USER'S MANUAL **990-828**

REVISION 27 **JULY 2018**

AMADA MIYACHI AMERICA

OPERATION MANUAL

FOR THE

DELTA LASER WORKSTATION

REVISION RECORD

Revision	EO	Date	Basis of Revision
1	N/A	07/05	Engineering Release
2	N/A	10/05	Update
3	N/A	10/05	Revised per QA
4	N/A	11/05	Revised per QA
5	N/A	11/05	Remove G-Code, change Title
6	N/A	05/06	Add SW/DSW Control Panel
7	N/A	08/06	Graphics for Pendant – Class IV and Glovebox
8	N/A	09/07	Add Vertical Door Notes
9	N/A	6/08	Login Information Added
10	N/A	6/08	Removed firing option from RS-485 (F10 & F11)
11	N/A	6/08	Add Captures
12	N/A	2/09	Add Remote Access Support
13	N/A	11/09	Add I/O Monitor Capability
14	N/A	11/09	Add login procedure
15	N/A	1/10	Add usage information LASER ENABLE + M00
16	N/A	2/11	Add Status Message Display Windows (M09)
17	N/A	10/12	Power-Up and DM load before stage homing
18	N/A	04/13	Additional Fiber Laser Notes
19	N/A	XX/XX	Updated
20	N/A	12/14	Updated Wording P.6
21	N/A	12/14	Updated Logos
22	N/A	01/15	Updated Document Formatting
23	N/A	09/15	Additional Machine Procedure
24	N/A	02/16	Addition to Machine Start Up Procedure
25-27	N/A	07/18	Corrections Requested by Customer

FOREWORD

Thank you for purchasing the Delta Tau Workstation. If you have any questions about the contents of this manual, or find any errors or omissions, please notify Amada Miyachi America at:

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WARNING

This instruction manual describes how to perform procedures on lasers. These procedures MUST be performed as detailed by QUALIFIED and TRAINED personnel.

Procedures not performed as prescribed in this manual may expose personnel to laser radiation hazards.

Be sure to wear protective goggles having an optical density of at least 6 at a wavelength of 1064 nanometers.

CONTENTS

Section I. General

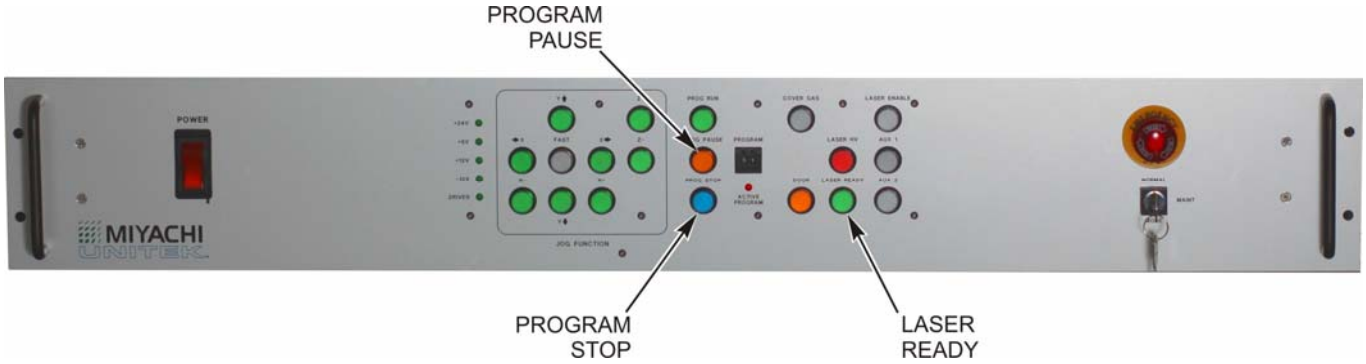
Introduction

This is the Operation manual for Delta Tau Workstation. This software program is intended to allow the machine operator to quickly and easily accomplish the tasks required to successfully weld devices.

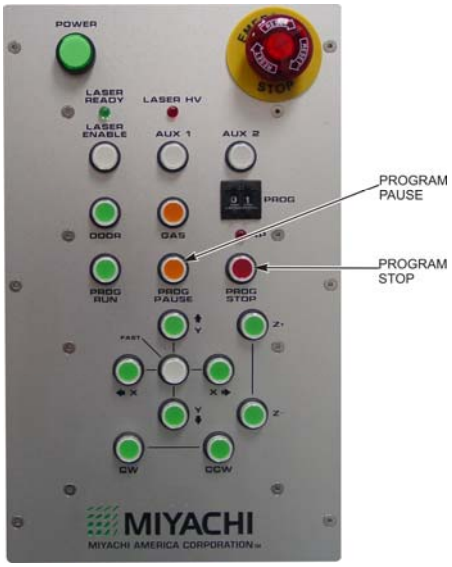
The Workstation Operators Manual is intended to familiarize the machine operator with the features and functions of the Laser Welding machine.

NOTE: This manual DOES NOT include the specific sequence for setting up all of the weld schedules for the Miyachi Unitek Laser Welder. Please refer to the Amada Miyachi America Operations Manual for further instructions.

Machine Start up Procedure (TYPICAL PANELS SHOWN)



Standard Delta Workstation Interface



Workstation Pendant

1. Turn on power to the Delta Station.
2. Press the *PROG STOP* button which will enable the drives.
3. If the Keyswitch is in the 'Normal' position and the door is open, stages may not home. Press the 'Door' button to close the door. When the door is fully closed, the PROG STOP button will flash informing the user that the stage(s) have not been homed.
4. If drives are enabled successfully, both the *PROG PAUSE* and *PROG STOP* lights will begin to flash.

NOTE: If after pressing *PROG STOP* the *PROG PAUSE* button does not begin to flash, check and make sure that all E-STOP switches have not been pressed and are working properly and that door interlock indicates doors are closed.

5. Power up computer and launch DeltaMotion application.
Note: When power up windows there are three levels of login.
First: Engineer (password: eng).
Second: Technician (password: tech).
Third: Operator (password: **no password**). There can be up to 20 operator passwords.
These passwords can be changed to allow for secure access to the system

6. Pressing both the *PROG PAUSE* and *PROG STOP* buttons simultaneously will cause each stage to home. DeltaMotion should be connected to welding system prior to stage homing. Homing will not proceed in *NORMAL MODE* unless door interlock indicates doors are closed.

ANY ADDITIONAL APPLICATIONS PLEASE REFER TO ATTACHED DOCUMENTS

7. Once the homing has been completed the jog button lights will illuminate; this is the time to power on the laser and turn the laser key switch.

8. When the *Laser Ready* light turns green you can now begin the process of preparing your parts and executing your programs.

9. Before the execution of a program a part should be loaded in place. Some systems utilize PIP sensors and cannot proceed unless a part is detected. Other systems utilize tooling that might be damaged if the laser is permitted to fire upon it

WARNING: BE SURE THAT THE PART IS LOADED **PROPERLY** WITHIN THE AREA OF THE STAGE; MISPLACEMENT OF PARTS CAN CAUSE **SERIOUS DAMAGE** TO THE WORKSTATION, FOCUS HEAD, AND THE PART ITSELF

10. **VERTICAL DOOR OPTION ONLY**: In most systems, it is possible to run programs with or without the door closed. If you plan to run a program that will operate the laser, you should make sure the door is closed before proceeding.

    a. Incorporate door open and close commands within your program.
    b. Use the button labeled DOOR to open and close the door.

    Note that motion is typically enabled when the door is open. If this is not consistent with your company's safety policies, the stage can be disabled unless the door is closed. Also, the MAIN/NORMAL mode select can be utilized as an over-ride if motion with door open is sometimes required for technicians. Please consult AMYA factory for quotation of upgrade if a field modification is required

11. Enable the laser if laser welding is desired. In NORMAL MODE, the laser will automatically be set as enabled. In MAINT MODE, pressing the LASER ENABLE button will enable/disable the laser. Indicator will be lit when laser is enabled. If enabling needs to be controlled in the program, the variable P800 can be utilized. Including the line "P800=1" will enable and "P800=0" will disable laser in a motion program when that line is executed. Note that subsequent pressing of the LASER ENABLE button will continue to toggle the enable/disable state.
12. When program execution reaches an M00, program execution will pause at. This is typically used to allow a technician to modify a part location or confirm parts are set properly. Jog buttons are enabled to align part under laser cross-hair. It is recommended that this be done with LASER DISABLED. When it is desired to resume the program, operator should press the CYCLE START button.
13. With the stage properly in place and a part correctly loaded it is now time to run your program; this can be completed in two ways:

    a. Hardware Panel Mode
    b. Software Panel Mode

    Please refer to the appropriate sections for additional information on how to run programs (HARDWARE AND SOFTWARE PANEL MODES).

Machine Shut Down Procedure:

1. Remove all parts.
2. Save any open programs
3. Exit all open computer programs including Deltamotion
4. Shut down the PC using the windows standard shutdown procedure
5. Turn off power at control panel.
6. Turn Laser Enable (KeySwitch) Off then turn off laser power

Emergency Stop Recovery Procedure

1. Twist and pull the EMERGENCY STOP button.
2. Press the PROG STOP button which will enable the drives. The EMERGENCY STOP button light will turn off.
3. If the Keyswitch is in the 'Normal' position and the door is open, homing stages may not be permitted. Press the 'Door' button to close the door.

NOTE: If after pressing *PROG STOP* the *PROG PAUSE* button does not begin to flash, check and make sure that all E-STOP switches have not been pressed and are working properly and that door interlock indicates doors are closed.

4. If drives are enabled successfully, both the PROG PAUSE and PROG STOP lights will begin to flash.
5. Pressing both the PROG PAUSE and PROG STOP buttons simultaneously will cause each stage to home. Homing will not proceed in NORMAL MODE unless door interlock indicates doors are closed.
6. Once the homing has been completed the jog button lights will illuminate; this is the time to power on the laser and turn the laser key switch.
7. If the emergency stop is enabled; the laser will go into "ALARM" state (RED LED) on laser panel. This requires pressing Trouble Reset from the laser panel then cycling the Laser Enable Key Switch OFF then ON.

Door Homing

(Proceed as Follows to Re-Home Door and all Stages)

Door Homing is performed whenever the system powers up. It may also be required to re-home door motors if a fault occurs.

1. Press the EMERGENCY STOP button.
2. Press AUX1 until Light Illuminates
3. Twist and pull the EMERGENCY STOP button.
4. Press the PROG STOP button which will enable the drives. The EMERGENCY STOP button light will turn off.
5. If the Keyswitch is in the ‘Normal’ position and the door is open, homing stages may not be permitted. Press the ‘Door’ button to close the door.

NOTE: If after pressing *PROG STOP* the *PROG PAUSE* button does not begin to flash, check and make sure that all E-STOP switches have not been pressed and are working properly and that door interlock indicates doors are closed.

6. If drives are enabled successfully, both the PROG PAUSE and PROG STOP lights will begin to flash.
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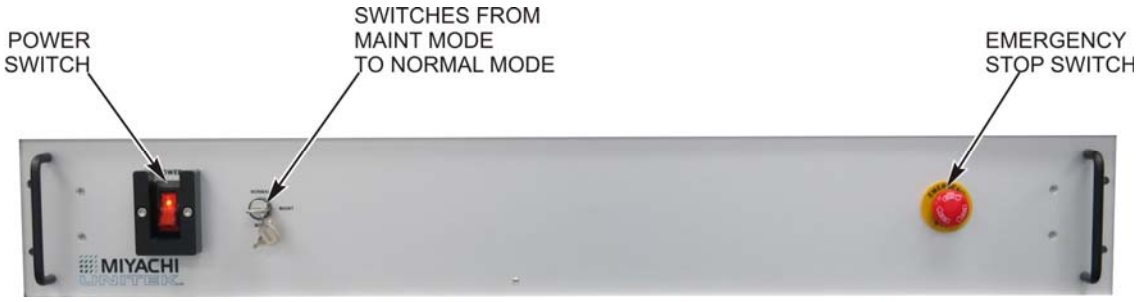
8. Once the homing has been completed the jog button lights will illuminate; this is the time to power on the laser and turn the laser key switch.
9. If the emergency stop is enabled; the laser will go into "ALARM" state (RED LED) on laser panel. This requires pressing Trouble Reset from the laser panel then cycling the

Laser Enable Key Switch OFF then ON.

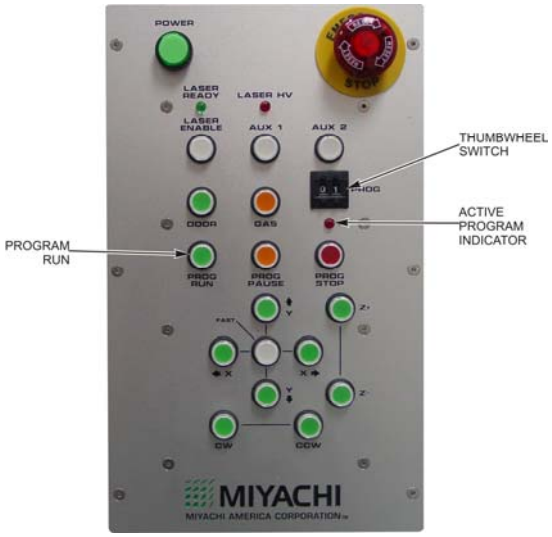
Running the Laser in Hardware Panel Mode:

(TYPICAL PANEL SHOWN)

Standard Delta Workstation Interface



Class IV and Glovebox Interface



1. If the *Active Program LED* is currently lit that means your machine is running in Hardware Panel Mode.

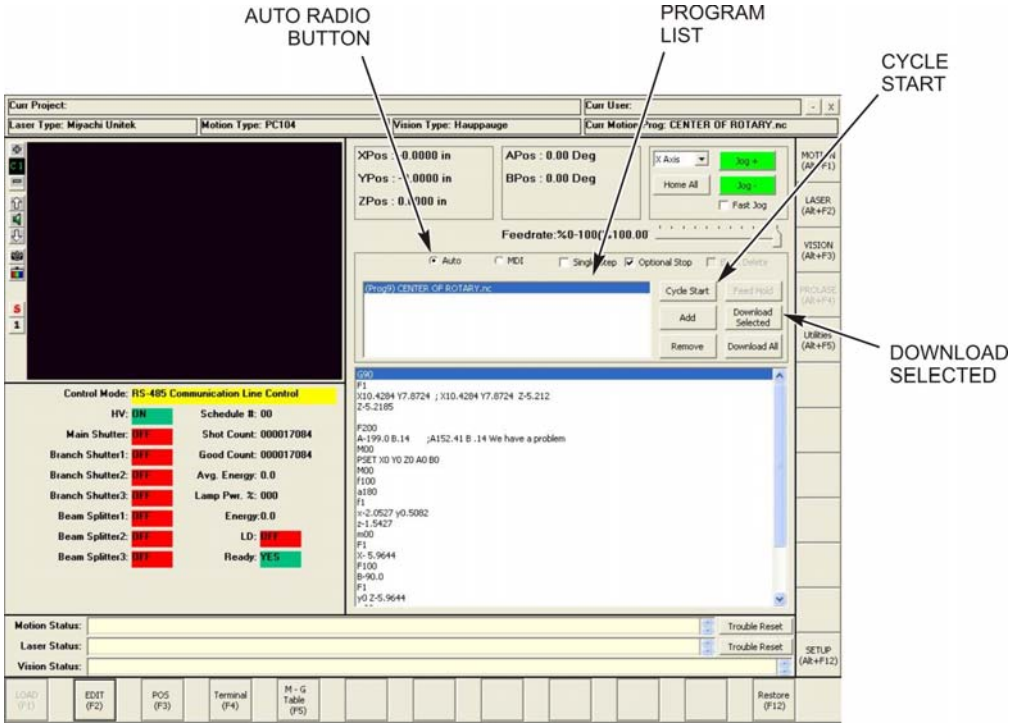
NOTE: To change between Hardware and Software Panel Mode please see the section below entitled “Switching Program Execution Modes”

2. To select a program from Hardware Panel Mode use the *Thumb Wheel Switch* to go to the appropriate program written for that specific part.

WARNING: MAKE SURE THE PROGRAM NUMBER MATCHES WITH THE PART CURRENTLY LOADED; FAILURE TO DO SO CAN CAUSE **SERIOUS DAMAGE** TO THE FOCUS HEAD, WORKSTATION, AND THE PART ITSELF.

3. Once the program is properly selected you may begin program execution by using the *PROG RUN* button.

Running the Laser in Software Panel Mode:



1. If the *Active Program LED* is <u>not</u> lit then your workstation is currently in Software Panel Mode.

NOTE: To change between Hardware and Software Panel Mode please see the section below entitled “Switching Program Execution Modes”.

2. Select a program from the list by highlighting the desired program for execution.

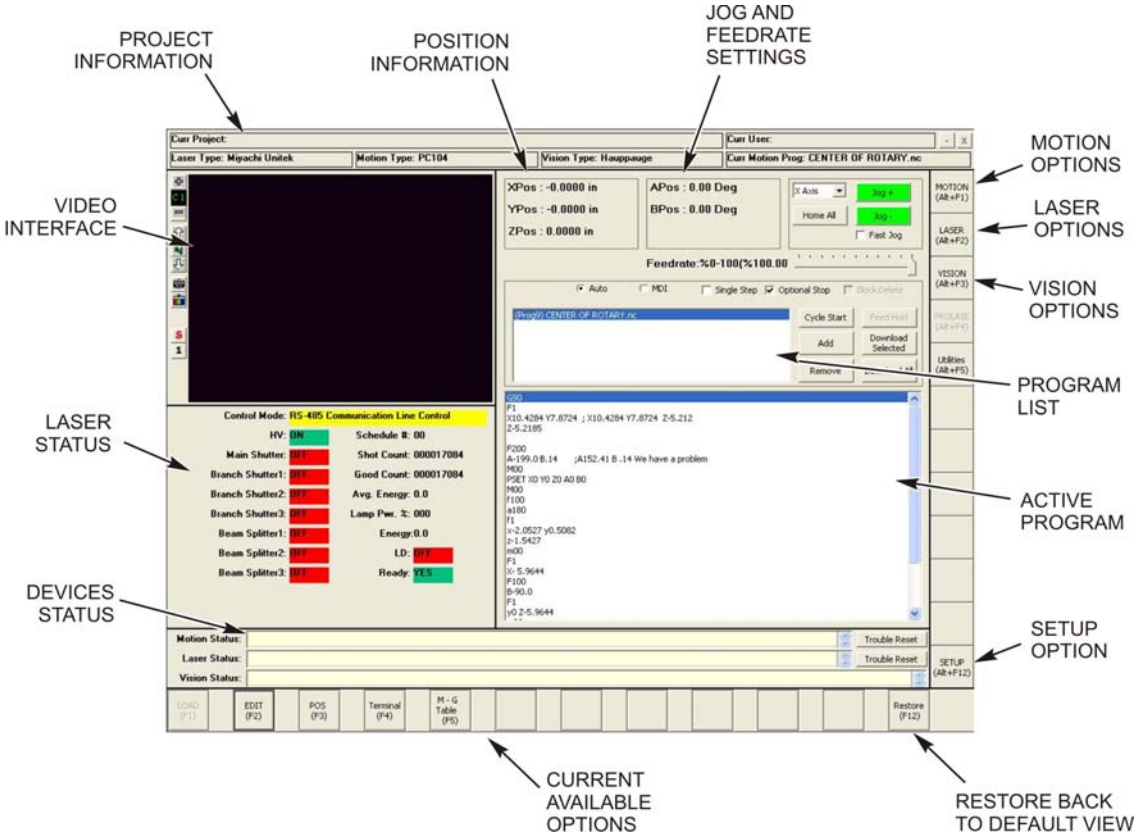
3. Click the *Download Selected* button (or double click on the highlighted program) to set your active program for the specified part you’ve just loaded.

WARNING: MAKE SURE THE ACTIVE PROGRAM MATCHES WITH THE PART; FAILURE TO DO SO CAN CAUSE **SERIOUS DAMAGE** TO THE FOCUS HEAD, WORKSTATION, AND PART ITSELF

4. Ensure that the *Auto* radio button is set as active.

5. When ready to execute your program press the *Cycle Start* button.

Delta Motion Interface:



Motion Option:
Changes the *Current Available Options* located at the bottom of the screen to allow the user to select from various Motion Options such as access to the PMAC terminal, detailed position information, M-G Code Tables, and a program editor. See **Motion Options** for further details

Vision Option:
Changes the *Current Available Options* located at the bottom of the screen to allow the user to select from different Vision Options such as allowing the user to expand the view of the video input. See **Vision Options** for further details

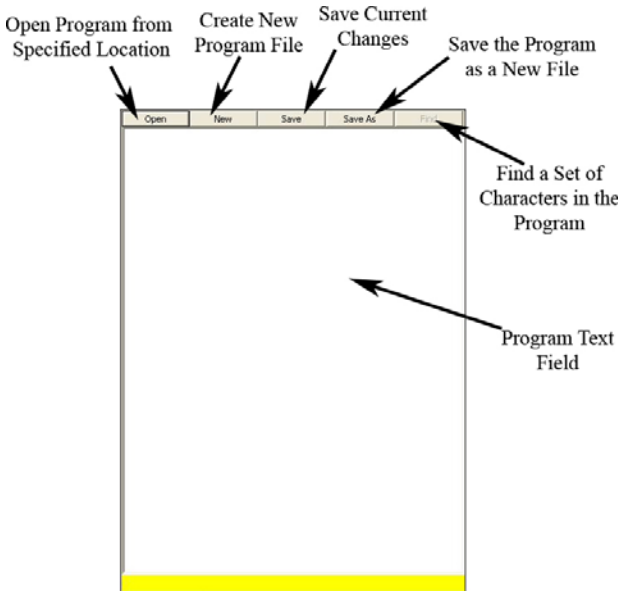
Laser Option:
Changes the *Current Available Options* located at the bottom of the screen to allow the user to select from different Laser Options such as configurable laser data, laser scheduling configurations, and software firing of the laser. See **Laser Options** for further details.

Setup Option:
Changes the *Current Available Options* located at the bottom of the screen to allow the user to select from various Setup Options such as enabling and disabling drive motors and allowing the user to change program execution modes. See **Setup Option** for details

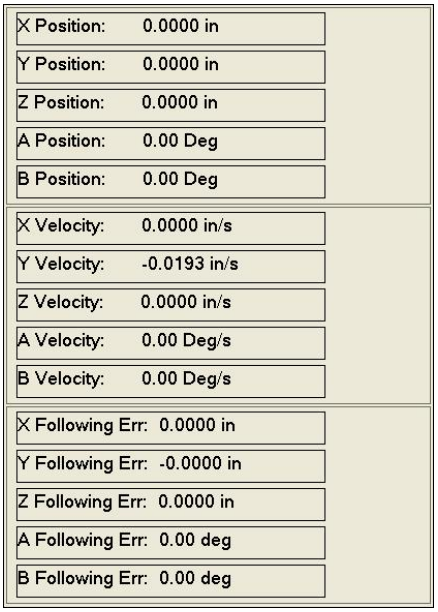
Motion Options:

LOAD (F1): Allows the user to load a motion program from a specified location into the *Program List* field

EDIT (F2): Displays the dialog box where a user is able to open, create, save, and search programs.

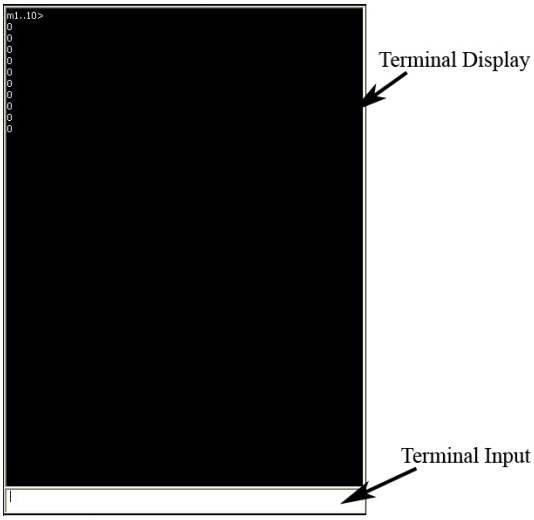


POS (F3): Gives the user further detailed information about the drives current position, velocity, and following error.



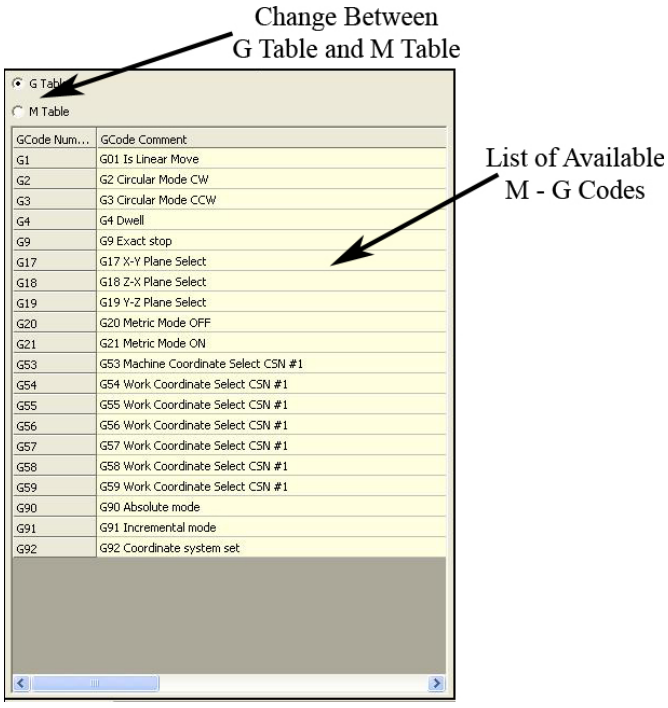
Motion Options (Cont'd):

TERMINAL (F4): Allows the user direct access to the PMAC via the terminal.



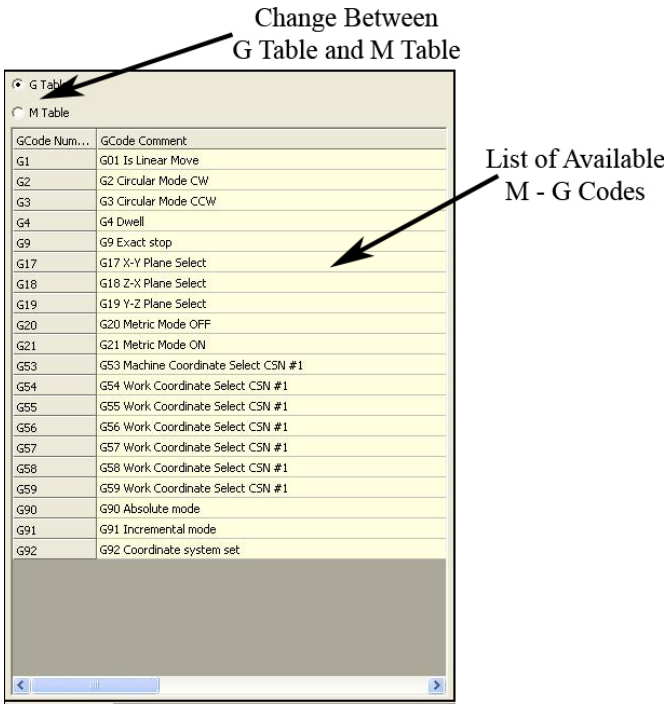
WARNING: DO NOT USE THE TERMINAL UNLESS SPECIFICALLY INSTRUCTED BY A TRAINED AMADA MIYACHI EMPLOYEE. CHANING SETTINGS ON THE PMAC MAY CAUSE **SERIOUS DAMAGE** TO THE FOCUS HEAD OR WORKSTATION.

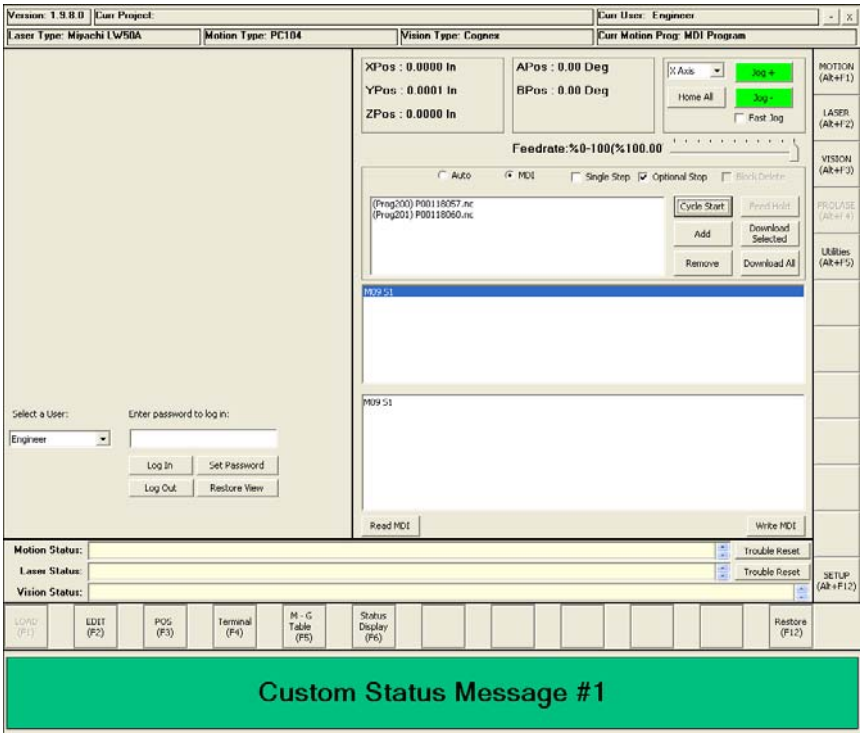
M-G Table (F5): Provides a detailed table of M and G Codes that are available to the user when creating or modifying a program.



GCode Num...	GCode Comment
G1	G01 Is Linear Move
G2	G2 Circular Mode CW
G3	G3 Circular Mode CCW
G4	G4 Dwell
G9	G9 Exact stop
G17	G17 X-Y Plane Select
G18	G18 Z-X Plane Select
G19	G19 Y-Z Plane Select
G20	G20 Metric Mode OFF
G21	G21 Metric Mode ON
G53	G53 Machine Coordinate Select CSN #1
G54	G54 Work Coordinate Select CSN #1
G55	G55 Work Coordinate Select CSN #1
G56	G56 Work Coordinate Select CSN #1
G57	G57 Work Coordinate Select CSN #1
G58	G58 Work Coordinate Select CSN #1
G59	G59 Work Coordinate Select CSN #1
G90	G90 Absolute mode
G91	G91 Incremental mode
G92	G92 Coordinate system set

Status Display (6): Allows the user to display custom programmable status message when executing the M09 M Code. Click on Status Display (F6) button will toggle to show or hide the status message display window.

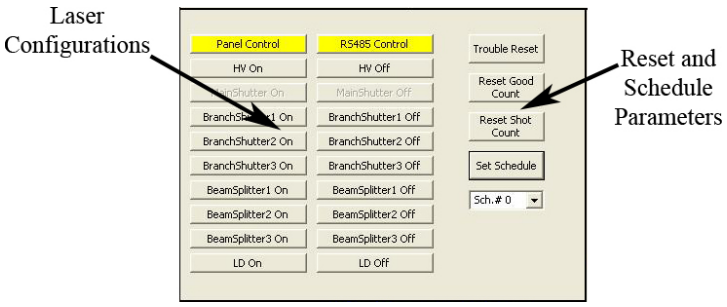




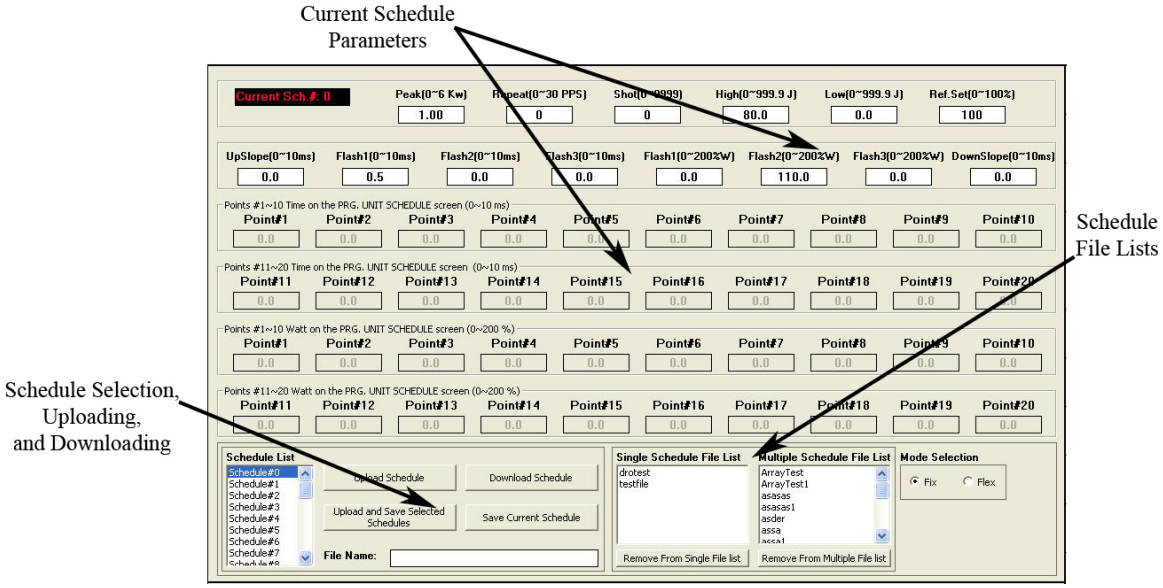
Laser Options:

Note: Not Available on Fiber Laser Systems

Laser Data (F1): Allows the user to specify where the control of the laser lies, branch shutter parameters, changing and activating laser schedules, and the resetting of good/shot counts



Sch Cfg (F2): Provides the user full control over the current laser parameters, loading laser parameters from file, and uploading and downloading schedules to and from the laser **(NOTE: After entering this screen, and transferring to RS485 Mode, you must press F1 (Laser Data), and select Panel Control) in order to reset laser Mode**



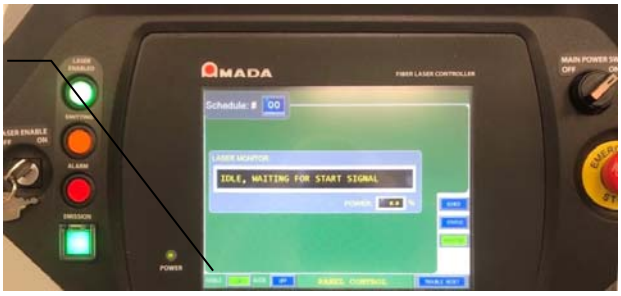
System Reset

A Reset Button has been incorporated into the system. Pressing Aux2 executes program 99 which resets system from a fault. Note that the door close command is included at the end of the Reset Program.

1. Identify Error indicated on DeltaMotion Message Line
2. Make corrections for indicated error.

   Example – If an excessive motor current is noted and there is material blocking the X-Y stage motion, remove the blockage.
3. Press RESET to complete process and bring system to default machine state.
4. Turn-off the Laser from the Laser Generator Touch Screen

Touch on Box for Laser Enable to turn OFF



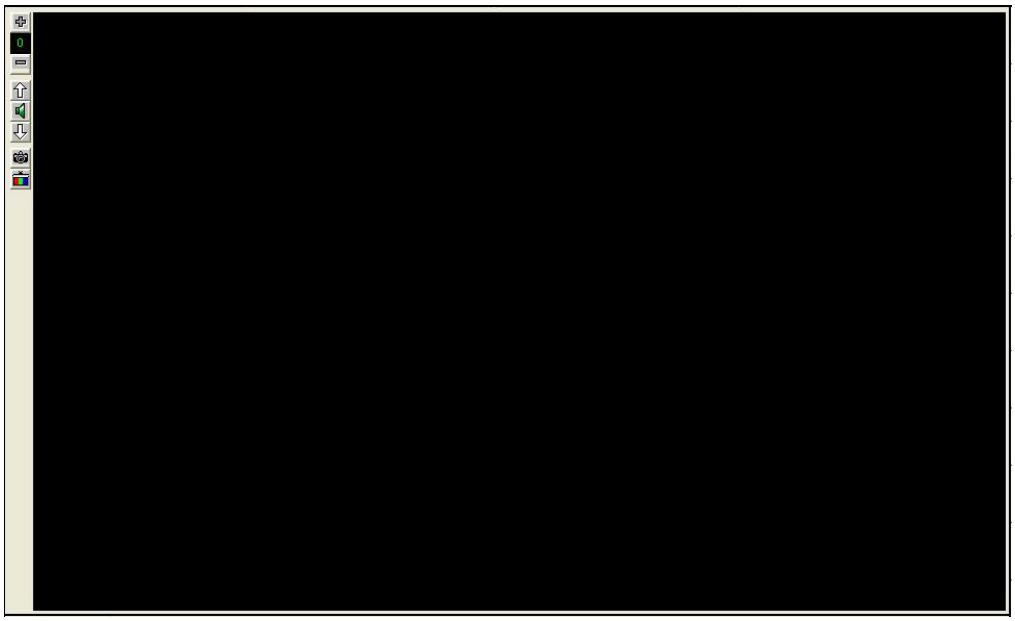
Turn OFF Laser Enable

Close Enable Box to retain settings

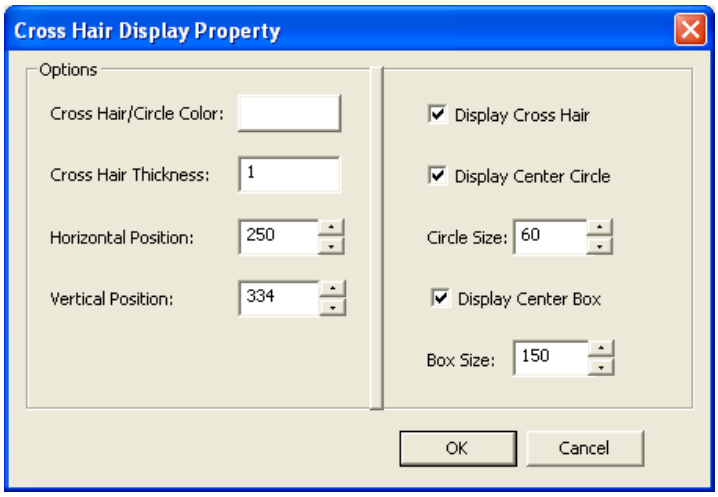
5. Reload the program from the Delta Motion Screen (click on program in program list and then click on download selected.)

Vision Options:

Expand (F1): Expands the current view of the video input to the size of the entire screen.

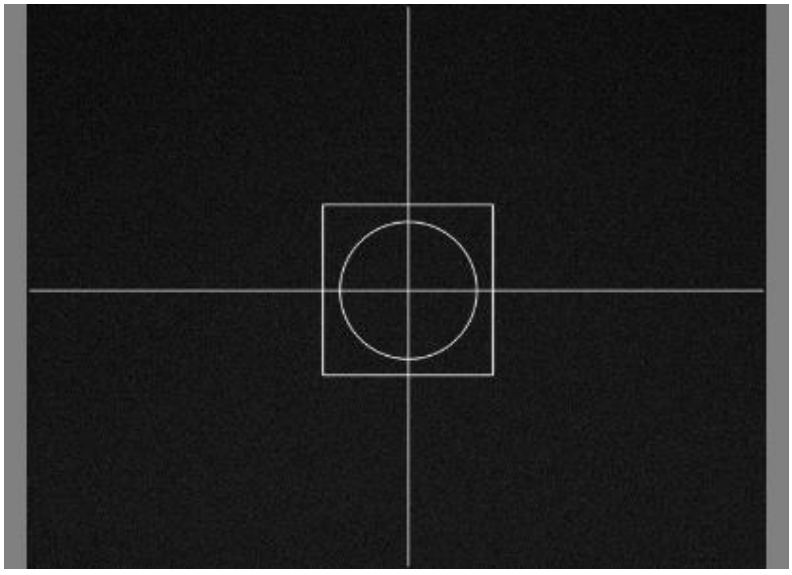


Cross Hair (F2): To display the Cross Hair Display Property Dialog.



- Cross Hair/Circle Color Button - to adjust the color of cross hair or tracking circle/square center
- Cross Hair Thickness - thickness size of cross hair
- Horizontal Position - Up/down spin control to adjust the cross hair / circle /square horizontal position
- Vertical Position - Up/down spin control to adjust the cross hair / circle /square vertical position
- Display Cross Hair - Checkbox to turn on / off the display of cross hair
- Display Center Circle - Checkbox to turn on / off the display of center circle
- Circle Size – Up/down spin control to adjust the size of center circle
- Display Center Box - Checkbox to turn on / off the display of center box
- Box Size – Up/down spin control to adjust the size of center box

Restore (F12): To restore the vision display back to normal size.



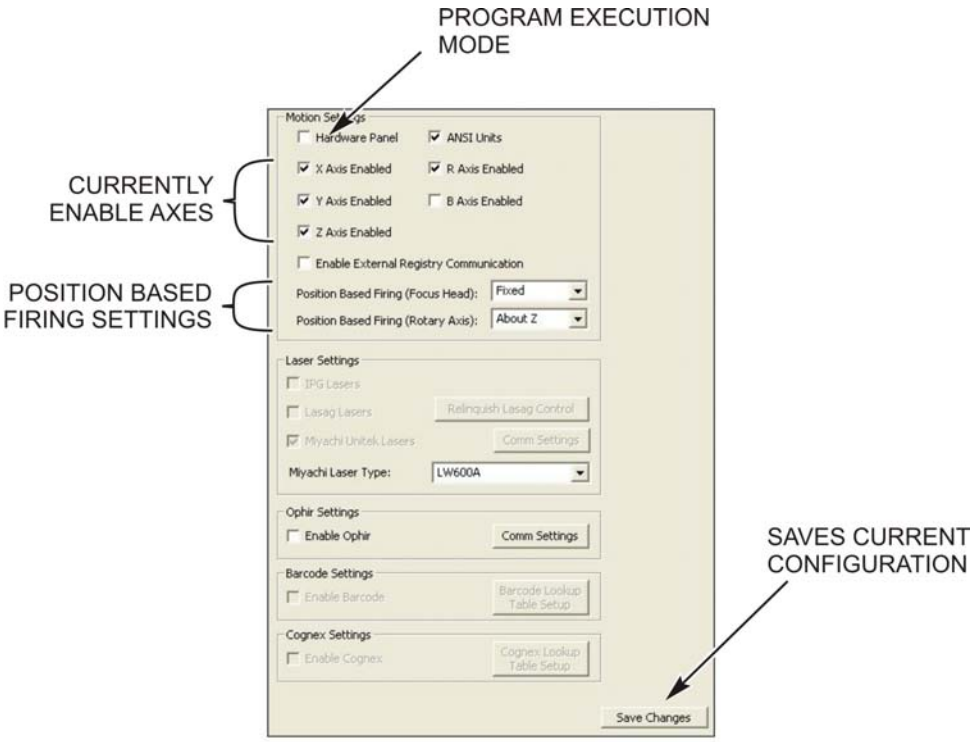
Application Options (SETUP):

Motion (F1): Not to be confused with the *Motion Options* button, this menu allows the enabling and disabling of axes as well as dictates the current *Program Execution Mode,* in Hardware Panel Control or Software Control.

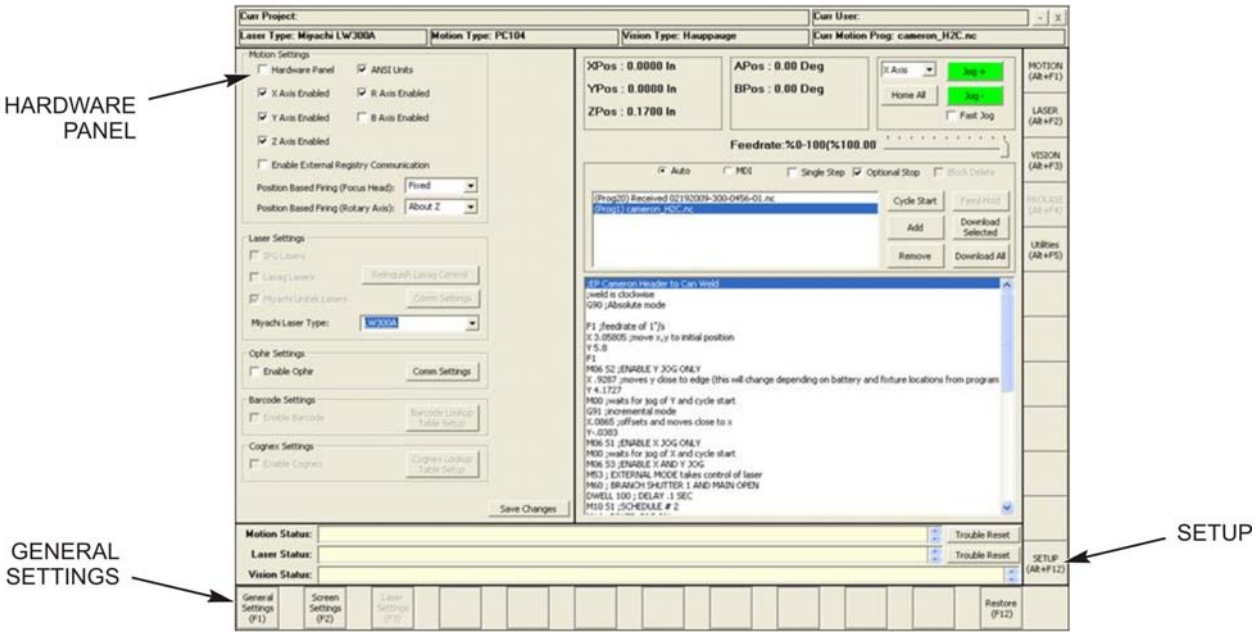
Position Based Firing - select the Position Based Firing drop down boxes to configure the mounting of the Focus Head and the Rotary Axis. The corrected mounting position of the Focus Head and Rotary Axis is needed to be selected for the computation of distance where each shot to be fired when executing the Position Based Firing features.

- Focus Head – Fixed, About X, About Y, About Z. Only Fixed and About Y are currently supported.
- Rotary Axis – About X, About Y, About Z. If rotary axis is rotating about X or about Y, the center location of shaft/rotary needs to be determined and PSET as Z=0.

Hardware Panel – Allows Program to be control on hardware panel. If changes are made only to the *Hardware Panel* check box you do not need to *Save Changes*



Switching Program Execution Modes:



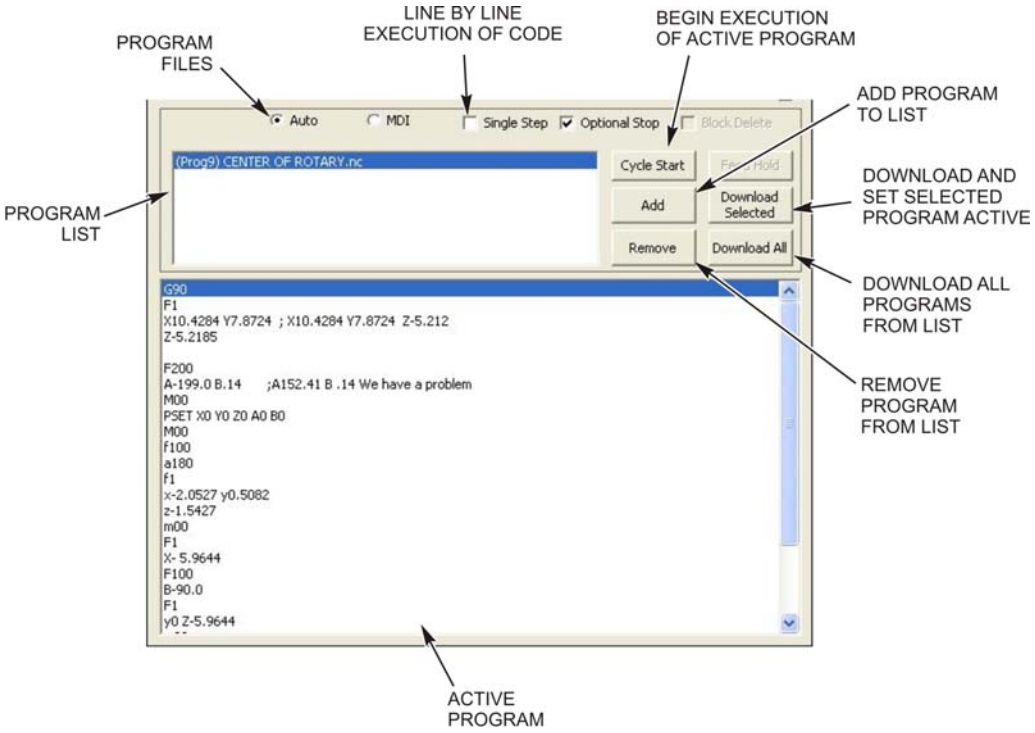
1. To switch between the executions of programs from *Software Panel Mode* to *Hardware*

Panel Mode make sure that the *DeltaMotion* program is running.

2. In the lower right hand part of the screen click the *SETUP* button.
3. Now in the lower left hand part of the screen click *General Setting.*
4. There will be a series of check boxes on the left hand side of the *DeltaMotion* screen; check for Hardware Panel Mode or un-check for Software Panel Mode

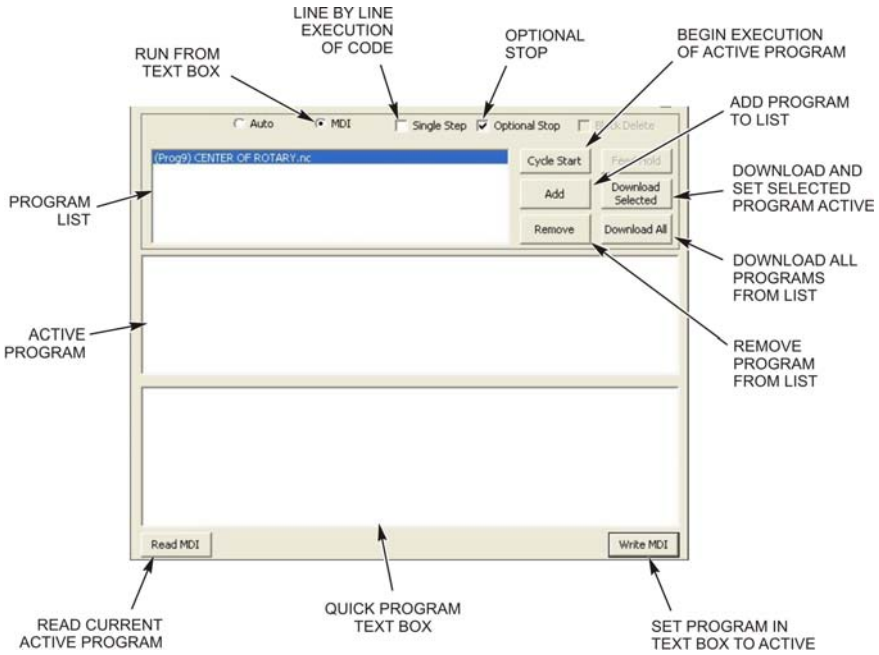
NOTE: You do not have to *Save Changes* if you are changing just the Program Execution Mode. ONLY upon disabling/enabling axes does one have to *Save Changes*

Working With Programs (Auto Mode):



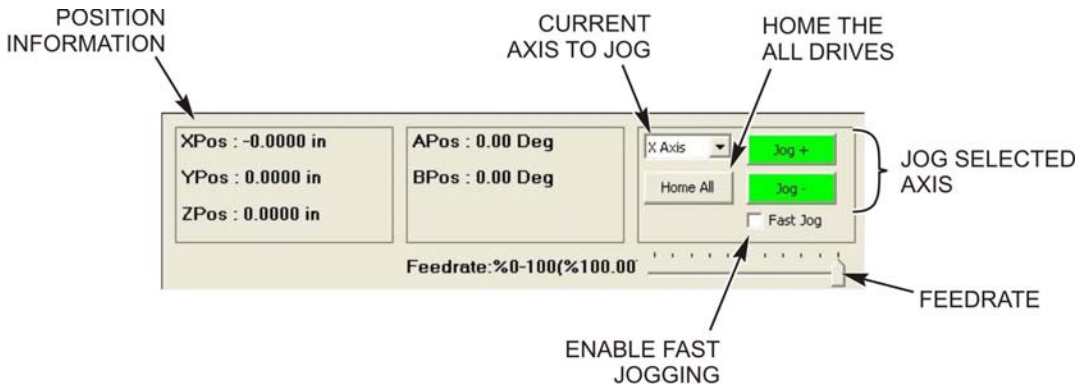
Add	Allows the user to add prewritten programs to the program list.
Cycle Start	Starts the execution of the currently *Active Program.*
Download All	Downloads all programs in the *Program List* to the PMAC.
Download Selected	Downloads the currently selected file from the *Program List* and sets it as the *Active Program.*
Remove	Removes the currently selected program from the *Program List.*
Single Step	If checked allows line by line execution of the *Active Program*. Clicking the *Cycle Start* button will cause the program to jump the successive line.

Working With Programs (MDI Mode):



Add	Allows the user to add prewritten programs to the program list.
Cycle Start	Starts the execution of the currently *Active Program.*
Download All	Downloads all programs in the *Program List* to the PMAC.
Download Selected	Downloads the currently selected file from the *Program List* and sets it as the *Active Program.*
Quick Program Text Box	Space for the user to write a quick program to test M Codes, G Codes, or for other program development use
Read MDI	Reads the currently set *Active Program* from the PMAC and updates the *Active Program* field
Remove	Removes the currently selected program from the *Program List.*
Single Step	If checked allows line by line execution of the *Active Program*. Clicking the *Cycle Start* button will cause the program to jump the successive line
Write MDI	Sets the currently written program in the *Quick Program Text Box* as the *Active Program.*
Optional Stop	If checked, pause and hold program execution where M01 code is executed.

Jogging Information:

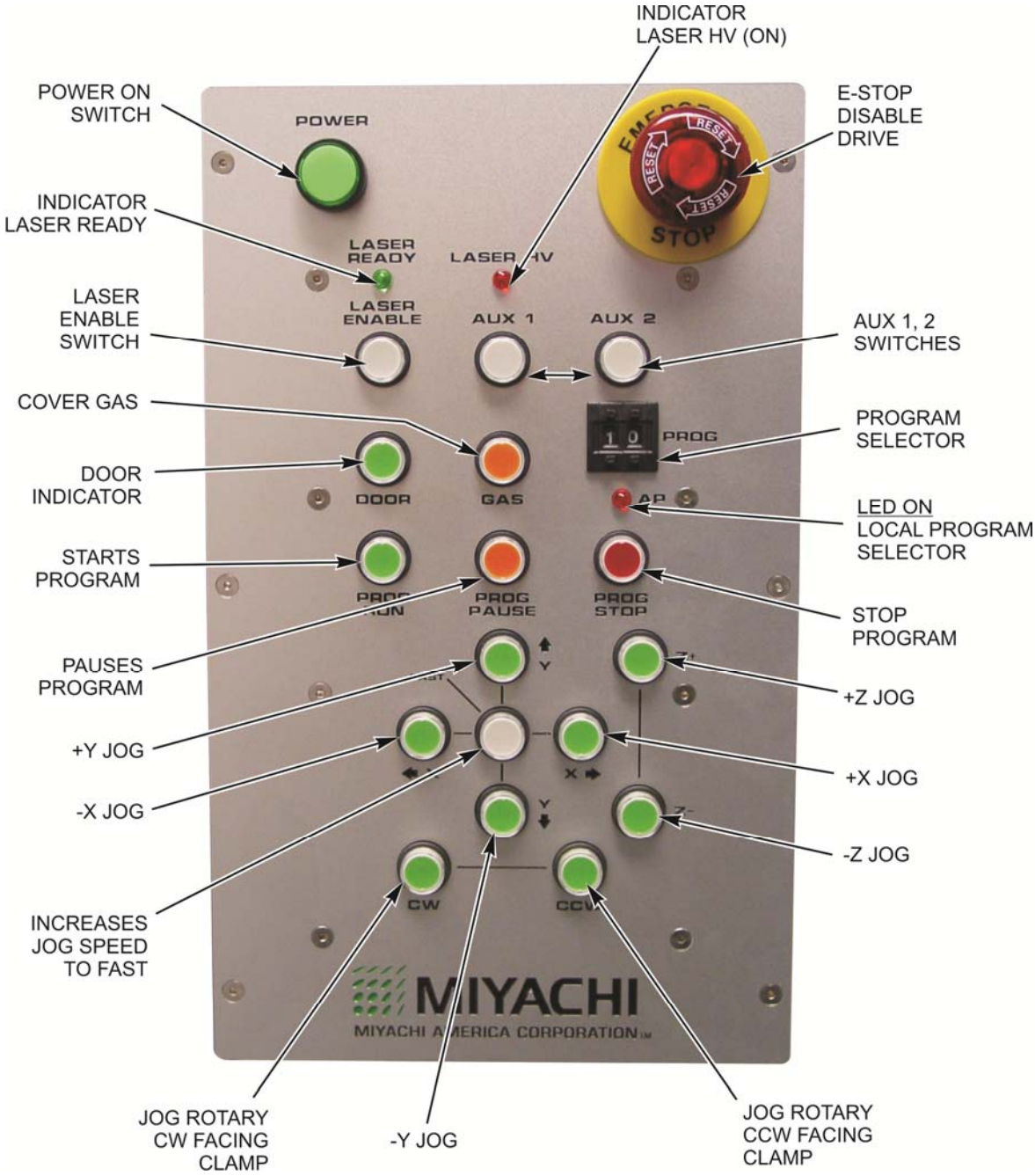


Position Information	Provides accurate information on the location of your axes.
Current Axis to Jog	The selected radio button determines which axis the *Jog+* and *Jog-* buttons operate on.
Jog Selected Axis	Will jog the currently selected axis.
Enable Fast Jogging	If checked increases the slew rate of the currently selected axis.
Feedrate	The feed rate slider is a global control allowing the currently programmed feed rate to be lowered manually using a multiplier. When the feed rate slider is set to 100% (or multiplier of 1.0) all axes move according to their programmed feed rates. At 50% (or 0.50) they move at half their programmed speed. This affects jogging as well and is an excellent way to fine tune a precision move when even the slow jog is too fast. This slider is left in the 100% position during normal operation.

Section II. Operation Control Panel

Control Panel - Class IV and Glovebox Interface
(TYPICAL 4-AXIS SHOWN)

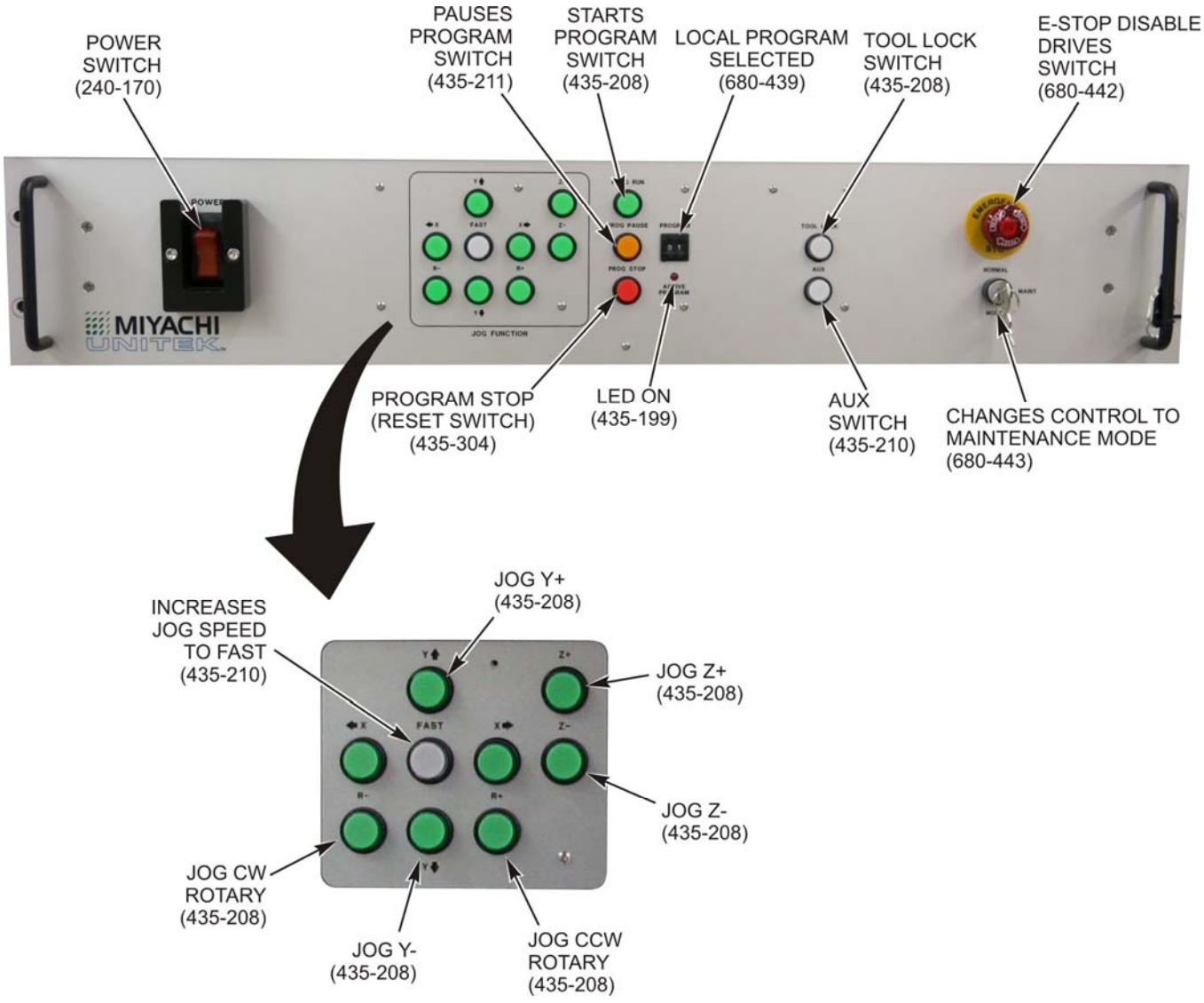
The “Operation Control Panel” is a separate pendant (not mounted), and provides the machine operator access to the necessary machine functions and indicators:



Control Panel - Standard Delta Workstation Interface

(TYPICAL 4-AXIS PANEL SHOWN)

The “Operation Control Panel” is mounted on the bottom of the machine enclosure, and provides the machine operator access to the necessary machine functions and indicators:



Note: For manual door systems door switch also indicates lit on when doors are closed.

Section III. Schedule Codes

Laser Control Note

To be able to control the laser using the software Laser Control window or Trouble Reset button in the Laser Status line the laser must be in RS-485 mode. If the laser is in "Panel Mode," "External Mode," or "Ext + RS-485" the buttons in the Laser Monitor screen will not work.

If "Panel Mode" appears on the Branch Shutter screen of the laser:
Reconnect the RS485 using the software button in the Laser Control window

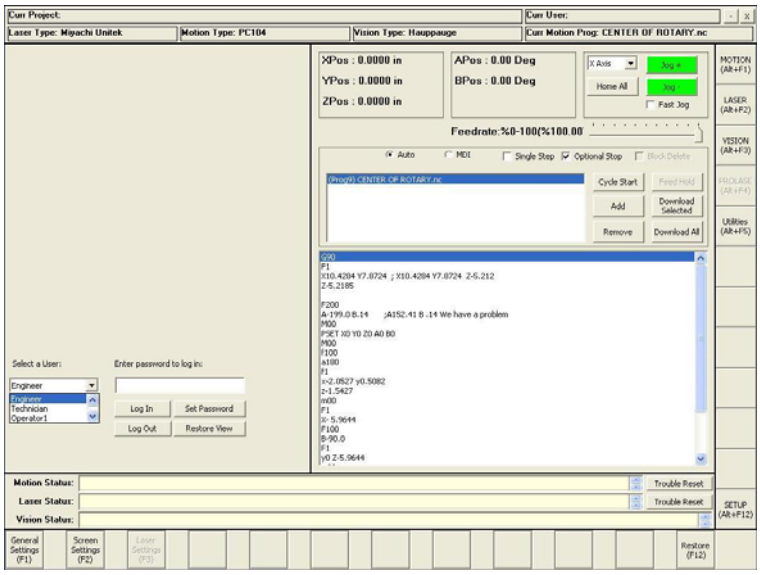
If "External Mode" appears on the laser Branch Shutter screen:
Use the MDI screen to send a M52 to release external control
Reconnect the RS485 using the software button in the Laser Control window

If "External + RS485" appears on the laser Branch Shutter screen:
Use the MDI screen to send a M52 to release external control.

Note that modification of laser schedules at the laser can only be done with laser in Pendant Control Mode. External and External+RS485 lock out access to laser schedule programming.

This issue can be avoided by including an M53 s1 (removes RS485 control) before the first laser command and an M52 after the last laser command in every program as standard programming practice. The RESET button included on your pendant will also set the system in Pendant Control Mode.

Section IV. Login Access



Engineering Login

The Engineering Login gives full access to the DeltaMotion interface.
This access includes:

- Special features when applicable
- Execution Mode selection access
  - Thumbwheel on front panel or Selection from DeltaMotion
- Ability to disable axis
- Ability to select Ansi / Metric units
- Registry communication

Technician Login

The Technician Login gives wide access to the DeltaMotion interface.
This access includes similar access to the Engineering access except certain features:

- Cannot change execution mode
  - Thumbwheel on front panel or Selection from DeltaMotion
- Access to MDI, SINGLE STEP, and OPT, STOP screens
- Motion – all
- Jog cont – all
- Laser - all

Operator Login

The Operator Login gives a limited access to the DeltaMotion interface.
This access includes:

- Position display Only
- Feedrate fixed at 100%
- OK to expand vision display
- Cannot select mdi/ss/opt stop screens

Section V. Remote Access Support

Each Delta Laser Workstation Software Installation includes a **Team Viewer** Quick Support (TeamViewerQS.exe) remote access standalone application. Team Viewer is a simple, fast and secure remote control application that allows Field Support Engineers to access a laser system control PC remotely for troubleshooting problems via internet connection without requiring any installation or hosting service running on the background of the laser system control PC, and therefore without the need for Windows® administrator rights. Also TeamViewer can communicate across firewall barriers and proxies without any need for special firewall configurations.

To give remote access, the user must manually start up the Team Viewer Quick Support application on the laser system control PC to give connection access. Each time Team Viewer Quick Support is launched, a new session password will be generated which ensures the laser system control PC is only accessible by persons authorized by the user. Since the Password changes with each start of Team Viewer Quick Support application session, it would be totally safe for the user since no other person can connect or reconnect to the laser system control PC again until a new password is given, thus no person can get permanent control over the laser system control PC.

To setup remote access to the laser system control PC, the Field Support Engineer must perform the two steps described below:

Step 1:

On the the laser system control PC, the user must launch the TeamViewer QuickSupport application from the Windows Desktop or under the folder c:\Program Files\DeltaMotion\TeamViewerQS.exe. Once the program is launched, the laser system control PC can accept incoming requests but cannot initiate any outgoing requests.

NOTE: In order to remotely access a the laser system control PC via internet connection, the laser system control PC must be configured with internet access capability and will be able to connect to the internet, without requiring any special firewall bypass permissions or administrator rights. If there is no internet connectivity when launching the TeamViewer Quick Support application, an error message will popup and show as:

Once the Team Viewer Quick Support application is started up successfully (see picture below), a new session Password will be created along with the Connection ID (alias of IP address of the laser system control PC). The customer must then supply this Connection ID and Password to the Field Support Engineer.

Make sure that the Team Viewer Quick Support application remains opened and running to wait for the incoming connection. If the customer exits this Team Viewer Quick Support application, then the laser system control PC is no longer reachable via remote access. Another new session Password would be needed to be given to the Field Support Engineer again after restart of Team Viewer Quick Support in order to re-establish the incoming connection.

This is the connection ID and Password that get generated after launching TeamViewerQuick Support application from customer PC to allow incoming remote access

Step 2:

Once the user has given the connection ID and Password to the Field Support Engineer, the Field Support Engineer will then launch the TeamViewer Application on his service PC.

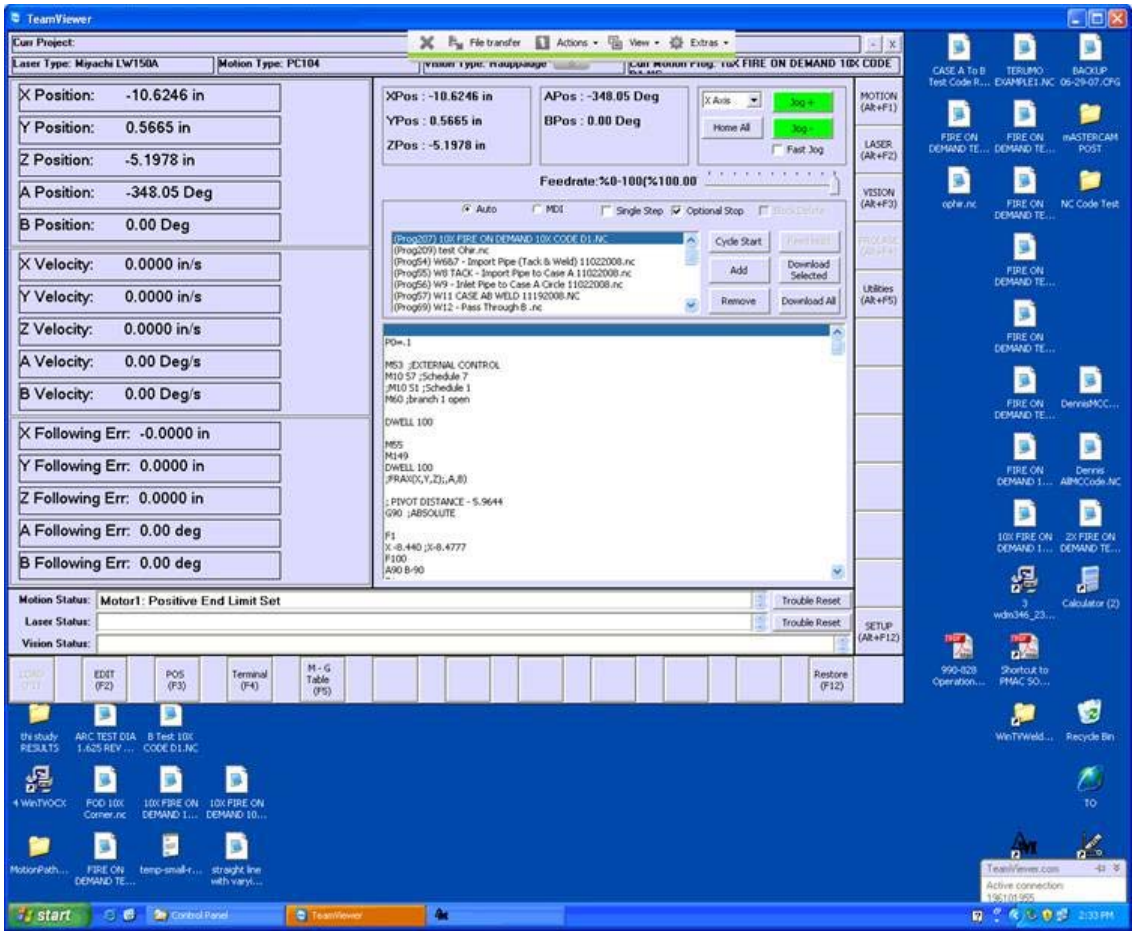
The TeamViewer Main Control Window is separated into 2 sections:

Wait for session (not used)
This section is only required for incoming connection to Field Support Engineer PC. See the TeamViewer user manual for more detailed information.

Create session
In this section, the Field Support Engineer must enter the provided Connection ID and Password to initiate a remote access connection to the laser system control PC. The TeamViewer mode needs to be selected as "Remote support"
TeamViewer modes:

- **Remote Support** - For remote control and desktop sharing. (this mode needs to be selected)
- Presentation - For showing your desktop or a single window to a partner.
- File Transfer - For transferring files from or to your partner's computer. (You can also start the file transfer option later during remote support).
- VPN - For establishing a VPN connection to your partner. For this purpose, TeamViewer VPN needs to be installed.

Once the remote access session has been established, the laser system control PC windows desktop will display on the Field Support Engineer's TeamViewer (Main Control Window). The Field Support Engineer now has full control of the laser system control PC until the customer or Field Support Engineer terminates the remote access session. The picture below shows what a remote laser system control PC window looks like via remote access on the Field Support Engineer's PC. Once the support task is over, either the Field Support Engineer or the customer can end the connection and no additional access to the laser system control PC cannot be made until a new session is set up again.


TeamViewer
Laser Type: Miyachi LW150A
Motion Type: PC104
X Position: -10.6246 in
Y Position: 0.5665 in
Z Position: -5.1978 in
A Position: -348.05 Deg
B Position: 0.00 Deg
X Velocity: 0.0000 in/s
Y Velocity: 0.0000 in/s
Z Velocity: 0.0000 in/s
A Velocity: 0.00 Deg/s
B Velocity: 0.00 Deg/s
X Following Err: -0.0000 in
Y Following Err: 0.0000 in
Z Following Err: 0.0000 in
A Following Err: 0.00 deg
B Following Err: 0.00 deg
XPos : -10.6246 in
YPos : 0.5665 in
ZPos : -5.1978 in
APos : -348.05 Deg
BPos : 0.00 Deg
Feedrate:%0-100(%100.00
Motion Status: Motor1: Positive End Limit Set
Laser Status:
Vision Status:
Trouble Reset
Cycle Start
Add
Remove
Download Selected
Download All
Restore (F12)
start

Section VI. System I/O Monitor Capability

Definitions of System I/O files:

The System_IO.TBL, locates under C:\Program Files\DeltaMotion\, is a macro table file which contains subset list of macro definitions as defined in Address.h file. A macro definition is nothing more than a substitution name (that is invented) which is used in place of any valid PMAC variable (like P1, M22, Q342, etc.).

The list of macro definitions defines in the System_IO.TBL file is compatible and can be loaded by either DeltaMotion.exe or PEWin32PRO2 software application for System I/O variable monitoring. The default path where the System_IO.TBL file resides that DeltaMotion.exe would locate to load is C:\Program Files\DeltaMotion\ folder. DeltaMotion.exe will be capable to load and display the I/O status for the first 40 macro definition items in the System_IO.TBL file.

Below is the sample list of the macro definitions in the System_IO.TBL.

```
LASER_ENABLED=P800
LaserHV=M918 ;Laser HV Ready
LaserReady=M919 ;Laser Ready
LASER_TROUBLE=M923 ; Laser in Trouble
DoorDownSensor=M920 ;Door Closed
CoverGas=M969 ; Cover Gas Enable
```

For example, if the macro definition item is: LaserHV=M918 ;Laser HV Ready

LaserHV is the Variable name
M918 is the actual PMAC variable
; Laser HV Ready is the user readable name/label to display on the IO item field.

Note: If there is no customized readable label defined, the Variable name will be used as a display name/label.

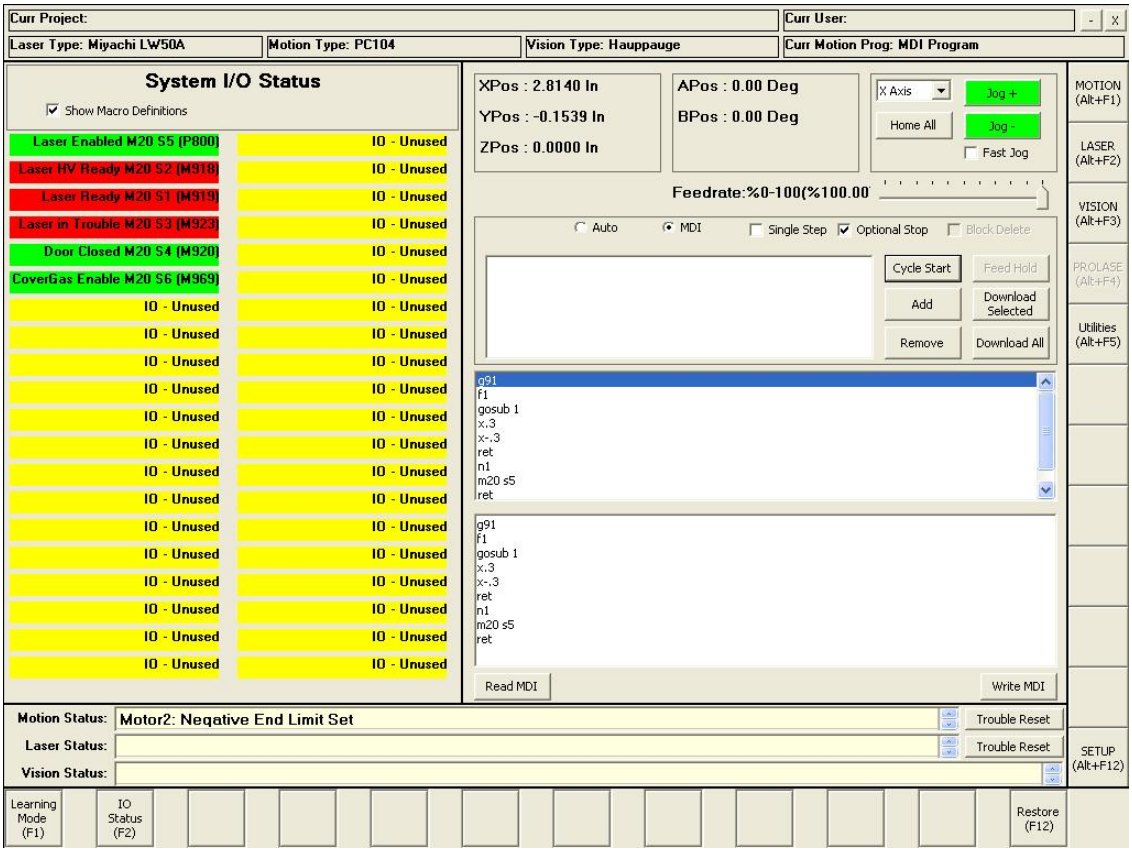
Adding Macro Definitions to System I/O files:

To add more macro definition to the System_IO.TBL, user can determine which PMAC system variable from the Address.h file to use for IO monitor.

For example, if user wants to monitor the I/O status of Laser GuideBeam

- from Address.h file, Guide Beam is defined as:
  #define GuideBeam M957
- Copy and paste it onto System_IO.TBL.
- Convert and change the format to a recognized Macro Definition format
  GuideBeam=M957
- User can include a readable label for the IO status display such as:
  GuideBeam=M957 ;Laser Guide Beam

To view the System IO status from DeltaMotion Software application, click on the SETUP (Alt+F12) and IO Status (F2) button.



Operator can edit, add or remove any macro definitions in the System_IO.TBL file.

- To reload the new edited System_IO.tbl, click on Learning Mode (F1) or any other button to navigate away from System I/O Status windows and click on IO Status (F2) button again to reload.
- Show Macro Definitions checkbox is to turn on the display of variable.

Section VII. Conclusion

Amada Miyachi America makes every attempt to insure that all of the information contained in the Workstation Basic Operations Manual reflects the current operational features and functions of the hardware and software.

This manual IS NOT intended to be a “Technical Reference” document for process engineers and maintenance personnel who require a more detailed understanding of how the Workstation is programmed.

If you have any questions, comments, or suggestions on how this manual can better serve your needs, please contact:

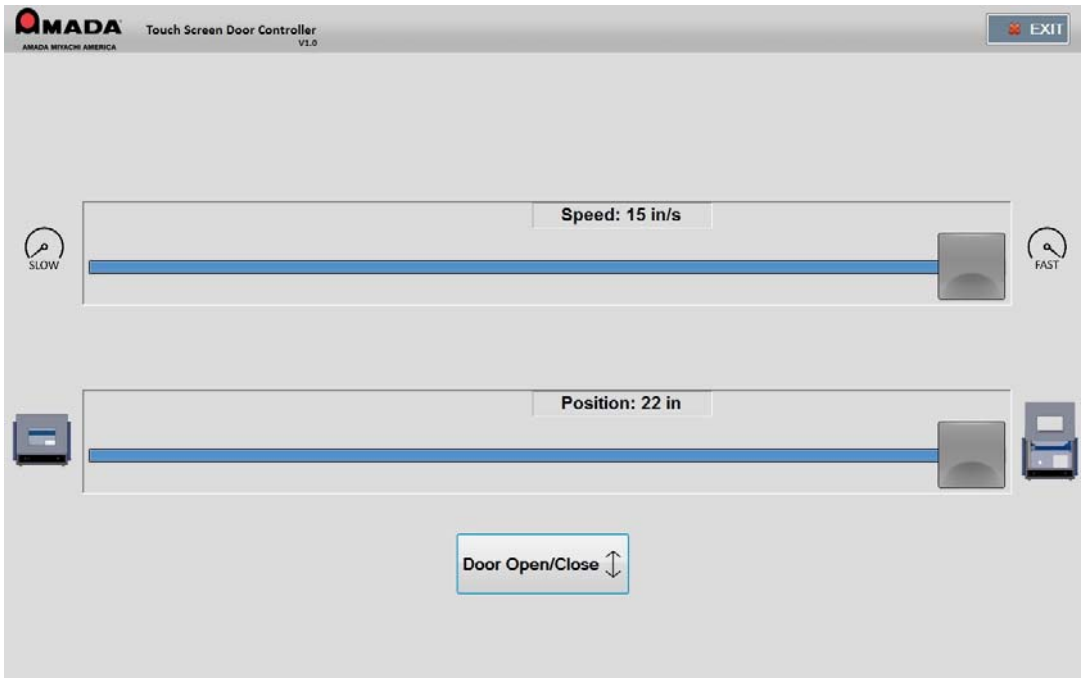
Customer Support
Amada Miyachi America, Inc.
(626) 303-5676 [Business Phone]

Appendix A

Touch Screen Door Control:

This System has a touchscreen integrated to the Deltamotion Control. The touchscreen allows for modifications to the door speed and opening width.

To change door speed, touch the slider bar button under “Speed” and slide to the desired setting. Moving to the right will incrementally increase speed. Moving to the left will incrementally decrease speed. To change door opening, touch the slider bar button under “Position” and slide to the desired setting for opening. Moving to the right will incrementally increase opening. Moving to the left will incrementally decrease opening. Changes will take effect on next door activation.

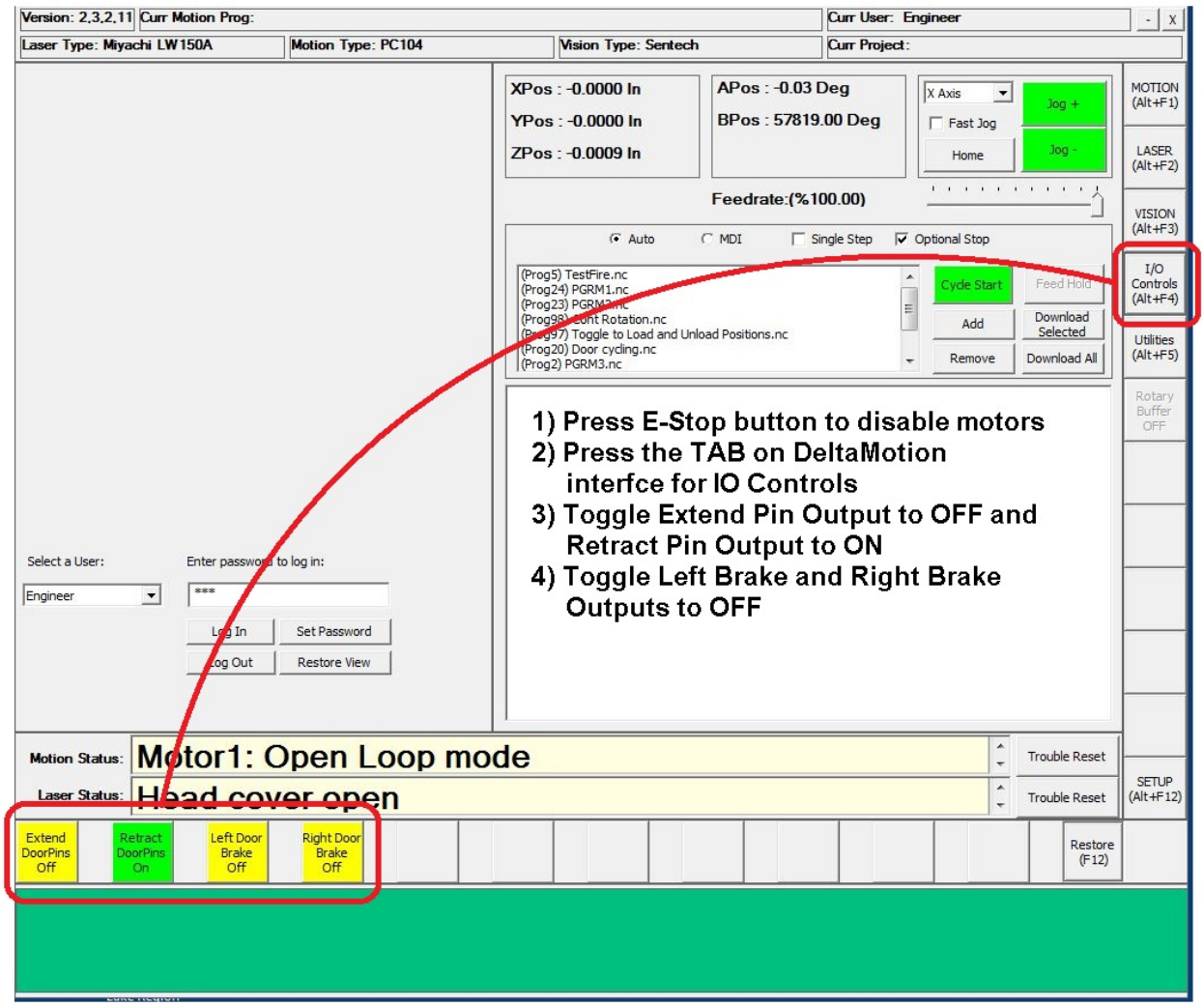


In addition, the Deltamotion M35 and M36 M-codes for opening and closing door are modified to support this as well. Door opening is set with the P-Parameter (P22 / max and P1 / min). Door velocity is set with the V-Parameter (V15 / max and V1 / min). Position can only be changed with M35 (Open). Velocity can be set with either M36 (Close) and or M35 (Open). Both the touchscreen and the M-codes interact so the last one touched /executed will be in effect for the next door cycle.

Examples:
M36 V15 will close door at a speed of 15 ips
M35 V10 P8 will open door to 8 inches at a speed of 10 ips
M36 will close the door at whatever setting was last selected

Appendix B

Door Release Procedure:



On occasion, you may need to over-ride motors to move the door up/down by hand. The following sequence will allow for this.

1) Press E-stop button to disable motors
2) Press the TAB on DeltaMotion interface for IO CONTROLS
3) Toggle Extend Pin Output to OFF and Retract Pin Output to ON
4) Toggle Left Brake and Right Brake Outputs to OFF

Appendix C

Changing the Argon Flow Sensor Setpoint

On occasion, it may be desired to change the setpoint of the argon flow switch. This flow switch indicates when the flow exceeds the minimum set value.

1) On the digital flow sensor, press the blue 'S' button until "P_1" is displayed.

2) Press the up or down arrow to set the minimum flow value. Note this is in liters/min.
3) Press the blue 'S' button again to register the value.
4) Test the set value and the actual flow rate by turning on the gas flow. Press the 'Gas' button on the control pendant. Adjust the gas flow with the black knob on the flow meter to exceed the minimum set value. The displayed flow value should display in green when the alarm is satisfied.