-DOS-like file system. For cases where direct access to files is needed, "File Manager" applet can give access to controller' files, as well as easy access to other applets working with files.

In order to get access to file system, controller must be placed in "Command line interpreter" mode. This is done by issuing ".quit" command in terminal window, or by confirming the target communication in "File manager" applet. This mode differs from standard controller operation by the prompt displayed, "C:\>". Although this prompt resembles command prompt of MS-DOS® operating system, or the one available in NT-class operating systems, the controller does not run neither of these operating systems. Full list of available commands in this mode are given in relevant documentation.

Before entering "Command line" mode on the controller, one must make sure that this is a safe operation, since the controller servo loop will be disabled.



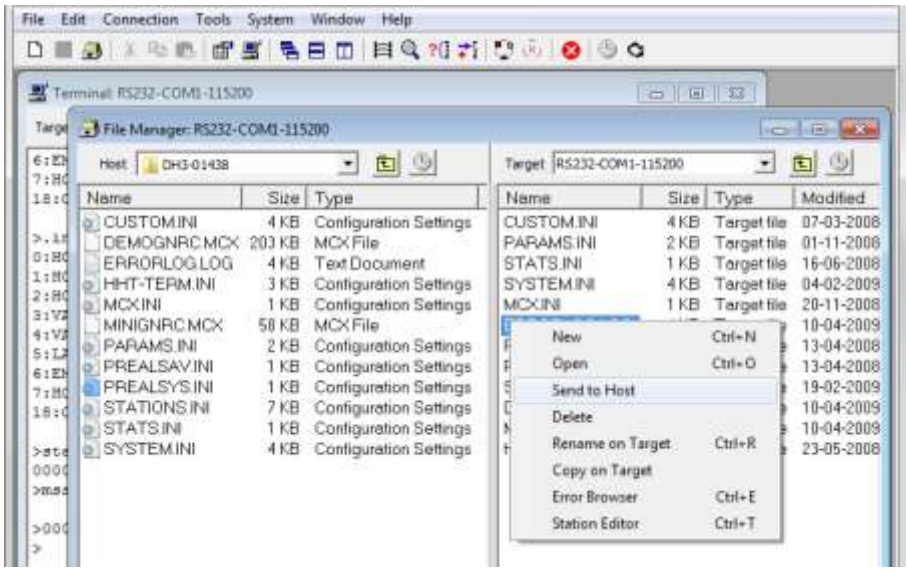
A file can be transferred from host PC to the target by drag-and-drop, or by right-clicking on its name and selecting “Send to Target”, or from File | Send to | Target” menu option. Several files can be selected for transfer in single operation by Ctrl-click-ing on them.



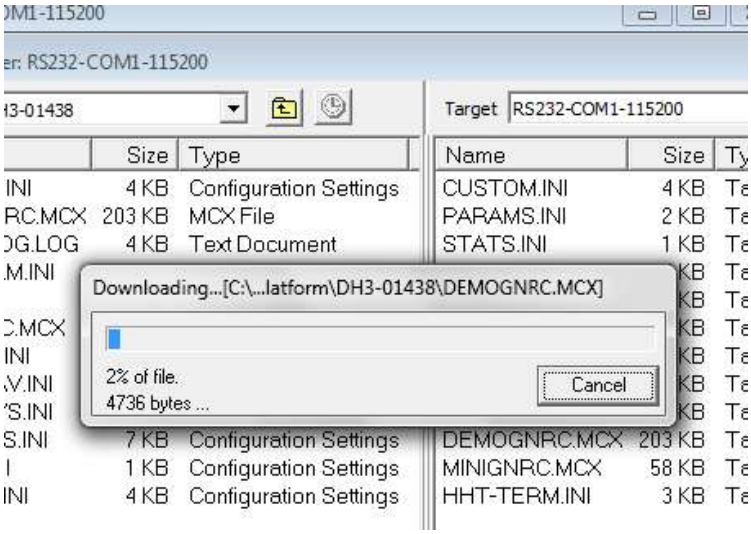
If the file to be transferred has a long file name (that is, file name is more than 8 character, or file extension is more than 3 characters), a warning message will be displayed. If file with the same name exist on the target, a confirmation dialog will be displayed.

Same techniques can be used to transfer files from the target to the host.

In order to transfer files from the host PC to WHR:



The file transfer uses X-modem file transfer protocol, which transfers files using block size of 128 bytes. Therefore, all transferred files will have sizes multiple of 128. Text files will have end-of-file character, with ASCII code 26, used as filler. This character is recognized as end-of-file, and displayed as a square on most text editors, including LCC built-in text editor.



Depending on file size and communication speed, transfer time may vary. A progress indicator shows each file being transferred, and file transfer can be cancelled by pressing <Cancel> button.

Double-clicking of a file on the target will initiate a transfer of this file to a temporary file, then opening this file into text editor applet. When this applet is closed, the file will be saved to the target.

If the file to be opened has an extension of .INI, it can be opened as stations parameter file into “Station Editor” applet by selecting “Station editor” from the right-click menu. Similarly, a file with an extension of .LOG can be opened into “Error browser” applet by selecting “Error browser” from the right-click menu.

File manager can be used also to rename and copy files on host PC, or onto target.