**GROUP 9  
 GUI Object Tags**

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| **Date of Edit** | **Edited By** | **Comments** |
| 04/09/2018 | Angat Vora | Added all tags for the gui objects present as of 04/09/2018. Added:   * Pose Move * Jogging Panel * IO Controls * Connection Status * Joint Angles * End-Effector Orientation and Position * Event Recorder * Program Control * Cameras * Starting Panel |
| 15/09/2018 | Angat Vora | Update for all existing tag tags;  Add tags for:   * Set Params * Safety System Panels   Included tcp messages for:   * DIO * Request Pose * Request Errors * Program Control * Request Conveyor Status   Included Error Handling procedures for Communication errors in MATLAB |
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| **Panel** | **GUI Object** | **Tag** |
| **Pose Move** | X Display Tag | PoseXMove |
| Y Display Tag | PoseMoveY |
| Z Display Tag | PoseMoveZ |
| Q1 Display Tag | PoseMoveQ1 |
| Q2 Display Tag | PoseMoveQ2 |
| Q3 Display Tag | PoseMoveQ3 |
| Q4 Display Tag | PoseMoveQ4 |
| Move to Pose Button | Move2PoseBtn |
| X User input tag | PoseX |
| Y User input tag | PoseY |
| Z User input tag | PoseZ |
| Q1 User input tag | PoseQ1 |
| Q2 User input tag | PoseQ2 |
| Q3 User input tag | PoseQ3 |
| Q4 User input tag | PoseQ4 |
| **Jogging Control Panel** | X + button | JogXPlusBtn |
| X - button | JogXMinusBtn |
| Y + button | JogYPlusBtn |
| Y - button | JogYMinusBtn |
| Z + button | JogZPlusBtn |
| Z – button | JogZMinusBtn |
| **IO Controls** | Conveyor Enable Button | ConvEnableBtn |
| Conveyor Run Button | ConvRunBtn |
| Change Direction Button | ConvDirBtn |
| Vacuum Solenoid Button | VacSolBtn |
| Vacuum Pump Button | VacPumpBtn |
| **Connection Status** | Connection Status Text | ConnStatus |
| Manual Connection Button | ManualConnectBtn |
| **Set Parameters** | Speed Display Tag | SpeedTag |
| Mode Display Tag | ModeTag |
| Frame Display Tag | FrameTag |
| Set Parameters Button | SetParamsBtn |
| Speed Popup Menu | SetSpeedPopup |
| Mode Popup Menu | SetModePopup |
| Frame Popup Menu | SetFramePopup |
| **Joint Angles** | Joint 1 Display Tag | Joint1Angle |
| Joint 2 Display Tag | Joint2Angle |
| Joint 3 Display Tag | Joint3Angle |
| Joint 4 Display Tag | Joint4Angle |
| Joint 5 Display Tag | Joint5Angle |
| Joint 6 Display Tag | Joint6Angle |
| Received Commands Listbox | RXcommands |
| **Cameras** | Table Camera Axis | axes1 |
| Conveyor Camera Axis | axes3 |
| **Panel** | **GUI Object** | **Tag** |
| **Starting Panel** | Accept Button | SWPaccept |
| Decline Button | SWPdecline |
| SWP checkbox 1 | SWPcb1 |
| SWP checkbox 2 | SWPcb2 |
| SWP checkbox 3 | SWPcb3 |
| SWP checkbox 4 | SWPcb4 |
| SWP checkbox 5 | SWPcb5 |
| SWP checkbox 6 | SWPcb6 |
| SWP checkbox 7 | SWPcb7 |
| SWP checkbox 8 | SWPcb8 |
| SWP checkbox 9 | SWPcb9 |
| SWP checkbox 10 | SWPcb10 |
| **Program Control** | Resume Button | ResumeProgBtn |
| Pause Button | PauseProgBtn |
| Cancel Button | CancelProgBtn |
| **Event Recorder** | Sent Commands Listbox | TXcommands |
| Received Commands Listbox | RXcommands |
| **Safety System** | Emergency Stop Panel | eStopPanel |
| Light Curtain Panel | LCPanel |
| Motors Error Panel | motorsPanel |
| Hold to Enable Panel | holdEnablePanel |
| Execution Error Panel | execErrPanel |
| Motion Supervisor Panel | motionSupPanel |
| Conveyor Disabled Panel | convDisPanel |
| Emergency Stop Panel Display Tag | estopdisplaytag |
| Light Curtain Panel Display Tag | lcDisplayTag |
| Motors Error Panel Display Tag | motorsDisplayTag |
| Hold to Enable Panel Display Tag | holdEnabDisplayTag |
| Execution Error Panel Display Tag | execErrorsDisplayTag |
| Motion Supervisor Panel Display Tag | motSuperDisplayTag |
| Conveyor Disabled Panel Display Tag | ConvDisabDisplayTag |

**GROUP 9   
TCP   
MESSAGES**

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|  | **Control** | **Message** | **Expecting Response** | **Notes** |
| **Input/Output** | Control Conveyor Run | **DIO\_1\_X** | NO | X = 1 (on) X = 0 (off) |
| Control Conveyor Direction | **DIO\_2\_X** | NO | X = 1 (on) X = 0 (off) |
| Control Vacuum Solenoid | **DIO\_3\_X** | NO | X = 1 (on) X = 0 (off) |
| Control Vacuum Pump | **DIO\_4\_X** | NO | X = 1 (on) X = 0 (off) |
| **Request Pose** | Live Pose Update From RAPID | **REQ\_POSE** | YES | Receives message as a string of bytes. Format:  [J1, J2, J3, J4, J5, J6, X, Y, Z] |
| **Request Safety System Errors** | Provides Diagnosis of error systems | **REQ\_ERROR** | YES | Expects to receive message as a string of bytes. 1 for error, 0 for no error.  Format:  [eStop, Light Curtain, Motors off, hold to enable not pressed, execution error, motion supervision triggered, conveyor not enabled when trying to use conveyor] |
| **Request Conveyor Status** | Receive signal regarding conveyor status | **REQ\_CONSTAT** | YES | Expects to receive message as a single byte, either 1 or 0; |
| **Program Control** | Resume Program | **PROG\_RESUME** | NO | Sends signal to resume current task being executed |
| Pause  Program | **PROG\_PAUSE** | NO | Sends signal to pause current task being executed |
| Cancel Running Program | **PROG\_CANCEL** | NO | Sends signal to cancel current task being executed |
| **Set Params** | Set Speed | **SDP\_X** | NO | Sets speed from pop down list; X = {V5, V100, V1000, VMAX} |
| Set Frame | **FRM\_X** | NO | Sets Frame of Reference from pop down list; X = {Base, Tool} |
| Set Motion Mode | **MDE\_X** | NO | Sets Motion Mode from pop down list; X = {Mode1, Mode2, Mode3, Mode4}  Mode1 = Axis 1-3;  Mode2 = Axis 4-5;  Mode3 = Linear;  Mode4 = Reorient; |

**GROUP 9   
Error Handling**

**Communication Errors In MATLAB:**

* **If incorrect IP address and port is supplied, dialog added with a manual connect button with which user can change IP address and port and reconnect to the server.**
* **Whilst sending messages, try and catch methods are used to prevent error stopping GUI functionality from socket timeouts and disconnection. Socket status is updated and all button functionality is disabled (with the exception of manual reconnect) to prevent commands being sent. Command queue is cleared.**
* **User is advised of a network disconnection through text being displayed on GUI.**