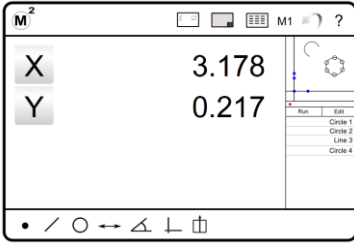# ‹ MetLogix ›

M²

Quick Start Guide

Welcome!

The following pages will describe the operation of the M2 measuring software.

User Interface:

Horizontal Format

The M2 horizontal layout contains three (3) main viewports, one large viewport on the left side of the screen and two smaller viewports to on the right side of the screen. The left viewport is the "focus" port and can provide a large display of the current encoder position, selected feature detail, or part view. The view selector buttons in the top tool bars will set the desired view to the "focus" viewport. The viewports themselves can also be pressed to switch views on the fly. The location of the small viewports can be changed within the "Desktop" settings screen.

Vertical Format
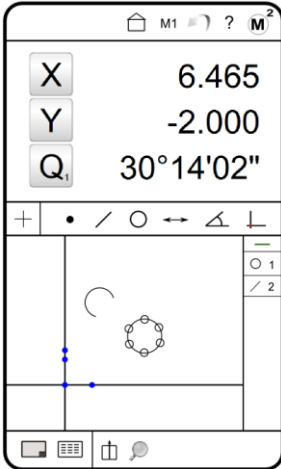
The M2 vertical layout contains two (2) main viewports, one on the upper portion of the screen and one at the bottom. The upper viewport displays encoder position, feature detail, and active measurement information. The bottom viewport displays the part view and detailed report data. The feature and program list are always displayed to the right of the lower viewport, along the lower right hand side of the screen.

The M2 System Menu

The Measure Toolbar

Order below is according to the "toolbar" image above (left to right).

Probe Menu: Provides access to the Optical Edge probe buttons. (For Optical Edge enabled systems only)

Measure Point Menu/Button: Measures Point feature and provides access to the Point Menu.

Measure Line Menu/Button: Measures Line feature and provides access to the Line Menu.

Measure Circle Menu/Button: Measures Circle feature and provides access to the Circle Menu.

Measure Distance Menu/Button: Measures Distance feature and provides access to the Distance Menu.

Measure Angle Menu/Button: Measures Angle feature and provides access to the Angle Menu.

Measure Datum Menu/Button: Measures Datum feature and provides access to the Datum Menu.

The Toolbar Buttons

M2 System Menu: Provides access to the M2 system menu items.

"Home" Button: Resets the large viewport to the currently defined "home" view.

Data/Report View Button: Displays the data/report view in the large viewport.

Part View Button: Displays the part view in the large display port.

Undo Button: Executes an "Undo" on the last performed software command.

Magnification Menu: Provides access to the magnification selection menu.

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Help Button: Launches a PDF viewer, displaying the M2 User's Manual.

Preferences Menu: Provides access to configured preference selection items, including unit type, reference frame selector, and the on-screen keyboard launcher. *(These items are configured in "Settings"-"Desktop").*

Zoom Menu: Provides access to the Part View zoom buttons.

The crosshair and edge probes:

"Using an External Crosshair" Example

The M2 Software supports measuring features with an "External Crosshair" using the following procedure:

■ In Optical Edge enabled systems, select the crosshair probe from the probe menu. For crosshair only systems proceed to the next step.
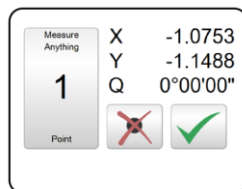
■ Press a Measure Feature button from the center or bottom toolbar.
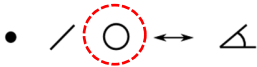
■ Position your comparator crosshair, or externally generated crosshair, on the edge of the feature to be measured.
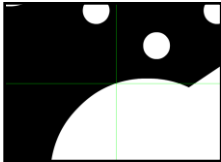
■ Press the large measure feature button," or click in the yellow measure window, to enter points for the feature measurement. Press "Done" (Green Check Button) to complete the measurement.

Note: If a measurement fails after pressing "Done", please refer to the Probe Points Requirements list or the measure feature examples, both found in Section 2.

"Using the Manual optical edge probe" Example

The Manual optical edge probe requires that edge crossings be confirmed by keypress. The point acquired at the last edge crossing will be added to the current feature measurement when either the large measure feature button (vertical format) or the yellow measure window (horizontal format) is pressed. The M2 Software supports measuring features with the "Manual Edge probe" using the following procedure:
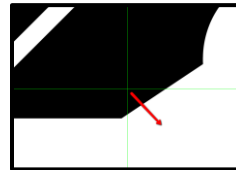
■ Select the Manual optical edge probe from the probe menu.

■ Press a Measure Feature button from the center or bottom toolbar.

■ Cross an edge on the feature to be measured, a point enter sound will be played indicating an edge crossing.

■ Press the large measure feature button, or click in the yellow measure window, to enter the point for the last edge crossed. This point will be added to the counter for the current feature measurement.
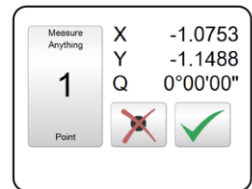
■ After the desired number of points have been probed, press "Done" (Green Check Button) to complete the measurement.

Note: If a measurement fails after pressing "Done", please refer to the Probe Points Requirements list or the measure feature examples, both found in Section 2.

"Using the Auto optical edge probe" Example

The Auto optical edge probe enters points automatically upon crossing an edge. The point acquired at the edge crossing will be added to the current feature measurement routine. The M2 Software supports measuring features with the "Auto edge probe" using the following procedure:
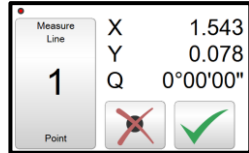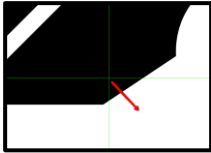
■ Select the Auto optical edge probe from the probe menu.

■ Press a Measure Feature button from the center or bottom toolbar.
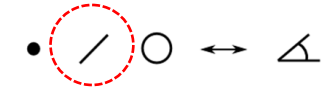
■ Cross an edge on the feature to be measured, a point enter sound will be played and the point will be added to the current measurement.

Measure Line	X	1.543
	Y	0.078
1	Q	0°00'00"
Point		

■ After the desired number of points have been probed, press "Done"(Green Check Button) to complete the measurement.

Note: If a measurement fails after pressing "Done", please refer to the probe points requirements list or the measure feature examples, both found in Section 2.

Optical Edge Teach

The use of the Manual and Auto Optical Edge probes requires that a valid optical edge teach routine be performed in the M2 software.

"Teaching Optical Edge" Example

■ Select the "Probe Teach" button located in the probe menu.
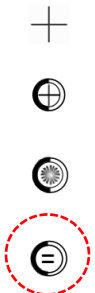
■ Follow the on-screen instructions for positioning your optical sensor throughout the 3-stage teach routine.

■ At the completion of the teach routine a message will be displayed indicating the results of the teach. After a successful teach, the Optical Edge probes can be used to perform feature measurements. If an edge teach failure occurs, attempt the teach routine again. If failure continues, please contact your machine service provider for assistance.
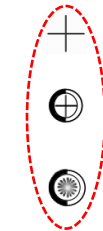
Measure Feature:

"Measure Circle" Example

The M2 Software supports measuring **Circle** features and can be accomplished using the following procedure:

■ Select the Measure Circle button from the Measure Toolbar.

■ Select a crosshair or optical edge probe from the probe menu.

■ Press "Done" to complete the Circle Measurement. The Circle is added to the Feature List and Part View.

All supported feature types can be measured explicitly using the same procedure described above.

Points requirements for probed and constructed features:

■ **Point Features** require one (1) or more points. When more than one (1) point is probed or used in a construction, the average point is the result.

■ **Line Features** require two (2) or more points. When more than two (2) points are probed, a data fit type is applied to the feature's data cloud.

■ **Circle and Arc Features** require three (3) or more points. When more than three (3) points are probed, a data fit type is applied to the feature's data cloud.

■ **Angle Features** require four (4) or more points. The first (2) points must be probed on one leg of the angle, followed by two (2) additional points on the second leg. More points can be added after the initial (4) in any location of the angle's legs.

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Construct Feature:

"Construct Line" Example

The M2 Software supports <u>Tangent Line</u> Constructions and can be performed using the following procedure:

■ Select the measure line button from the measure toolbar.

■ Select the two circles from the feature list or part view that are to be parents of the tangent line construction.

■ Press "Done" to complete the Tangent Line construction. The feature will be added to the feature list and part view.

All supported feature constructions can be performed using this same procedural method.

"Measure Repeat" Example

The M2 software supports measuring features in "Repeat Mode" using the following procedure:

■ When measuring in "Repeat Mode", the Measure Feature button does not need to be pressed between each feature measurement. The system prepares the next feature measurement automatically at the completion of the previous feature. This mode is designed for measuring a large quantity of "like features" sequentially. "Repeat Mode" is available for all feature types using the same procedure.

■ Press the measure feature button for the desired feature type, next select the repeat button for that feature.
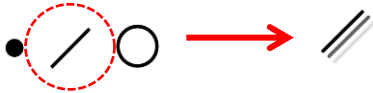
■ You can now select any video probe you would like and begin probing the first feature. When finished press "Done".

■ You will notice that the system is now ready for another line measurement. This will continue until "Repeat mode" is exited. Press the "Done" button to exit "Repeat Mode".

Apply a Tolerance:

"X/Y Position Tolerance" Example

The M2 software supports applying an XY positional tolerance to a circle feature and can be accomplished by using the following procedure:

■ Select the circle feature in the feature list you intend to apply the tolerance to.

■ Access the feature detail screen for the circle by pressing in the feature detail viewport.

■ Toggle the feature detail screen from "Actuals" view to "Nominals" view using the screen selection button located above the feature coefficients.

■ Set the nominal position values in X and Y for your circle feature.

■ Select the X or Y positional tolerance button from the toolbar and then enter the desired tolerance values in the appropriate fields.
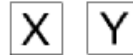
■ Switch the detail view screen from "Tolerance" to "Deviation" using the view selector button to observe the results of the applied tolerance.

All supported tolerance types can be applied to features using the same fundamental procedure described above.

Supported Tolerances by Feature Type

■ **Point Features**: True Position(RFS), X/Y/Z Positional

■ **Line Features**: X/Y Positional, Angle(Theta), Parallelism, Angularity, Perpendicularity, Straightness

■ **Circle Features**: True Position(RFS/MMC/LMC), X/Y Positional, Diameter, Concentricity, Runout, Roundness

■ **Distance**: X/Y/Z Positional, Length

■ **Arc Features**: True Position(RFS), X/Y Positional, Diameter/Radius

■ **Angle**: Angle(Theta)

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Tolerance Symbols:

X Y Z

X/Y/Z Positional Tolerance

D R

Diameter/Radius Size Tolerance

θ

Theta(Angle) Tolerance

f

Form Tolerance

//

Parallelism Orientation Tolerance

Angularity Tolerance

⊕

True Position Tolerance

Straightness Tolerance

//

Parallelism Tolerance

⊥

Perpendicularity Tolerance

○

Roundness Tolerance

◎

Concentricity Tolerance

Runout Tolerance

Datum Features:

Datuming in the M2 software is accomplished using any of a variety of alignment operations. These operations may be used individually or in combination, and will be based upon the capability of the measuring machine, as well as the particular alignment requirements of the application.

 "Part Skew" Example

The M2 software supports skew or secondary alignment and can be explicitly measured using the following procedure:

■ Select a Video Probe from the probe menu.

■ Press the "Datum" toolbar button to access the datum submenu.
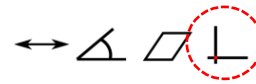
■ Press the "Measure Skew" button to initiate the explicit skew measurement or skew construction.

■ Probe at least (2) points on the line to apply skew to, or select the features from the feature list or part view that you would like to construct the skew line from.

■ Press "Done" to complete the skew measurement.

Note: Previously measured or constructed features can also be used to apply skew by manually zeroing the theta angle coefficient and X or Y axis coefficient. Pressing the label buttons to the left of these coefficients, in either the feature detail screen or the mini-DRO view port, sets the corresponding value to zero.

"Part Datum" Example

The M2 software supports setting a Datum(Origin) point and can be performed using the following procedure:

Note: Setting a datum position is typically performed on a previously constructed or measured feature. Datum points can be explicitly measured as well using the "Measure Datum" button.

"Datum Construction" Method

■ Press the "Datum" toolbar button to initiate the datum procedure. The system is now prepared to set an existing feature to the datum or to explicitly measure a datum position.
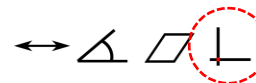
■ Select the feature that you would like to set as the Datum Zero position.

■ Press "Done" to apply the datum to the selected feature.

Note: As in the example of skew, the datum can be manually zeroed using the X,Y, or Z DRO buttons from a features detail view.

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Printing/Exporting Measurement Data:

Any of (4) standard report formats can be viewed within the Report View screen. By default, all features within the Feature List will be populated within each of these (4) report formats.

Reports can be printed as hard copies to standard Windows compatible printers, or exported as data files in ".txt" or ".csv" format.

"Select Report Template" Example

The M2 software supports (4) report format templates. These templates can be toggled using the following procedure.

■ Populate your Feature List with measured, constructed, or created features.

■ Access the report view screen using the "Report View" button found in the top or bottom toolbar.

■ Select from the available report templates using the "Report Type" menu button found in the bottom toolbar.

■ The name of the currently selected report template will be shown at the top left of the report screen.

"Print Report" Example

The M2 software supports printing the selected report view to a Windows compatible printer using the following procedure:

■ Display the desired report template in Report View and configure the report to look like the desired printed report.

■ While in Report View, press the "Print Report" button found in the M2 System Menu and confirm print settings from the displayed Windows Print dialog box.

"Export Data File" Example

■ Display the desired report template in report view and configure the report formatting according to the file export style desired.

■ Press the "Export Data" toolbar button, found in the bottom toolbar, and choose the desired export format.

■ The exported data file will be written to the designated target location, and a message will appear indicating successful export of the data file.

"Printout" settings items:

The options listed below can be configured either globally from within the "Printouts" setup screen, or at the point of each print execution.

Note: To configure the software to prompt for "Printout" settings at each Print command, configure the "Printout" settings item called "Prompt for Print Settings" to "Yes".

■ **Print Report Header** Set this field to "Yes" to include the report header in your report printout. Additional items, listed below, will affect what items are included in the report header. Set this item to "No" to omit the report header from printed reports.

■ **Print Column Header** Set this field to "Yes" to include column headers in report printouts. The column header labels the contents of a report column by category. Some examples are X, Y, Deviation, etc…Set this field to "No" to omit the column header from printed reports.

■ **Print Grid Lines** Set this field to "Yes" to include grid lines on printed reports. Set this field to "No" to have the grid lines removed from printed reports.

■ **Print "PrintLogo.bmp"** *in Header*: Set this field to "Left", "Center", or "Right" to include a custom bitmap image in the desired location of the report header. Set this field to "No" to omit the custom bitmap from the report header. Place the desired custom bitmap image, with the file name "PrintLogo.bmp", into the root location of your M2 software.

■ **Print User Name in Header** Set this field to "Left", "Center", or "Right" to include the currently "logged-in" user name in the desired location of the report header. Set this field to "No" to omit the username from the report header.

■ **Print Date/Time in Header** Set this field to "Left", "Center", or "Right" to include the system date and time in the desired location of the report header. Set this field to "No" to omit the date and time from the report header.

■ **Print Part View with Data** Set this field to "Top", "Bottom", or "Watermark" to include an image of the current part view in the desired location of the printed report. Setting the field to "Watermark" will print an alpha blended part view image underneath the report data. Set this field to "No" to omit the part view image from printed reports.

■ **Print Page Number in Footer** Set this item to "Yes" to include a page number in the report footer. Set this item to "No" to omit page numbers from report printouts.

■ **Printed Part View Height** Set this item to the desired size of the part view to be included with the printed report. This item can be set to 25%, 50%, 75%, or 100% of the native size of the part view image.

■ **Print Custom Text in Header** Enter custom alpha-numeric information into these fields to be displayed in the report header. Custom text entered into these fields will always be aligned left and bottom in the report header. Leaving these fields blank will omit custom text from the printed report.

Program Playback/Edit:

In the M2 software, groups of measured constructed, and created features can be saved to a part program file. Part program files, when loaded, will prepare the M2 software to repeat a sequence of feature measurement steps. Other software functions such as printing, and exporting data can also be "played back" as part of a program.

IMPORTANT Optical Edge note: Programs created using the Optical Edge probes will always default to the Manual Edge probe type for the first feature in a program playback. This will help avoid unwanted probe firing in the event edges must be traversed in order to position your probe for the start of playback.

With the exception of the above rule, all feature program steps will be played back according to the probe type used to measure the feature initially. In addition, the operator can always over-ride the probe type used in playback by selecting the desired probe from the probe menu.

"Using Program Playback Mode" Example

The M2 Software supports playing back part programs using the following procedure:

■ Press the play button in the M2 System Menu to execute program playback.

In the event the program is newly created (not from a previously saved file) a default program file name will automatically be assigned and the program file saved.

■ Probe the first feature in the playback sequence according to the screen instruction, and the Blue Pin position in the "run" list. The feature to be measured will be highlighted by a white region on grey background, within the part view. The first two features in playback should be probed using the red ball as the target location. Once a valid coordinate system is established, subsequent features will require the target ball be green in order for the currently selected probe to be active. The target playback ball will be red until the stage coordinates are close to the target ball at which point the ball turns green.
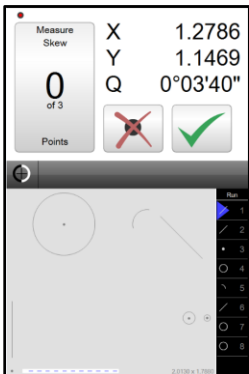
■ Continue measuring the programmed features of the part program, where each target ball will turn green allowing for point entry by either manual crosshair or an optical edge probe. The size of the active target playback zone can be increased or decreased the Edge Zone parameter in the "Programs" settings screen.
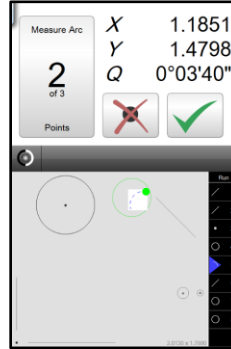
■ When the program playback is complete, the program options screen will appear. The part program can then; be Replayed, cleared for New Part creation, display measurement results, or edited(pending adequate privileges).
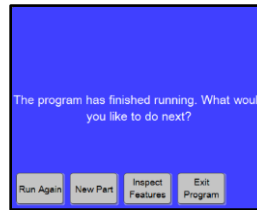
■ For features with tolerances applied, the features name in the "run" list, the part view graphic, and the corresponding detail view field, will display in either red (fail) or white(pass).

■ Other software functions may also execute during playback. Data exports, report printouts, and user messages are some examples.

"Using Program Edit Mode" Example

The M2 software supports editing of current, or previously saved part programs using the following procedure:

■ To edit existing program files, open the program file prior to proceeding.

.mlxpart

■ Press the "program play" button from the M2 menu.

■ Press the "Edit" tab found at the top of the feature/program list.

Run	Edit

■ The program steps will be listed within the "Edit" view.

■ Use the feature detail screens to make changes to tolerance and feature data for a selected program step. Use the edit buttons in the bottom toolbar to make changes to data export and print steps, remeasure features, and append recorded steps.

■ If desired, save the program file using the "Save" button from the M2 System Menu .

"Appending Program Steps" Example

The M2 software supports appending, or "recording-in", program steps and can be accomplished using the following procedure:

■ Select the program edit view.

Run	Edit
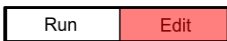
■ Select the program step where you would like your newly created program operations to be added. These newly added program operations will be inserted after the selected program step.

■ Press the "Record Into" button from the bottom toolbar.

■ A blue "Edit Pin" will be positioned between the currently selected program step and the following step, indicating the current "record into" position.

Note: When editing a program that has already been "played back", the context generation will occur automatically, filling in context dependent program steps automatically from the previously acquired program data. For programs that have not yet been "played back" the software will prompt the operator to manually measure all context dependent features prior to completing the context generation.

■ Once the "record into" edit command has been initiated, the operator may measure or construct new features or insert data output or print command steps according to the standard software procedures for these functions.

■ These newly added program steps will be added to the current program edit list.

■ To save the newly added program steps to the currently loaded part program, press the "save" button found in the M2 System Menu.

"Adding a User Message" Example

The M2 software supports adding and editing custom "user messages" for program playback, and can be accomplished using the following procedure:

-Note: "User messages" are added and edited in program edit mode. Part program edit mode can only be accessed after the play program button has been pressed.

■ Select the program edit view.

Run	Edit

■ Select the program step where you would like the user message displayed in program playback. The message will be displayed after this selected step.

■ Press the "User Message" edit command found in the bottom toolbar.

■ The "user message" window will appear. Enter the desired user message text into the space provided.

■ Press the "Done" button to complete the user message. The user message will be displayed as part of the program playback sequence.

Product Warranty

This product is warranted against defects in workmanship, material and design for two (2) years from date of delivery to the extent that METLOGIX will, at its sole option, repair or replace the product or any part thereof which is defective, provided, however, that this warranty shall not apply to products subjected to tampering or, abuse, or exposed to highly corrosive conditions.

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