UPGRADED STEAG WET BENCH QUICK REFERENCE GUIDE

REV. 1.06

Teach Pendants 1
- Gantry Teach Pendant Functions and Control Dialogs 1
- I/O Transfer Station Robot Teach Pendant Functions and Control Dialogs 3

Robot Homing Process 6
- Homing Staubli Robots (ITS/OTS) Steps 6
- Homing Gantry Steps 6

Robot Teach Pendant Moves 8
- Manual Gantry Moves w/ ePALM Teach Pendant 8
- Manually Unloading Wafers w/ The Staubli Manual Control Pendant 8
- Changing Gantry Teach Pendant Move Speeds for X & Y Axes 9

Recovery Processes 10
- Tool EMO Recovery Process 10
- Robot EMO Recovery Process 11
- Robot Stop Button Recovery Process 12
- ITS/OTS Stop Button Recovery Process 13
- Access Door Opened w/o Bypass Recovery Process 13
- Recovering From Gantry Fault 14

Robot Teaching 16
- ITS/OTS Staubli Teaching 16
- Gantry Teaching 19

Tool Network Troubleshooting 22
- Tool Network Topology 22
- Network Error 22
- Causes for Network Error 23
- Basic Processes from the HMI 23
- ASConnex Server Failure 24
- Ethernet Switch Failure 25
- Network Cabling Failure 25
- Ethernet NIC in HMI or PLC Failure 26

TEACH PENDANTS

Gantry Teach Pendant Functions and Control Dialogs

To teach a position you have to make use of the hand panel below and the PC masks (examples shown on the following pages):

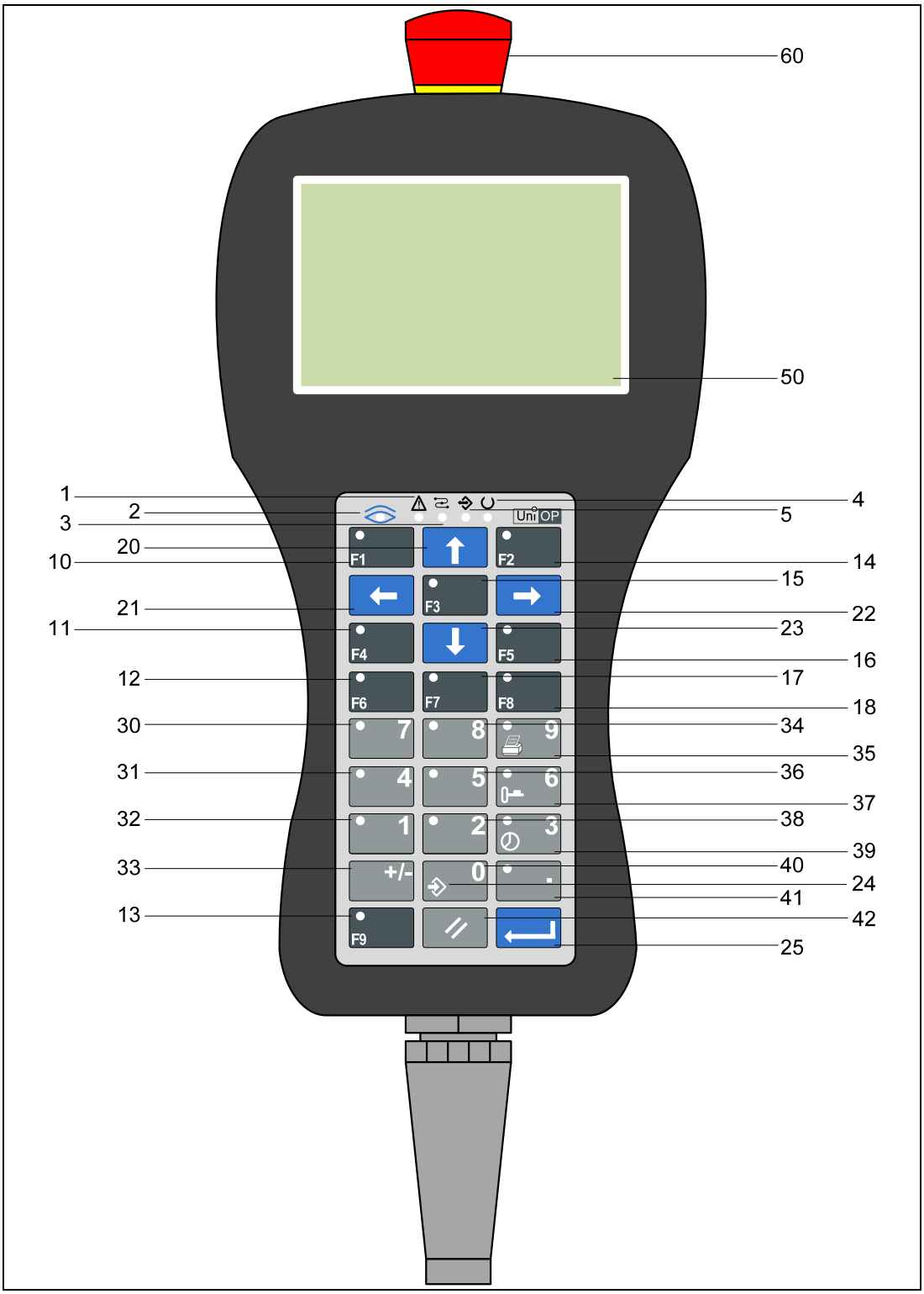


Fig 1: Teach Pendant

Symbols

1	ACKNOWLEDGEMENT	Flashes whenever a key is pressed
2	SPARE	Not Used
3	NETWORK	Solid when network connection is made
4	SPARE	Not Used
5	POWER	Solid when ePalm is powered

Menu

10	F1	Teach Menu (Back to Main Menu from other screens)
11	F2	Jog Setup
12	F3	Move Menu
13	F4	Not Used
14	F5	Open/Close Lid
15	F6	Not Used
16	F7	Safety Wall Down
17	F8	Safety Wall Up
18	F9	Teach position

Keys for Teach Mode

20	↑	Direction for vertical robot axis
21	←	Direction for horizontal robot axis
22	→	Direction for horizontal robot axis
23	↓	Direction for vertical robot axis
24	SELECT/EDIT ENTRY	Press to enter value
25	ENTER	Press to commit action

Edit Numerical Options

30	7	Numeric key
31	4	Numeric key
32	1	Numeric key
33	+/-	Numeric key
34	8	Numeric key
35	9	Numeric key
36	5	Numeric key
37	6	Numeric key
38	2	Numeric key
39	3	Numeric key
40	0	Numeric key
41	.	Decimal point
42	SPARE	Not Used

Display

50	DISPLAY	Displays five lines

Robot Emergency Stop

60	ROBOT EMERGENCY STOP	Stops all movements of the robot, the input station, the output station, and the dryer axis.

I/O Transfer Station Robot Teach Pendant Functions and Control Dialogs

Additional details regarding the Staubli Teach Pendant reference Staubli's CS8C Controller Instruction Manual - Section 6.2.

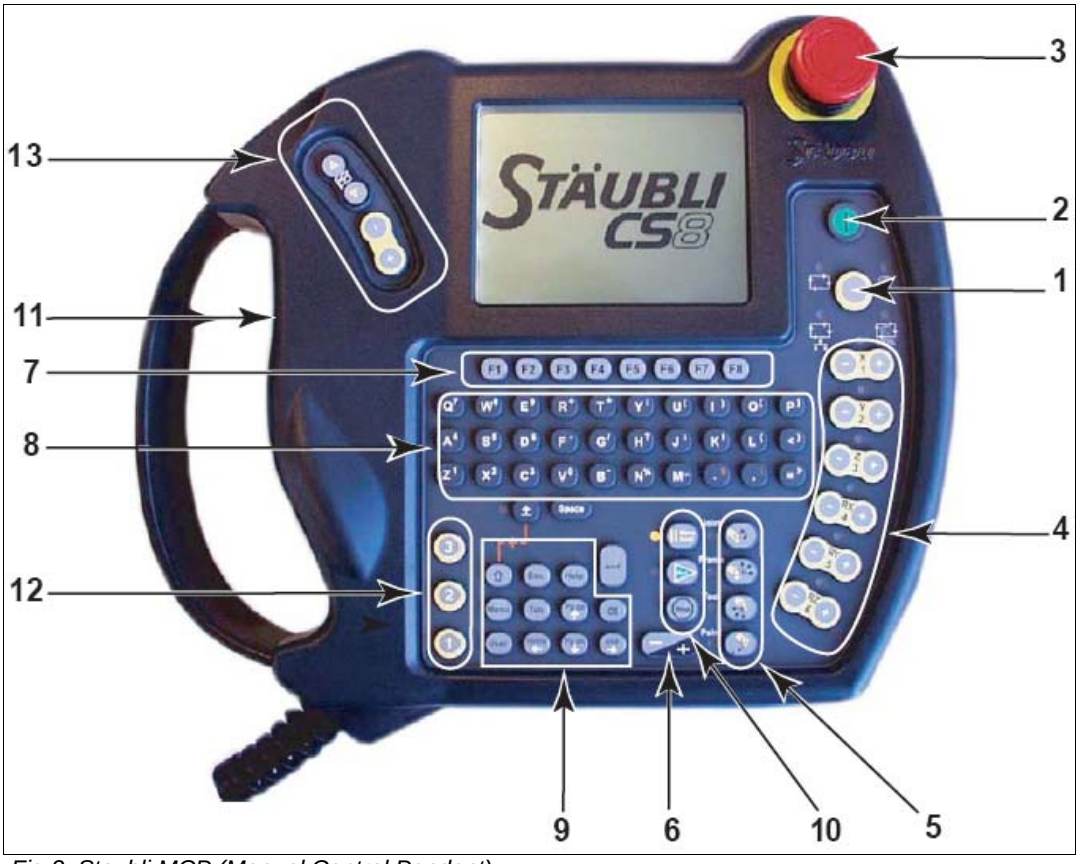


Fig 2: Staubli MCP (Manual Control Pendant)

1	OPERATING MODE SELECTOR BUTTON	This pushbutton enables you to select one of the 4 operating modes (test mode, manual mode, local mode and remote mode). The mode selected is displayed around the button opposite the operating mode icons.
2	BUTTON TURNING ON ARM POWER	This illuminated button enables you to connect the arm to the power supply or disconnect it. When the green indicator light comes on steady, this shows that arm power is on. In manual mode or test mode, if the MCP has not been placed on its holder, the enable button (11) must be pressed.
3	EMERGENCY STOP	The emergency stop must only be used in the event of absolute necessity for an unforeseen stop in your application.
4	MOVEMENT KEYS	These keys are active in manual mode and they enable you to generate arm movements per axis or using Cartesian coordinates, depending on the movement mode selected (See Staubli's CS8C Controller Instruction Manual - Paragraph 6.6). LEDs and Luminous indicator keys
5	MOVEMENT MODE SELECTION KEYS	When the arm power is on and in manual mode, each of these 4 keys enable you to select the desired movement mode (Joint, Frame, Tool or Point). The indicator light associated with the key shows the current mode.

6	SPEED ADJUSTMENT KEY	This key enables you to vary the speed within the limits imposed by the movement mode. It can be deactivated, depending on the current user profile (See Staubli's CS8C Controller Instruction Manual - Chapter 5.9.3). The speed is shown in the MCP status display bar. *Note: The speeds vary in accordance with predefined values (With a factor of about 2 each time the key is pressed). The Current speed is incremented or decremented by 1%, by pressing Shift at the same time as the speed key*
7	FUNCTION KEYS	These are used to select the menus displayed above them
8	ALPHANNUMERICAL KEYS	These keys are used to enter the data for your application.
9	INTERFACE NAVIGISTION KEYS	The functions of these keys are described in Staubli's CS8C Controller Instruction Manual - Paragraphs 6.2.3 and 6.2.4.
10	APPLICATION CONTROL KEYS	These keys are used to start or stop an application and to enable arm movements. The functions of these keys are set out in Staubli's CS8C Controller Instruction Manual - Paragraph 6.2.3.
11	ENABLE BUTTON	This button has three positions, and it states are: • Open when the button is not pressed. • Closed in the intermediate position. • Open in the fully depressed position, which corresponds to tenseness in the user. These contacts stay open until the button is released. This button can be used to authorize connecting arm power in manual mode (see paragraph 6.3), but only when it is in intermediate position. The 2 other positions prevent the arm from being powered up or cut off the power supply if the arm is under power in manual mode. In automatic mode, the position of the button is not taken into account. The pendant is designed to enable the button to be pressed by right-handed operators (holding the MCP one way up) or by left-handed operators (holding the MCP the other way). This is used in manual mode or in test mode in the event that the MCP is used other than on its holder. This button can be used in three positions. In the release position or when it is pressed down fully (pressed hard), the arm power is cut off. In between these two positions, power is supplied to the arm (See Staubli's CS8C Controller Instruction Manual - Paragraph 6.6.1).
12	DIGITAL OUTPUT ACTIVATION KEYS	In manual mode, these keys change the status of the digital outputs that are associated with them (See Staubli's CS8C Controller Instruction Manual - Paragraph 6.2.4).

13	JOG KEYS	These keys are activated in manual mode and they enable you to generate arm movements, per axis or using Cartesian coordinates, depending on the movement mode selected (Joint, Frame, Tool), with one hand (See Staubli's CS8C Controller Instruction Manual - Paragraph 6.7).

ROBOT HOMING PROCESS

Homing Staubli Robots (ITS/OTS) Steps

The following steps can be used to home the Staubli robots that are a part of the Input Transfer Station (ITS) and Output Transfer Station (OTS):

1. Tool operational.

Control Panel Input Station

2. Turn "**MAINTENANCE MODE**" key switch clockwise
   ⇒ **"MAINTENANCE MODE"** lamp is switched on.

Process Controller Monitor

3. User Interface (UI): From the **Status\Main Status** screen, click on the **"Manual"** button to place the tool in Manual Mode.
4. UI: From the **\Maintenance\Service\Module Service\Module #** screen for the ITS or OTS robot you are homing, click on the "**Manual**" button to place the Staubli Robot in Manual Mode. *(Note: If the Staubli robot is in manual mode, you will see the word TETRA on the Staubli Manual Control Pendant display).*

Staubli Manual Control Pendant

5. Change the speed of the robot to 10% - 25% by using the button.
6. Change the mode to **Manual Mode** ( )
7. Pull the Staubli Manual Control Pendant from its stand and then replace it, or keep the Staubli Manual Control Pendant detached from its stand and use the dead man bar on the bottom left side of the Staubli Manual Control Pendant.
8. Press the **Green Power** button to apply power to the robot arm. .
9. Select **F7** to Home the robot. *Note: You may have to select F8 to acknowledge an OK on the screen before selecting F7. Also, after selecting F7, you may be prompted to press the Move/Hold button ( ).*
10. Change the mode to **Remote Mode** ( )
11. Change the speed of the robot to 75% by using the button.

Process Controller Monitor

12. UI: From the **\Maintenance\Service\Module Service\Module #** screen for the ITS or OTS robot you are homing, click on "**Auto**" button to place the Staubli Robot in Auto Mode.
13. UI: From the **Status\Main Status** screen confirm that both the ITS & OTS robots are "**Ready**".

Control Panel Input Station

14. Turn "**MAINTENANCE MODE**" key switch counterclockwise
    ⇒ **"MAINTENANCE MODE"** lamp is switched off.

Homing Gantry Steps

The following steps can be used to home the Gantry robot:

1. Tool operational.

Control Panel Input Station

2. Turn "**MAINTENANCE MODE**" key switch clockwise
   ⇒ **"MAINTENANCE MODE"** lamp is switched on.

Process Controller Monitor

3. User Interface (UI): From the **Status\Main Status** screen, click on the **"Manual"** button to place the tool in Manual Mode.
4. If the Gantry's position is inside a Process Module, you first must use the ePALM to take it above the Process Module *(See: Manual Gantry Moves w/ ePALM Teach Pendant)*
5. UI: From the **\Maintenance\Gantry Control\Robot Control** screen, click on Home to Home the Gantry.
6. UI: From the **\Maintenance\Gantry Control\Robot Control** screen, click on Park Robot to Park the Gantry.

Control Panel Input Station

7. Turn “**MAINTENANCE MODE**” key switch counterclockwise
   ⇒ "**MAINTENANCE MODE**" lamp is switched off.

ROBOT TEACH PENDANT MOVES

Manual Gantry Moves w/ ePALM Teach Pendant

1. Tool operational.

Control Panel Input Station

2. Turn "**MAINTENANCE MODE**" key switch clockwise
   ⇒ "**MAINTENANCE MODE**" lamp is switched on.

Process Controller Monitor

3. User Interface (UI): From the **Status\Main Status** screen, click on the "**Manual**" button to place the tool in Manual Mode.
4. UI: From the **\Maintenance\Gantry Control\Robot Control** screen, click on Epalm Enable to enable the ePalm Teach Pendant.

ePALM Teach Pendant

5. Select **F2** for Jog Setup. *(Note: If you do not see anything displayed on the ePALM display, select the **F1** key.)*
6. Use the arrow keys to move the Gantry Robot. Keep the dead man's switch pressed when moving the Gantry. *(Note: The left ( ) and right ( ) arrows move the X-Axis of the Gantry Robot, and the up ( ) and down ( ) arrows move the Y-Axis of the Gantry Robot. If moving to Module 12 or 13, you must lower the Safety Wall (**F7** "**Safety Wall Down**" / **F8** "**Safety Wall Up**") prior to moving.)*
   ⇒ Dead man's switch is located on the right side of the Teach Pendant.

Process Controller Monitor

7. UI: From the **\Maintenance\Gantry Control\Robot Control** screen, click on Epalm Exit to exit the ePalm Teach Pendant

Control Panel Input Station

8. Turn "**MAINTENANCE MODE**" key switch counterclockwise
   ⇒ "**MAINTENANCE MODE**" lamp is switched off.

Manually Unloading Wafers w/ The Staubli Manual Control Pendant

1. Tool operational.

Control Panel Input Station

2. Turn "**MAINTENANCE MODE**" key switch clockwise
   ⇒ "**MAINTENANCE MODE**" lamp is switched on.

Process Controller Monitor

3. User Interface (UI): From the **Status\Main Status** screen, click on "**Manual**" button to place the tool in Manual Mode.
4. UI: From the **\Maintenance\Service\Module Service\Module #** screen for the ITS or OTS robot you are homing, click on "**Manual**" button to place the Staubli Robot in Manual Mode. *(Note: If the Staubli robot is in manual mode, you will see the word TETRA on the Staubli Manual Control Pendant display.)*

Staubli Manual Control Pendant

5. Change the speed of the robot to 10% - 25% by using the button.
6. Change the mode to **Manual Mode** ( )
7. Pull the Staubli Manual Control Pendant from its stand and then replace it, or keep the Staubli Manual Control Pendant detached from its stand and use the dead man bar on the bottom left side of the Staubli Manual Control Pendant.
8. Press the **Green Power** button to apply power to the robot arm. .
9. Select **F7** to Home the robot. *Note: You may have to select F8 to acknowledge an OK on the screen before selecting F7. Also, after selecting F7, you may be prompted to press the Move/Hold button ( ).*
10. Select **F2** for Teach Wafer.
11. Select **<Location>** ***(FOUP, Carrier, Buffer, or Buffer 180)***
12. Select **F3** for Pick
13. Use the up arrow to select the Carrier slot to pick from. *(Note: DO NOT pick a slot that would have a wafer(s) to the right of it. You must pick the first slot from the right that has a wafer in it.).*
14. Select **F3** for Pick

15. Select **F8** for Ok
16. Hold down the Move/Hold button ( ).until the wafer is gripped and the robot is back to its Home position.
17. Select **F8** to Quit
18. Select **<Location>** ***(FOUP, Carrier, Buffer or Buffer 180)***
19. Select **F4** for Place
20. Use the up arrow to select the FOUP/Crystalpak slot to place in. *(Note: DO NOT place in a slot that would have a wafer(s) below it. You must place wafers in a FOUP/Crystalpak from the top down.).*
21. Select **F4** for Place
22. Select **F8** for Ok
23. Hold down the Move/Hold button ( ).until the wafer is gripped and the robot is back to its Home position.
24. Select **F8** to Quit
25. **Repeat steps 10 – 24** for each wafer sitting in the Carrier.
26. Select **F7** to Home the robot. *Note: You may have to select F8 to acknowledge an OK on the screen before selecting F7. Also, after selecting F7, you may be prompted to press the Move/Hold button ( ).*
27. Change the mode to **Remote Mode** ( )
28. Change the speed of the robot to 75% by using the button.

Process Controller Monitor

29. UI: From the **\Maintenance\Service\Module Service\Module #** screen for the ITS or OTS robot you are homing, click on "**Auto**" button to place the Staubli Robot in Auto Mode.
30. UI: From the **Status\Main Status** screen confirm that both the ITS & OTS robots are "**Ready**".

Control Panel Input Station

31. Turn "**MAINTENANCE MODE**" key switch counterclockwise
    ⇒ "**MAINTENANCE MODE**" lamp is switched off.

Changing Gantry Teach Pendant Move Speeds for X & Y Axes

1. ePALM enabled

ePALM Teach Pendant

2. Select **F2** for Jog Setup. *(Note: If you do not see anything displayed on the ePALM display, select the **F1** key.)*
3. As the ePALM display continuously scrolls through the Jog Setup screen, you will see the speed for the X-Axis first and then the Y-Axis. When you see "***Speed 1%***" (Default Value) for the axis you wish to change, select (0), enter the number of the new speed you want to use for this axis, and then **Enter** ( ).

RECOVERY PROCESSES

Tool EMO Recovery Process

TOOL CONDITION
Tool EMO button pressed..
No power to the Tool or any of its subcomponents.
Baths with liquids in them remain with liquids in them.
No HMI screen visible.

Pre-Recovery Steps

STEP	ACTION
1	Note the location of the Gantry Robot. Things to look for are: a. What is the X-Axis/Module location of the Gantry? (Is it not stationed over the Gripper Cleaner (Park Position)?) b. What is the Y-Axis location of the Gantry? (Is it inside a Process Module?)
2	Note the state of the ITS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?
3	Note the state of the OTS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?

Recovery Steps

STEP	ACTION
1	Reset/Unlock Tool EMO button that was pressed by turning the button. *(Note: It should pop back out of position.)*
2	Power up tool by pushing the green Power button located on the Controller Cabinet.
3	Press the Control On button located on the Controller Cabinet to enable the Tool's Control System.
4	Power up the HMI Computer by pressing the power button located in the upper left hand corner of the computer *(Note: The HMI Computer is located behind Module 13)*
5	Looking at the HMI Computer screen and once the ASConnex Server command window says "PCOServer: Main is done" in the right hand corner of the command window, double click on the ASWorx icon located on the HMI Computer, and select **Start All**. Wait for the HMI graphics to appear on the screen.
6	UI: Place the Tool in Manual mode.
7	Turn "**MAINTENANCE MODE**" key switch clockwise ⇒ "**MAINTENANCE MODE**" lamp is switched off.
8	Home ITS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
9	Home OTS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
10	Home the Gantry Robot *(See: Homing Gantry Robot Steps)*
11	Turn "**MAINTENANCE MODE**" key switch counterclockwise. ⇒ "**MAINTENANCE MODE**" lamp is switched off.
12	UI: Place the Tool in Stop mode.
13	UI: Enable all Process Modules.
14	UI: Place the Tool in Manual mode.
15	UI: Drain all Process Modules.
16	Once all Process Modules have drained, use the UI to Fill all Process Modules. *(Note: If you place the Tool in Auto mode, all Process Modules will Fill automatically.)*

STEP	ACTION
17	Manually move any wafers sitting in carriers within the ITS and/or OTS. *(See: Manually Unloading Wafers w/ The Staubli Manual Control Pendant)*
18	Manually move carriers that were being processed out of the bench and manually unload wafers.

Robot EMO Recovery Process

TOOL CONDITION
Audio alarm is sounding.
Baths with liquids in them remain with liquids in them.
Gantry servos inside the Control Cabinet have their top status lights blinking red.
Tool mode is 'Stop'.
ITS & OTS Robots have stopped.
Modules are 'Stopped'.

Pre-Recovery Steps

STEP	ACTION
1	Note the location of the Gantry Robot. Things to look for are: a. What is the X-Axis/Module location of the Gantry? (Is it not stationed over the Gripper Cleaner (Park Position)?) b. What is the Y-Axis location of the Gantry? (Is it inside a Process Module?)
2	Note the state of the ITS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?
3	Note the state of the OTS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?

Recovery Steps

STEP	ACTION
1	Verify yellow Robot EMO that was pressed has been properly released by pressing the same Robot EMO again.
2	UI: Acknowledge the alarms. *(Note: Only Acknowledge the alarms. Do not Clear them.)*
3	UI: Place the Tool in Manual mode.
4	Turn "**MAINTENANCE MODE**" key switch clockwise ⇒ "**MAINTENANCE MODE**" lamp is switched off.
5	Home ITS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
6	Home OTS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
7	UI: Reset the Gantry Servos **\Maintenance\Gantry Control\Robot Control\Reset** *(Note: When the blinking red lights on the Gantry Servos should go solid green when they have been properly reset.)*
8	Home the Gantry Robot *(See: Homing Gantry Robot Steps)*
9	Turn "**MAINTENANCE MODE**" key switch counterclockwise. ⇒ "**MAINTENANCE MODE**" lamp is switched off.
10	Manually move any wafers sitting in carriers within the ITS and/or OTS. *(See: Manually Unloading Wafers w/ The Staubli Manual Control Pendant)*
11	Manually move carriers that were being processed out of the bench, and use the HMI to manually unload wafers.
12	UI: Clear all alarms.

Robot Stop Button Recovery Process

TOOL CONDITION
Audio alarm is sounding.
Baths with liquids in them remain with liquids in them.
Gantry servos inside the Control Cabinet have their top status lights blinking green.
Tool mode is 'Stop'.
ITS & OTS Robots have stopped.
Modules are 'Stopped'.

Pre-Recovery Steps

STEP	ACTION
1	Note the location of the Gantry Robot. Things to look for are: a. What is the X-Axis/Module location of the Gantry? (Is it not stationed over the Gripper Cleaner (Park Position)?) b. What is the Y-Axis location of the Gantry? (Is it inside a Process Module?)
2	Note the state of the ITS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?
3	Note the state of the OTS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?

Recovery Steps

STEP	ACTION
1	UI: Acknowledge the alarms. (Note: Only Acknowledge the alarms. Do not Clear them.)
2	UI: Place the Tool in Manual mode.
3	Turn "**MAINTENANCE MODE**" key switch clockwise ⇒ "**MAINTENANCE MODE**" lamp is switched off.
4	Home ITS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
5	Home OTS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
6	UI: Reset the Gantry Servos **\Maintenance\Gantry Control\Robot Control\Reset** *(Note: When the blinking green lights on the Gantry Servos should go solid green when they have been properly reset.)*
7	Home the Gantry Robot *(See: Homing Gantry Robot Steps)*
8	Turn "**MAINTENANCE MODE**" key switch counterclockwise. ⇒ "**MAINTENANCE MODE**" lamp is switched off.
9	Manually move any wafers sitting in carriers within the ITS and/or OTS. *(See: Manually Unloading Wafers w/ The Staubli Manual Control Pendant)*
10	Manually move carriers that were being processed out of the bench, and use the HMI to manually unload wafers.
11	UI: Clear all alarms.

ITS/OTS Stop Button Recovery Process

TOOL CONDITION
Audio alarm is sounding.
Baths with liquids in them remain with liquids in them.
ITS/OTS Robot has stopped.
ITS/OTS Robot arm power is off.

Pre-Recovery Steps

STEP	ACTION
1	Note the state of the ITS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?
2	Note the state of the OTS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?

Recovery Steps

STEP	ACTION
1	UI: Acknowledge the alarms. *(Note: Only Acknowledge the alarms. Do not Clear them.)*
2	UI: Place the Tool in Manual mode.
3	Turn "**MAINTENANCE MODE**" key switch clockwise ⇒ "**MAINTENANCE MODE**" lamp is switched off.
4	If the ITS Stop button was used, home the ITS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
5	If the OTS Stop button was used, home OTS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
6	Turn "**MAINTENANCE MODE**" key switch counterclockwise. ⇒ "**MAINTENANCE MODE**" lamp is switched off.
7	Manually move any wafers sitting in carriers within the ITS and/or OTS. *(See: Manually Unloading Wafers w/ The Staubli Manual Control Pendant)*
8	UI: Clear all alarms.

Access Door Opened w/o Bypass Recovery Process

TOOL CONDITION
Audio alarm is sounding.
Door on tool is/has been opened without the Bypass Key being turned on.
Baths with liquids in them remain with liquids in them.
Gantry servos inside the Control Cabinet have their top status lights blinking green.
Tool mode is 'Stop'
ITS & OTS Robots have stopped
Modules are 'Stopped'.
At least one of the Ferrocodes inside the Control Cabinet has its green light off (*Note: If the door that was opened is closed again, both the Ferrocodes' green lights should be on.)*
The display on the Staubli Manual Control Pendant should read that there was an EMO – Door Open.

Pre-Recovery Steps

STEP	ACTION
1	Note the location of the Gantry Robot. Things to look for are: 1. What is the X-Axis/Module location of the Gantry? (Is it not stationed over the Gripper Cleaner (Park Position)?) 2. What is the Y-Axis location of the Gantry? (Is it inside a Process Module?)
2	Note the state of the ITS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?
3	Note the state of the OTS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?

Recovery Steps

STEP	ACTION
1	Verify door(s) that were open are now closed. To confirm this look at the Ferrocode Safety Circuit Breakers and you should see a single green LED lit on each one.
2	UI: Acknowledge the alarms. *(Note: Only Acknowledge the alarms. Do not Clear them.)*
3	UI: Place the Tool in Manual mode.
4	Turn "**MAINTENANCE MODE**" key switch clockwise ⇒ "**MAINTENANCE MODE**" lamp is switched off.
5	Home ITS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
6	Home OTS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
7	UI: Reset the Gantry Servos **\Maintenance\Gantry Control\Robot Control\Reset** *(Note: When the blinking green lights on the Gantry Servos should go solid green when they have been properly reset.)*
8	Home the Gantry Robot *(See: Homing Gantry Robot Steps)*
9	Turn "**MAINTENANCE MODE**" key switch counterclockwise. ⇒ "**MAINTENANCE MODE**" lamp is switched off.
10	Manually move any wafers sitting in carriers within the ITS and/or OTS. *(See: Manually Unloading Wafers w/ The Staubli Manual Control Pendant)*
11	Manually move carriers that were being processed out of the bench, and use the HMI to manually unload wafers.
12	UI: Clear all alarms.

Recovering From Gantry Fault

TOOL CONDITION
Audio alarm is sounding.
Baths with liquids in them remain with liquids in them.
Gantry not moving and possibly its end effector is sitting inside a process module.
ITS/OTS Robot has stopped.
ITS/OTS Robot arm power is off.
Modules are 'Stopped'.

Pre-Recovery Steps

STEP	ACTION
1	Note the location of the Gantry Robot. Things to look for are: a. What is the X-Axis/Module location of the Gantry? (Is it not stationed over the Gripper Cleaner (Park Position)?) b. What is the Y-Axis location of the Gantry? (Is it inside a Process Module?)
2	Note the state of the ITS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?
3	Note the state of the OTS Staubli Robot. Things to look for are: a. Was the ITS Staubli Robot loading a carrier? b. Was the ITS Staubli Robot moving a carrier between the landing and the carrier buffer?

Recovery Steps

STEP	ACTION
1	UI: Acknowledge the alarms. *(Note: Only Acknowledge the alarms. Do not Clear them.)*
2	UI: Place the Tool in Manual mode.
3	Turn "**MAINTENANCE MODE**" key switch clockwise ⇒ "**MAINTENANCE MODE**" lamp is switched off.
4	Home ITS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
5	Home OTS Staubli Robot *(See: Homing Staubli Robots (ITS/OTS) Steps)*
6	UI: Reset the Gantry Servos **\Maintenance\Gantry Control\Robot Control\Reset** *(Note: When the blinking green lights on the Gantry Servos should go solid green when they have been properly reset.)*
7	Home the Gantry Robot *(See: Homing Gantry Robot Steps)*
8	Turn "**MAINTENANCE MODE**" key switch counterclockwise. ⇒ "**MAINTENANCE MODE**" lamp is switched off.
9	Manually move any wafers sitting in carriers within the ITS and/or OTS. *(See: Manually Unloading Wafers w/ The Staubli Manual Control Pendant)*
10	Manually move carriers that were being processed out of the bench, and use the HMI to manually unload wafers.
11	UI: Clear all alarms.

ROBOT TEACHING

ITS/OTS Staubli Teaching

Both the Input Transfer Station (ITS) and the Output Transfer Station (OTS) have the same number of teach points/locations and they are:

1. Carrier on Landing
2. Carrier on Top Carrier Buffer (Carrier Buffer 1)
3. Carrier on Bottom Carrier Buffer (Carrier Buffer 2)
4. Wafer in Slot One (1) of FOUP[1]
5. Wafer in Slot One (1) of Carrier on Landing[2]
6. Wafer in Slot One (1) of Wafer Buffer (Crystalpak)[3] (Buffer)
7. Wafer in Slot Thirteen (13) of Wafer Buffer (Crystalpak)[4] (Buffer 180)

Starting Staubli Teach Process

	1. Tool operational.
Control Panel Input Station	2. Turn "**MAINTENANCE MODE**" key switch clockwise ⇒ "**MAINTENANCE MODE**" lamp is switched on. 3. Turn "**PANELS/DOORS BYPASS**" key switch clockwise ⇒ "**PANELS/DOORS BYPASS**" lamp is switched on.
Process Controller Monitor	4. User Interface (UI): From the **Status\Main Status** screen, click on "**Manual**" button to place the tool in Manual Mode. 5. UI: From the **\Maintenance\Service\Module Service\Module #** screen for the ITS or OTS robot you are homing, click on "**Manual**" button to place the Staubli Robot in Manual Mode. *(Note: If the Staubli robot is in manual mode, you will see the word TETRA on the Staubli Manual Control Pendant display.)*
Staubli Manual Control Pendant	6. Change the speed of the robot to 10% - 25% by using the button. 7. Change the mode to **Manual Mode** ( ) 8. Pull the Staubli Manual Control Pendant from its stand and then replace it, or keep the Staubli Manual Control Pendant detached from its stand and use the dead man bar on the bottom left side of the Staubli Manual Control Pendant. 9. Press the **Green Power** button to apply power to the robot arm. 10. Select **F7** to Home the robot. *Note: You may have to select F8 to acknowledge an OK on the screen before selecting F7. Also, after selecting F7, you may be prompted to press the Move/Hold button ( ).* 11. Proceed to either ***Teaching ITS/OTS Wafer Points*** or ***Teaching ITS/OTS Carrier Points*** section.

[1] This slot is located at the bottom of the FOUP.
[2] This slot is located on the far right side as you hold the carrier or as you look down the tool from the side of the Tool you are teaching.
[3] This slot is located at the bottom of the Crystalpak.
[4] This slot is located at the top of the Crystalpak and when teaching this position, the end effector is flipped 180°.

Teaching ITS/OTS Wafer Points

Teach Tips

- The gripper should be center of the wafer so the front and rear gripper clamps close and touch the wafer's edge at approximately the same time.
- The gripper must be evenly parallel with the wafer so all the pads on the gripper are touching the wafer.
- The gripper wafer teach point for each location are as follows:

LOCATION	GRIPPER TEACH POINT
Wafer in Slot One (1) of FOUP	Gripper is lifting wafer, and ready to grip and pull back with the wafer.
Wafer in Slot One (1) of Carrier on Landing	Gripper is to the right of the wafer and ready to grip the wafer.
Wafer in Slot One (1) of Wafer Buffer	Gripper is lifting wafer, and ready to grip and pull back with the wafer.
Wafer in Slot Thirteen (13) of Wafer Buffer	Gripper is on top of wafer, and ready to grip and pull back with the wafer.

Staubli Manual Control Pendant

1. Complete ***Starting Staubli Teach Process*** section.
2. Select **F2** for Teach Wafer.
3. Select **F2** for GOTO
4. Select **<Location>** ***(FOUP, Carrier, Buffer, or Buffer 180)***
5. Select **F2** for GOTO
6. Select **F8** for Ok
7. Hold down the **Move/Hold** button ( ).until the gripper is at its currently taught position.
8. Select the **Tool** button ( ) to enable the six (6) axis movement buttons.
9. Change the speed of the robot to 1% or less by using the button.
10. Use the six (6) axis movement buttons on the right side to move the Staubli arm to the desired teach position.
11. When you are ready to teach the position, select the **Tool** button ( ) followed by **F1** (Here).
12. Select **F8** for Ok
13. Select **F5** to Home the robot.
14. Select **F8** for Ok
15. Change the speed of the robot to 25% by using the button.
16. Hold down the **Move/Hold** button ( ).until the arm is in the Home position.
17. **Repeat steps 4 – 13** for each point/location you want to teach.
18. When all teach points are completed go to ***Finishing Staubli Teach Process*** section.

Teaching ITS/OTS Carrier Points

Use these instructions for each platform that can hold a carrier.

Teach Tip

- The teach point position is when the gripper is ready to lift, but not yet lifting the carrier. The weight of the carrier is still resting on the platform.

Staubli Manual Control Pendant

1. Complete ***Starting Staubli Teach Process*** section.
2. Select **F4** for Teach Carrier.
3. Select **F2** for GOTO
4. Select **<Location>** ***(Landing, Carrier Buffer 1, or Carrier Buffer 2)***
5. Select **F2** for GOTO
6. Select **F8** for Ok
7. Hold down the **Move/Hold** button ( ).until the gripper is at its currently taught position.
8. Select the **Tool** button ( ) to enable the six (6) axis movement buttons.
9. Change the speed of the robot to 1% by using the button.
10. Use the six (6) axis movement buttons on the right side to move the Staubli arm to the desired teach position.
11. When you are ready to teach the position, select the **Tool** button ( ) followed by **F1** (Here).
12. Select **F8** for Ok
13. Select **F5** to Home the robot.
14. Select **F8** for Ok
15. Change the speed of the robot to 25% by using the button.
16. Hold down the **Move/Hold** button ( ).until the arm is in the Home position.
17. **Repeat steps 4 – 13** for each point/location you want to teach.
18. When all teach points are completed go to ***Finishing Staubli Teach Process*** section.

Finishing Staubli Teach Process

Staubli Manual Control Pendant

1. Select **F8** for Quit
2. Select **F8** for Quit
3. Select **F7** to Home the robot. *Note: You may have to select F8 to acknowledge an OK on the screen before selecting F7. Also, after selecting F7, you may be prompted to press the Move/Hold button ( ).*
4. Change the mode to **Remote Mode** ( )
5. Change the speed of the robot to 75% by using the button.

Process Controller Monitor

6. UI: From the **\Maintenance\Service\Module Service\Module #** screen for the ITS or OTS robot you just taught, click on "**Auto**" button to place the Staubli Robot in Auto Mode.
7. UI: From the **Status\Main Status** screen confirm that both the ITS & OTS robots are "**Ready**".

Control Panel Input Station

8. Turn "**MAINTENANCE MODE**" key switch counterclockwise.
   ⇒ "**PANELS/DOORS BYPASS**" lamp is switched off.
9. Turn "**PANELS/DOORS BYPASS**" key switch counterclockwise.
   ⇒ "**MAINTENANCE MODE**" lamp is switched off.

Gantry Teaching

Along with teaching the position of the Gripper Cleaner, every process module that can host a carrier needs to have one (1) teach point taught.

Starting Gantry Teach Process

1. Tool operational.

Control Panel Input Station

2. Turn "**MAINTENANCE MODE**" key switch clockwise
   ⇒ "**MAINTENANCE MODE**" lamp is switched on.
3. Turn "**PANELS/DOORS BYPASS**" key switch clockwise.
   ⇒ "**PANELS/DOORS BYPASS**" lamp is switched on.

Process Controller Monitor

4. User Interface (UI): From the **Status\Main Status** screen, click on the "**Manual**" button to place the tool in Manual Mode.
5. UI: From the **\Maintenance\Gantry Control\Robot Control** screen, click on [Epalm Enable] to enable the ePalm Teach Pendant.

ePALM Teach Pendant

6. Select **F1** "**Main Menu**".
7. Proceed to either ***Teaching Gantry Carrier in Bath/Landing Points*** or ***Teaching Gantry Gripper Cleaner Point*** section.

Teaching Gantry Carrier in Bath/Landing Points

Perform these steps for each of the process module that can host a carrier. This includes the ITS and OTS landing.

Teach Tip

- Teach with an empty carrier on the Gantry gripper.
- The teach point position is when the Gantry gripper is ready to lift, but not yet lifting the carrier. The weight of the carrier is still resting on the bottom of the bath.

9. Complete ***Starting Gantry Teach Process*** section.

Tool

10. Open safety doors in front of the module you want to teach the positions for.
11. Remove front panels of the module adjacent to the one you want to teach the positions for.

ePALM Teach Pendant

12. Select **F1** "**Teach Menu**"
13. When you see "***Go to Page***", select [0] (0), enter the number of the module you want, and then **Enter** ([↵]). *(Note: the number to enter for the module was scrolled through prior to seeing the line "Go To Page".)*
14. Use the arrow keys to move the Gantry Robot **over** the module you want to teach. Keep the dead man's switch pressed when moving the Gantry. *(Note: The left ([←]) and right ([→]) arrows move the X-Axis of the Gantry Robot, and the up ([↑]) and down ([↓]) arrows move the Y-Axis of the Gantry Robot. If moving to Module 12 or 13, you must lower the Safety Wall (**F7** "**Safety Wall Down**" / **F8** "**Safety Wall Up**") prior to moving.)*
    ⇒ Dead man's switch is located on the right side of the Teach Pendant.
15. When a lid exists open the module's lid by selecting **F5** "**Open/Close Lid**".
16. Place the carrier to the gripper by hand.
17. Move the gripper to the approximate unload position in the module.
18. Activate the corresponding directional key to move the robot to the position where the carrier is ready to be lifted by the Gantry, but the weight of the carrier is still resting on the bottom of the bath.
19. Select **F9** "**Teach Module**"

20. Select **Enter** (↵) for "**OK**"
21. Select **F1** "**Main Menu**"
22. Activate the corresponding directional key to move the robot out of the module.

Tool

23. Insert all front panels.
24. Close all safety doors.
25. For further modules start with step 2 of this procedure.
26. When all teach points are completed go to ***Finishing Gantry Teach Process*** section.

Teaching Gantry Gripper Cleaner Point

Teach Tip

- The teach point of the Gripper Cleaner is when the Gantry Gripper is at the bottom of the stroke when a clean is taking place.

1. Complete ***Starting Gantry Teach Process*** section.

Tool

2. Open safety doors in front of the module you want to teach the positions for.
3. Remove front panels of the module adjacent to the one you want to teach the positions for.

ePALM Teach Pendant

4. Select **F1** "**Teach Menu**"
5. When you see "***Go to Page***", select (0), enter the number of the module you want, and then **Enter** (↵). *(Note: the number to enter for the module was scrolled through prior to seeing the line "Go To Page".)*
6. Use the arrow keys to move the Gantry Robot **over** the module you want to teach. Keep the dead man's switch pressed when moving the Gantry. *(Note: The left (←) and right (→) arrows move the X-Axis of the Gantry Robot, and the up (↑) and down (↓) arrows move the Y-Axis of the Gantry Robot. If moving to Module 12 or 13, you must lower the Safety Wall (**F7** "**Safety Wall Down**" / **F8** "**Safety Wall Up**") prior to moving.)*
   ⇒ Dead man's switch is located on the right side of the Teach Pendant.
7. If there is a carrier on the gripper, remove it by hand.
8. Activate the corresponding directional key to move the robot to the position where the gripper is at the bottom of the stroke of a clean.
9. Select **F9** "**Teach Module**"
10. Select **Enter** (↵) for "**OK**"
11. Select **F1** "**Main Menu**"
12. Activate the corresponding directional key to move the robot out of the module.

Tool

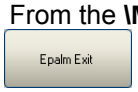
13. Insert all front panels.
14. Close all safety doors.
15. Go to ***Finishing Gantry Teach Process*** section.

Finishing Gantry Teach Process

ePALM Teach Pendant

1. Move the robot to the “Park Position” by selecting **F3** “**Move Menu**”,
2. Using the Select button, enter **27** “**M8 – Gripper Cleaner**” followed by the Enter key (↵).
   ⇒ Wait for the robot to move to Module 8 (Gripper Cleaner).

Process Controller Monitor

3. UI: From the **\Maintenance\Gantry Control\Robot Control** screen, click on 

to exit the ePalm Teach Pendant

Control Panel Input Station

4. Turn "**MAINTENANCE MODE**" key switch counterclockwise.
   ⇒ "**MAINTENANCE MODE**" lamp is switched off.
5. Turn "**PANELS/DOORS BYPASS**" key switch counterclockwise.
   ⇒ "**PANELS/DOORS BYPASS**" lamp is switched off.

TOOL NETWORK TROUBLESHOOTING

Tool Network Topology

Network Infrastructure

The topology of the Tool network is what is commonly known as an “active star network”. Active star networks are one of the most common computer network topologies. In its simplest form, an active star network consists of one active central switch, which acts as a conduit to transmit messages from the surrounding hosts (HMI Computers, PLCs, etc.).

The star topology reduces the chance of network failure by connecting all of the systems to a central switch. All peripheral nodes may thus communicate with all others by transmitting to, and receiving from, the central switch only. The failure of a transmission line linking any peripheral node to the central node will result in the isolation of that peripheral node from all others, but the rest of the systems will be unaffected.

The primary disadvantage of a star topology is the high dependence of the system on the functioning of the central switch. While the failure of an individual link only results in the isolation of a single node, the failure of the central switch renders the network inoperable, immediately isolating all nodes.

Protocol

The protocol used so all the hosts connected on the Tool network can communicate with each other is IPv4 (Internet Protocol version 4). When writing IPv4 addresses in human-readable form, the most common notation is the dot-decimal notation. The table below represents the IP Address assigned to each host on the Tool Network.

HOST	IP ADDRESS
Tool PLC (Allen-Bradley ControlLogix 5000)	192.168.200.2
ePALM (Gantry Teach Pendant)	192.168.200.3
Dryer PLC (Allen-Bradley SLC 500)	192.168.200.5
HMI Computer	192.168.200.10

Network Error

When the network image located on the HMI’s Main Status Screen changes from **Network Good** to **Network Error** *(See table below for Images)*, this means the HMI computer has lost network communications with the Tool’s PLC (Allen-Bradley ControlLogix 5000), and any action done on the HMI will not be executed by the PLC.

NETWORK STATUS	IMAGE
Network Good	
Network Error	

*Note: If there is a network communications error with only the Dryer PLC, the network status image will still show **Network Good**, but an HMI alarm will appear.*

Causes for Network Error

The table below represents the most common causes for a Network Error.

PROPABILITY	TYPE	DESCRIPTION
High	ASConnex Server Failure	The ASConnex Server is the software application that links the HMI application with software running on the PLC.
Medium	Ethernet Switch Failure	The Ethernet Switch represents a single point of failure for the Tool Network, but as a solid-state device its failure rate is not very high. However it is an active device requiring power and if there is no power, there is no network.
Medium	Network Cabling Failure	One or more of the cables that connects the host (HMI Computer, PLC, etc.) with the Ethernet Switch has been disconnected or has been damaged.
Low	Ethernet NIC in HMI Failure	The Ethernet Network Interface Card (NIC) on the HMI Computer has either a component (s) on the board that has failed, or someone has changed the configuration of the card.
Low	Ethernet NIC in PLC Failure	The Ethernet Network Interface Card (NIC) module on the PLC has either a component(s) on the board that has failed, or someone has changed the configuration of the card.

Basic Processes from the HMI

These processes will help in resolving and/or troubleshooting network errors.

How to Restart the HMI Computer

From the HMI do the following steps:

1. Select ***CTRL-ESC***.
2. Select ***\Start\Shut Down***
3. Select ***Restart***.
4. Select ***OK***.
5. Wait for Windows XP to Restart
6. Looking at the HMI Computer screen and once the ASConnex Server Command Window says "*PCOServer: Main is done*" in the right hand corner of the ASConnex Server Command Window; double click on the ASWorx icon located on the HMI Computer's Desktop
7. From the ASWorx launcher, select **Start All**.
8. When prompted, logon to the HMI and wait for the HMI graphics to appear on the screen.

How to Use the Ping Command

Ping is a computer network tool used to test whether a particular host is reachable across an IP network; it is also used to self test the network interface card of the computer, or as a speed test. It works by sending ICMP "echo request" packets to the target host and listening for ICMP "echo response" replies. Ping estimates the round-trip time, generally in milliseconds, and records any packet loss, and prints a statistical summary when finished.

From the HMI do the following steps:

1. Select ***CTRL-ESC***
2. Select ***\Start\Run...\CMD***
3. Type ***ping*** **<ip_address>** then ***Enter***

Example of a Good Ping Response

This example shows a response to a ping command when there are no issues with network or protocol connectivity.

```
ping 192.168.200.10

Pinging 192.168.200.10 with 32 bytes of data:

Reply from 192.168.200.10: bytes=32 time<1ms TTL=128
Reply from 192.168.200.10: bytes=32 time<1ms TTL=128
Reply from 192.168.200.10: bytes=32 time<1ms TTL=128
Reply from 192.168.200.10: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.200.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Example of a Bad Ping Response

This example shows a response to a ping command when there are issues with network or protocol connectivity.

```
ping 192.168.200.10

Pinging 192.168.200.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.200.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

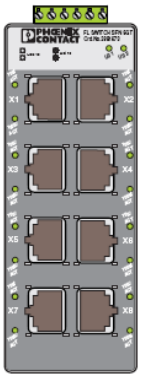
ASConnex Server Failure

ISSUE	CAUSE	RECOVERY
When starting/restarting the HMI computer, the person did not wait for the ASConnex Server Command Window to say “PCOServer: Main is done” in the bottom right hand corner of the command window before starting ASWorx.	Prior to the Network Error being displayed on the HMI, the HMI computer was restarted.	Restart HMI Computer
Someone closed the ASConnex Server Command Window.	If you do a CTRL-ESC and look at the Windows Task Bar, there is not a task window tab with the name “ASConnex”	Restart HMI Computer
ASConnex Server crashed.	Prior to the Network Error, either a JAVA or .NET error popup window appeared on the HMI screen.	Restart HMI Computer

Ethernet Switch Failure

The Ethernet Switch is located behind the first door from the left of the Control Cabinet, and there are five (5) Ethernet cables connected to it. Three (3) ports should always show a link light on since they are for the HMI Computer, Tool PLC, and Dryer PLC. The other two (2) should only show a link light if the ePALM is enabled and/or a support notebook is attached to the Tool network.

Below is what the Ethernet Switch looks like. It provides a number of visual LEDs to determine if there is power to the device and the individual port connectivity to the end node/host device.



	10 Mbps	100 Mbps
LNK/ACT[5]	ON/Blinking	ON/Blinking
100	OFF	ON

Troubleshooting

VERIFY	RECOVERY
Ethernet Switch has power.	If no power, you will have to determine if there truly is power being fed to the Ethernet Switch. If power is good, then most likely the Ethernet Switch has failed and should be replaced.
Link light on for end node currently turned on.	If there is no link light on for a device, this means one of the following is true: 1. Bad port on Ethernet Switch – Move network cable to open port on Ethernet Switch. 2. Network cable failure – See Network Cabling Failure 3. End node Ethernet NIC failure – See Ethernet NIC in HMI Computer or PLC Failure

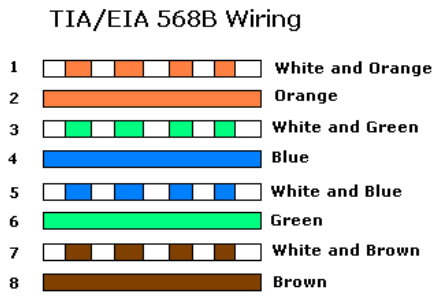
Network Cabling Failure

Typically a network cable failure takes place because there was some work taking place around the tool and a cable was accidentally cut or someone disconnected a network cable from either the Ethernet Switch or the end node device and forgot to reconnect it. The only way to really troubleshoot this is to:

1. Verify if there was any work being done by the Tool prior to the Network Error taking place.
2. Verify every end node device has a network cable attached to it. *Note: At times the bottom clip of the RJ45 connector can break off. If there is no clip on the RJ45 connector, then a new RJ45 connector should be crimped on that end of the network cable.*

[5] **ON**: indicates an electrical Link
Blinking: indicates network traffic (at high data rates the blinking is in a constant rate)

If a network cable was damaged, a new cable will need to be made using twisted pair Cat-5 cable cut to length, two RJ45 connectors, and the wiring standard below.



Ethernet NIC in HMI or PLC Failure

If the network infrastructure (Ethernet Switch & Network Cabling) is operating correctly, the remaining item to test is the individual network node's ability to communicate on the network. The steps below will help identify which node is not working properly prior to contacting Tetra Systems' Support Group. .

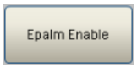
1. Verify HMI Computer network connectivity - ***ping 192.168.200.10***
2. Verify connectivity between HMI Computer and Tool PLC - ***ping 192.168.200.2***
3. Verify connectivity between HMI Computer and Dryer PLC - ***ping 192.168.200.5***

If there is a problem with the ePALM and you need to test its ability to communicate on the network, do the following:

Control Panel Input Station

1. Turn "**MAINTENANCE MODE**" key switch clockwise
   ⇒ "**MAINTENANCE MODE**" lamp is switched on.

Process Controller Monitor

2. User Interface (UI): From the **Status\Main Status** screen, click on the "**Manual**" button to place the tool in Manual Mode.
3. UI: From the **\Maintenance\Gantry Control\Robot Control** screen, click on 

to enable the ePalm Teach Pendant.
4. UI: Select ***CTRL-ESC***
5. UI: Select ***\Start\Run..\CMD***
6. UI: Type ***ping 192.168.200.3*** then ***<Enter>***
9. UI: From the **\Maintenance\Gantry Control\Robot Control** screen, click on

to exit the ePalm Teach Pendant

Control Panel Input Station

3. Turn "**MAINTENANCE MODE**" key switch counterclockwise.
   ⇒ "**MAINTENANCE MODE**" lamp is switched off.