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|----------------------|---------------------------|
| Project Name: | Cheese Production |
| Customer: | GEA North America |
| Industry: | Dairy – Cheese Production |
| PLC: | 1 x S7-300 |
| SCADA: | InTouch 7.11 |
| Networks | Ethernet & Profibus |
| I/O count | 800 I/O |

Project Summary;

Logicon provided a system to Tuchenhausen North America to provide control and automation for an entire cheese plant. The system used a Simatic S7 platform, consisting of S7-300 Series PLC and I/O on Profibus with a Siemens HMI, and Wonderware InTouch for control room.

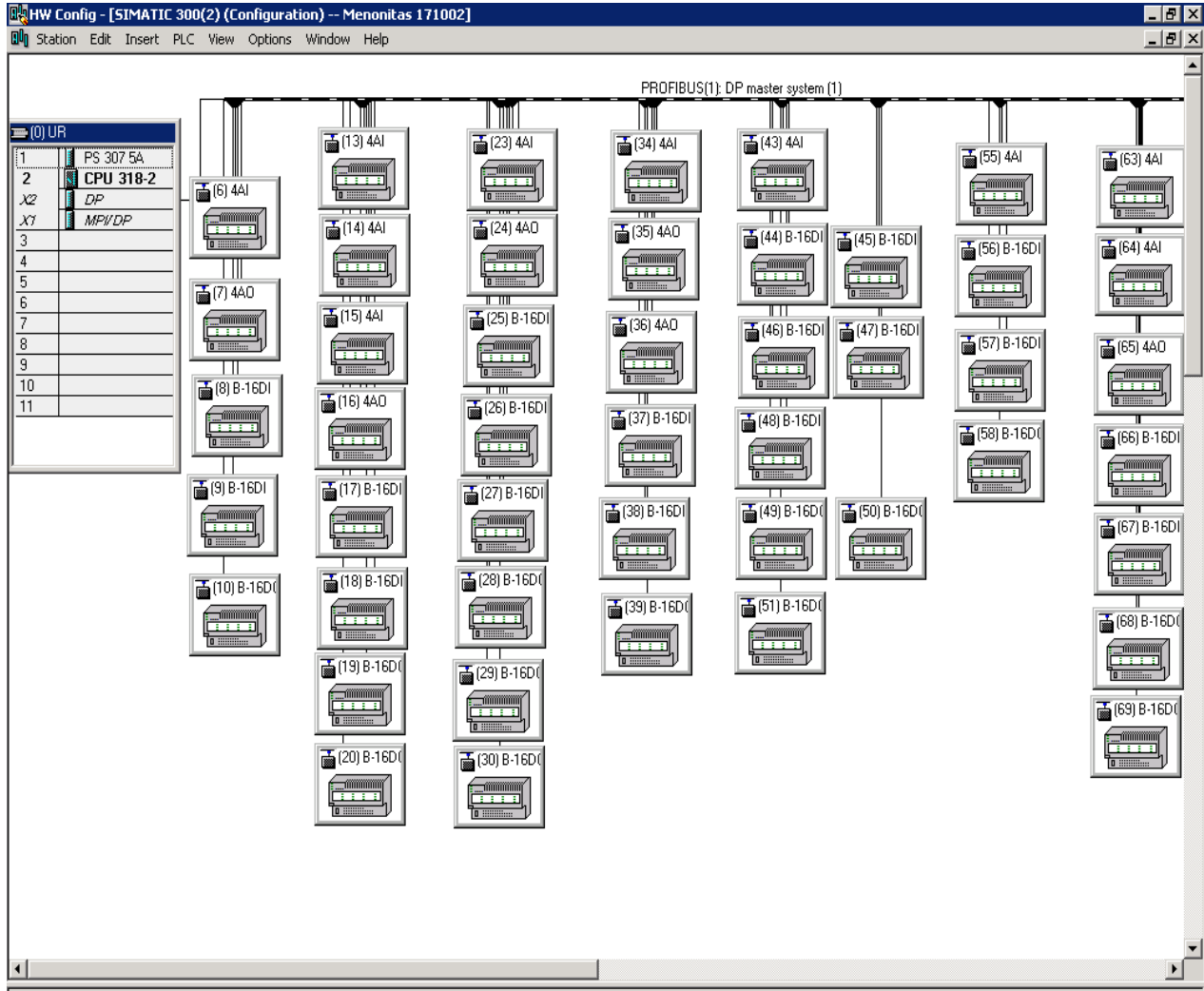
Logicon used an S7-300 series PLC with extensive Profibus based I/O to implement the solution. The areas automated were broadly grouped as follows

- Milk Receiving and Storage
- Milk Pasteurization
- 3-Vat Automation
- 3 Finishing Tables
- 2 Cheese Towers
- Whey Storage and Load-out
- 4-tank CIP System

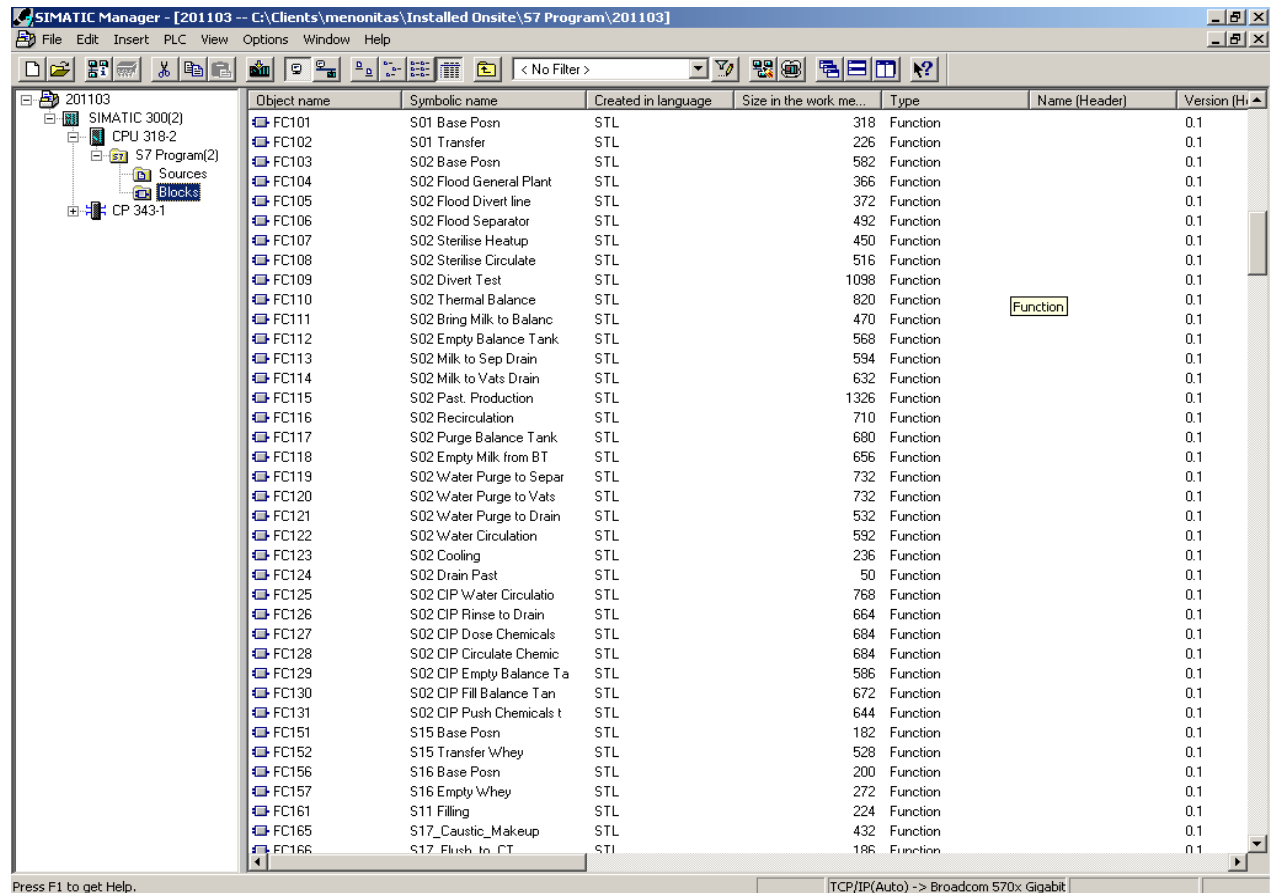
The main aspects of the project were;

Design of Hardware with large profibus network for remote I/O
Provision of full FDS for entire plant.
Provision of full PLC code for system
Provision of HMI application for operators
Provision of Full Scada system for Control Room
Installation and Commissioning

The PLC system was designed by Logicon and client. The client provided flow-sheets and process descriptions and Logicon developed a full FDS which was checked against flow-sheets and approved by client. We developed the PLC code very quickly and the HMI and Scada applications were then built on PLC Code completion. A FAT was carried out at client offices the plant was then commissioned successfully by our engineers. The plant went into production 3 weeks after commencement of commissioning, indicating a successful exercise in generation of accurate code.



Section of the Profibus network for the Plant

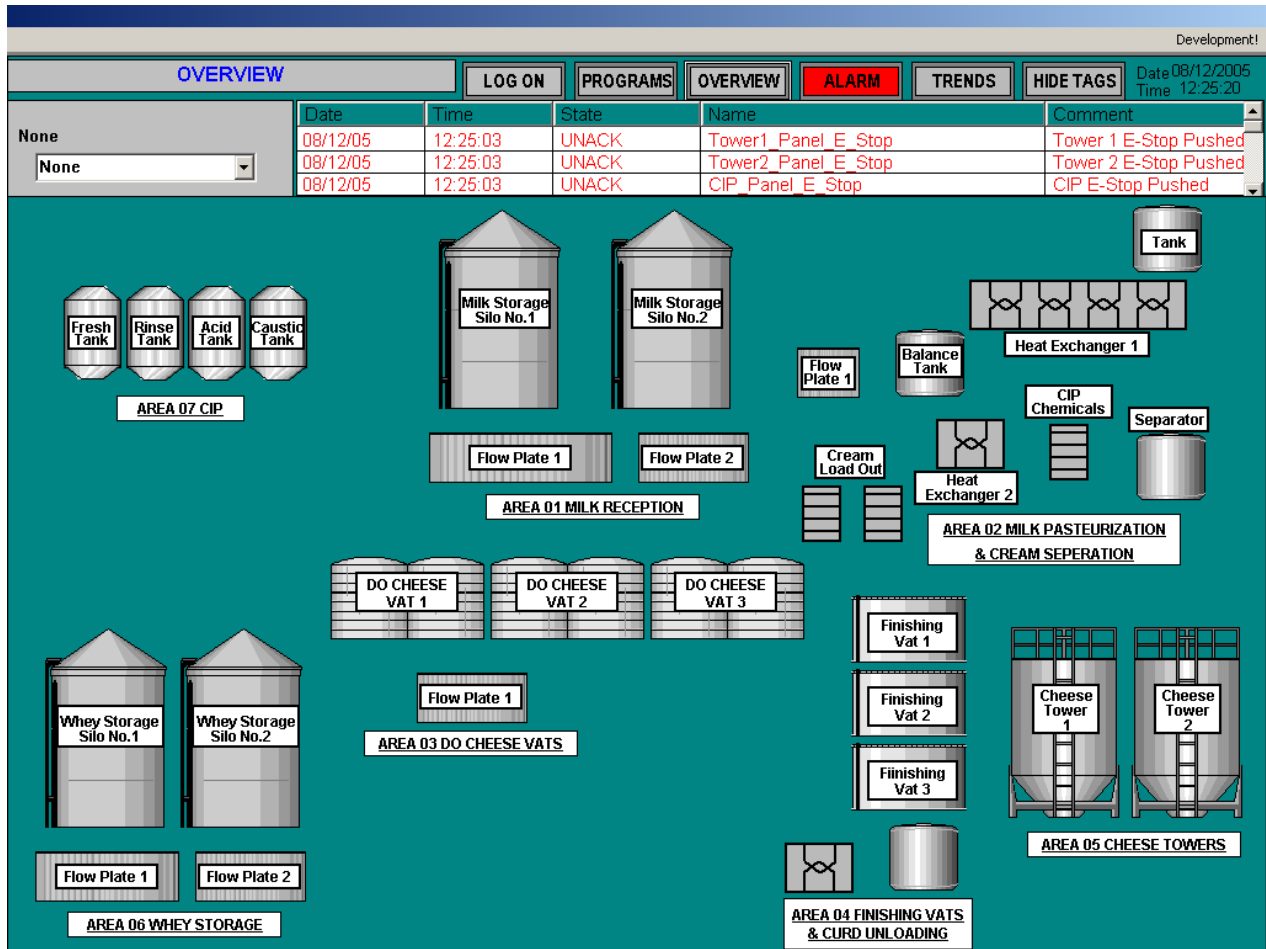


The screenshot shows the SIMATIC Manager interface with a project tree on the left and a table of function blocks on the right. The table lists various function blocks (FC) used in the PLC program, including their object names, symbolic names, languages, sizes, types, and versions.

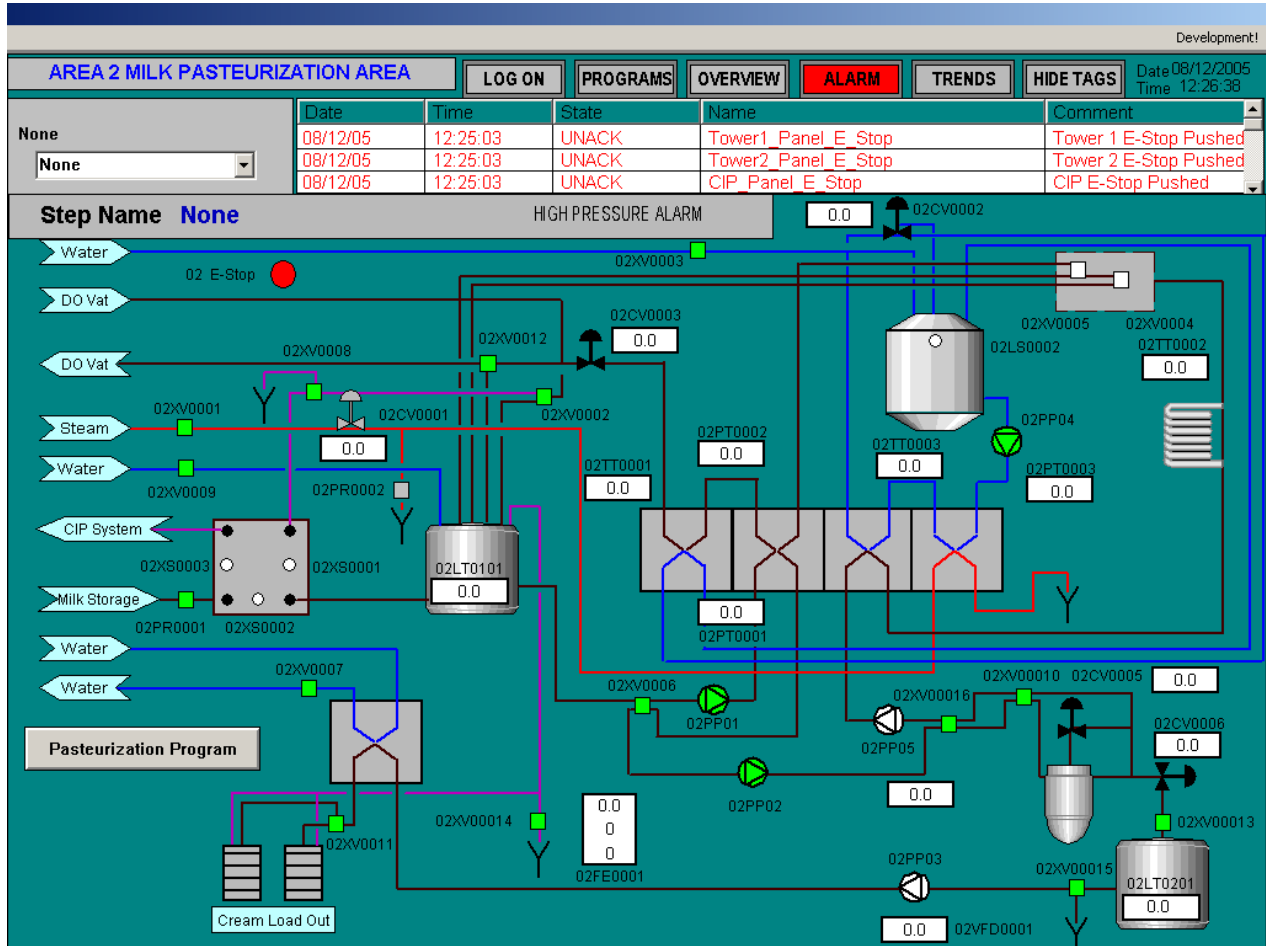
| Object name | Symbolic name | Created in language | Size in the work me... | Type | Name (Header) | Version (H) |
|-------------|--------------------------|---------------------|------------------------|----------|---------------|-------------|
| FC101 | S01 Base Posn | STL | 318 | Function | | 0.1 |
| FC102 | S01 Transfer | STL | 226 | Function | | 0.1 |
| FC103 | S02 Base Posn | STL | 582 | Function | | 0.1 |
| FC104 | S02 Flood General Plant | STL | 366 | Function | | 0.1 |
| FC105 | S02 Flood Divert line | STL | 372 | Function | | 0.1 |
| FC106 | S02 Flood Separator | STL | 492 | Function | | 0.1 |
| FC107 | S02 Sterilise Heatup | STL | 450 | Function | | 0.1 |
| FC108 | S02 Sterilise Circulate | STL | 516 | Function | | 0.1 |
| FC109 | S02 Divert Test | STL | 1098 | Function | | 0.1 |
| FC110 | S02 Thermal Balance | STL | 820 | Function | | 0.1 |
| FC111 | S02 Bring Milk to Balanc | STL | 470 | Function | Function | 0.1 |
| FC112 | S02 Empty Balance Tank | STL | 568 | Function | | 0.1 |
| FC113 | S02 Milk to Sep Drain | STL | 594 | Function | | 0.1 |
| FC114 | S02 Milk to Vats Drain | STL | 632 | Function | | 0.1 |
| FC115 | S02 Past. Production | STL | 1326 | Function | | 0.1 |
| FC116 | S02 Recirculation | STL | 710 | Function | | 0.1 |
| FC117 | S02 Purge Balance Tank | STL | 680 | Function | | 0.1 |
| FC118 | S02 Empty Milk from BT | STL | 656 | Function | | 0.1 |
| FC119 | S02 Water Purge to Separ | STL | 732 | Function | | 0.1 |
| FC120 | S02 Water Purge to Vats | STL | 732 | Function | | 0.1 |
| FC121 | S02 Water Purge to Drain | STL | 532 | Function | | 0.1 |
| FC122 | S02 Water Circulation | STL | 592 | Function | | 0.1 |
| FC123 | S02 Cooling | STL | 236 | Function | | 0.1 |
| FC124 | S02 Drain Past | STL | 50 | Function | | 0.1 |
| FC125 | S02 CIP Water Circulatio | STL | 768 | Function | | 0.1 |
| FC126 | S02 CIP Rinse to Drain | STL | 664 | Function | | 0.1 |
| FC127 | S02 CIP Dose Chemicals | STL | 684 | Function | | 0.1 |
| FC128 | S02 CIP Circulate Chemic | STL | 684 | Function | | 0.1 |
| FC129 | S02 CIP Empty Balance Ta | STL | 586 | Function | | 0.1 |
| FC130 | S02 CIP Fill Balance Tan | STL | 672 | Function | | 0.1 |
| FC131 | S02 CIP Push Chemicals t | STL | 644 | Function | | 0.1 |
| FC151 | S15 Base Posn | STL | 182 | Function | | 0.1 |
| FC152 | S15 Transfer Whey | STL | 528 | Function | | 0.1 |
| FC156 | S16 Base Posn | STL | 200 | Function | | 0.1 |
| FC157 | S16 Empty Whey | STL | 272 | Function | | 0.1 |
| FC161 | S11 Filling | STL | 224 | Function | | 0.1 |
| FC165 | S17_Caustic_Makeup | STL | 432 | Function | | 0.1 |
| FC166 | S17 Flush to CT | STL | 186 | Function | | 0.1 |

Representation of Layout of phase based code blocks in the PLC which allowed for standard coding to be used, easing commissioning and maintenance.

The code was based on Logicon in-house libraries, using a powerful step sequencer developed by Logicon staff which allowed rapid development the overall system. Logicon specialise in high level PLC programming allowing large complex projects to be executed quickly.



Mimic of overview of Plant



Mimic for Pasteurisation Area

Development!

CIP RECIPE LOG ON PROGRAMS OVERVIEW **ALARM** TRENDS HIDE TAGS Date 08/12/2005
 Time 12:27:57

| Date | Time | State | Name | Comment |
|---|------|-------|------|---------|
| There are no items to show in this view | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|--|--|---|--|--|---|--|--|---|--|--|---|--|--|---|--|--|---|--|--|---|--|--|---|--|--|--|---|--|
| <p>None <input type="text" value="None"/></p> <p>Caustic Req <input type="text" value="No"/></p> <p>Acid Req <input type="text" value="No"/></p> <p>Make Up <input type="text" value="No"/></p> <p>Caustic Conc <input type="text" value="0"/></p> <p>Acid conc <input type="text" value="0"/></p> <p>Pre-Rinse Time <input type="text" value="0"/></p> <p>Caustic Time <input type="text" value="0"/></p> <p>Mid Rinse Time <input type="text" value="0"/></p> <p>Acid Time <input type="text" value="0"/></p> <p>Final Rinse Time <input type="text" value="0"/></p> <p>Line Volume <input type="text" value="0"/></p> <p>Rinse Volume <input type="text" value="0"/></p> <p>Caustic Temp <input type="text" value="0"/></p> <p>Acid Temp <input type="text" value="0"/></p> | <p>Recipe No. <input type="text" value="None"/> Operation <input type="text" value="None"/></p> <p style="text-align: center;">Cycle Time <input type="text" value="0"/></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td>Pulse 1 On <input type="text" value="0"/></td> <td>Pulse 1 Off <input type="text" value="0"/></td> <td>Cycle Pulse 01 <input type="text" value="No"/></td> </tr> <tr> <td>Pulse 2 On <input type="text" value="0"/></td> <td>Pulse 2 Off <input type="text" value="0"/></td> <td>Cycle Pulse 02 <input type="text" value="No"/></td> </tr> <tr> <td>Pulse 3 On <input type="text" value="0"/></td> <td>Pulse 3 Off <input type="text" value="0"/></td> <td>Cycle Pulse 03 <input type="text" value="No"/></td> </tr> <tr> <td>Pulse 4 On <input type="text" value="0"/></td> <td>Pulse 4 Off <input type="text" value="0"/></td> <td>Cycle Pulse 04 <input type="text" value="No"/></td> </tr> <tr> <td>Pulse 5 On <input type="text" value="0"/></td> <td>Pulse 5 Off <input type="text" value="0"/></td> <td>Cycle Pulse 05 <input type="text" value="No"/></td> </tr> <tr> <td>Pulse 6 On <input type="text" value="0"/></td> <td>Pulse 6 Off <input type="text" value="0"/></td> <td>Cycle Pulse 06 <input type="text" value="No"/></td> </tr> <tr> <td>Pulse 7 On <input type="text" value="0"/></td> <td>Pulse 7 Off <input type="text" value="0"/></td> <td>Cycle Pulse 07 <input type="text" value="No"/></td> </tr> <tr> <td>Pulse 8 On <input type="text" value="0"/></td> <td>Pulse 8 Off <input type="text" value="0"/></td> <td>Cycle Pulse 08 <input type="text" value="No"/></td> </tr> <tr> <td>Pulse 9 On <input type="text" value="0"/></td> <td>Pulse 9 Off <input type="text" value="0"/></td> <td>Cycle Pulse 09 <input type="text" value="No"/></td> </tr> <tr> <td>Pulse 10 On <input type="text" value="0"/></td> <td>Pulse 10 Off <input type="text" value="0"/></td> <td>Cycle Pulse 10 <input type="text" value="No"/></td> </tr> </table> | Pulse 1 On <input type="text" value="0"/> | Pulse 1 Off <input type="text" value="0"/> | Cycle Pulse 01 <input type="text" value="No"/> | Pulse 2 On <input type="text" value="0"/> | Pulse 2 Off <input type="text" value="0"/> | Cycle Pulse 02 <input type="text" value="No"/> | Pulse 3 On <input type="text" value="0"/> | Pulse 3 Off <input type="text" value="0"/> | Cycle Pulse 03 <input type="text" value="No"/> | Pulse 4 On <input type="text" value="0"/> | Pulse 4 Off <input type="text" value="0"/> | Cycle Pulse 04 <input type="text" value="No"/> | Pulse 5 On <input type="text" value="0"/> | Pulse 5 Off <input type="text" value="0"/> | Cycle Pulse 05 <input type="text" value="No"/> | Pulse 6 On <input type="text" value="0"/> | Pulse 6 Off <input type="text" value="0"/> | Cycle Pulse 06 <input type="text" value="No"/> | Pulse 7 On <input type="text" value="0"/> | Pulse 7 Off <input type="text" value="0"/> | Cycle Pulse 07 <input type="text" value="No"/> | Pulse 8 On <input type="text" value="0"/> | Pulse 8 Off <input type="text" value="0"/> | Cycle Pulse 08 <input type="text" value="No"/> | Pulse 9 On <input type="text" value="0"/> | Pulse 9 Off <input type="text" value="0"/> | Cycle Pulse 09 <input type="text" value="No"/> | Pulse 10 On <input type="text" value="0"/> | Pulse 10 Off <input type="text" value="0"/> | Cycle Pulse 10 <input type="text" value="No"/> |
| Pulse 1 On <input type="text" value="0"/> | Pulse 1 Off <input type="text" value="0"/> | Cycle Pulse 01 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pulse 2 On <input type="text" value="0"/> | Pulse 2 Off <input type="text" value="0"/> | Cycle Pulse 02 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pulse 3 On <input type="text" value="0"/> | Pulse 3 Off <input type="text" value="0"/> | Cycle Pulse 03 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pulse 4 On <input type="text" value="0"/> | Pulse 4 Off <input type="text" value="0"/> | Cycle Pulse 04 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pulse 5 On <input type="text" value="0"/> | Pulse 5 Off <input type="text" value="0"/> | Cycle Pulse 05 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pulse 6 On <input type="text" value="0"/> | Pulse 6 Off <input type="text" value="0"/> | Cycle Pulse 06 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pulse 7 On <input type="text" value="0"/> | Pulse 7 Off <input type="text" value="0"/> | Cycle Pulse 07 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pulse 8 On <input type="text" value="0"/> | Pulse 8 Off <input type="text" value="0"/> | Cycle Pulse 08 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pulse 9 On <input type="text" value="0"/> | Pulse 9 Off <input type="text" value="0"/> | Cycle Pulse 09 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pulse 10 On <input type="text" value="0"/> | Pulse 10 Off <input type="text" value="0"/> | Cycle Pulse 10 <input type="text" value="No"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Area 7 CIP System

Mimic showing fully configurable CIP recipe