



chromperfect  
chromatography data systems

Gulf Coast Conference  
2014

## Application Data Systems

- General tool between plant and laboratory
- Learning curve shortened significantly
- Easy change control

# chromperfect

## Combine Elements of Acquisition and Analysis

The screenshot displays the Chrom Perfect File Editor interface, divided into four main panels for configuration and analysis.

**Top Left Panel: Component Table**

| Component | In Plot                             | Component Name | Retention Time, min. | Window Width, min. | Ref. Comp. # | Proxy Comp. # | Group # | Low Alarm |
|-----------|-------------------------------------|----------------|----------------------|--------------------|--------------|---------------|---------|-----------|
| 1         | <input checked="" type="checkbox"/> | PEN            | 1.536                | 0.1                | 0            | 0             | 0       | 0         |
| 2         | <input checked="" type="checkbox"/> | n-HEX          | 2.204                | 0.1                | 0            | 0             | 0       | 0         |
| 3         | <input checked="" type="checkbox"/> | Benzene        | 2.689                | 0.1                | 0            | 0             | 0       | 0         |
| 4         | <input checked="" type="checkbox"/> | cy-HEX         | 3.09                 | 0.1                | 0            | 0             | 0       | 0         |
| 5         | <input checked="" type="checkbox"/> | n-Heptane      | 3.357                | 0.1                | 0            | 0             | 0       | 0         |
| 6         | <input checked="" type="checkbox"/> | Toluene        | 4.125                | 0.1                | 0            | 0             | 0       | 0         |
| 7         | <input checked="" type="checkbox"/> | n-octane       | 4.542                | 0.1                | 0            | 0             | 0       | 0         |
| 8         | <input checked="" type="checkbox"/> | m,p-xylene     | 6.096                | 0.1                | 0            | 0             | 0       | 0         |
| 9         | <input checked="" type="checkbox"/> | o-xylene       | 6.413                | 0.1                | 0            | 0             | 0       | 0         |
| 10        | <input checked="" type="checkbox"/> | p-benzene      | 7.164                | 0.1                | 0            | 0             | 0       | 0         |

**Top Right Panel: Detector Settings**

| Parameter             | Detector #1 | Detector #2 |
|-----------------------|-------------|-------------|
| Temperature, deg. C   | 250         | 350         |
| Hydrogen pressure     | 25          | 26          |
| Air pressure (ignite) | 10          | 13          |
| Air pressure (run)    | 25          | 26          |

**Bottom Left Panel: Chromatogram Processing**

Chromatogram Processing

Type of Smoothing: **None** (Smoothing Time (sec): 0)

Subtract Baseline Chromatogram

Initial peak detect threshold: **-4**

Initial peak width, minutes: **0.1**

Calibration File Name: **\_Atest.cal**

Produce ASCII Area Files  Produce Plot PNG Files

**Current peak width and sample rate will give 12 samples across a peak.**

**Bottom Right Panel: Report Layout Configuration**

Layout: **ChromPlot**

Header: "HEADER"

ChromPlot

PTable 1 "PEAK TABLE"

Header: "FOOTER"

Orientation: **Portrait**

Report width in: **Page Width**

Version = 2    Format: CP32    Modified on 10/15/2013 6:20:08 AM    test

# chromperfect

Communicate to the Universe

- Make Data Available to all Customers
- Create Standard PDF files on the Fly
- e-mail reports and plots
- Evaluate Analysis and Produce Alarms
- Converse with SCADA

# chromperfect

## Symmetric Instrument Control

The Analyzer Instrument in the Plant or at the Sample Site

The Analytical Instrument in the Laboratory

C:\CPData\SampleData\Sample.mfl

Aux Oven | Events | Inlet | Detectors | Columns

| Detector #1                          |     | Detector #2                          |     |
|--------------------------------------|-----|--------------------------------------|-----|
| Temperature, deg. C                  | 250 | Temperature, deg. C                  | 350 |
| Hydrogen pressure                    | 25  | Hydrogen pressure                    | 26  |
| Air pressure (ignite)                | 10  | Air pressure (ignite)                | 13  |
| Air pressure (run)                   | 25  | Air pressure (run)                   | 26  |
| <input type="checkbox"/> Invert data |     | <input type="checkbox"/> Invert data |     |

C:\CPData\SampleData\Sample.mfl

Aux Oven | Events | Inlet | Detectors | Columns

|                              |     |
|------------------------------|-----|
| Oven Temperature, deg C      | 250 |
| Delay time, seconds          | 5   |
| Splitless time, seconds      | 0   |
| Split vent time, seconds     | 30  |
| Loop injection time, seconds | 10  |
| Idle Flow fraction, percent  | 33  |

Edit Column #1 Temperature Program

Temperature

Time, seconds

Initial Time, seconds: 0

Initial temperature, C: 35

Program time = 531.00 seconds

| Ramp # | Rate Deg C/sec | Final Temp. | Final Time, sec | Ramp Start, sec | Ramp End, sec |
|--------|----------------|-------------|-----------------|-----------------|---------------|
| 1      | 0.5            | 300         | 1               | 0               | 530           |
| 2      | 0              | 375         | 0               |                 |               |

OK

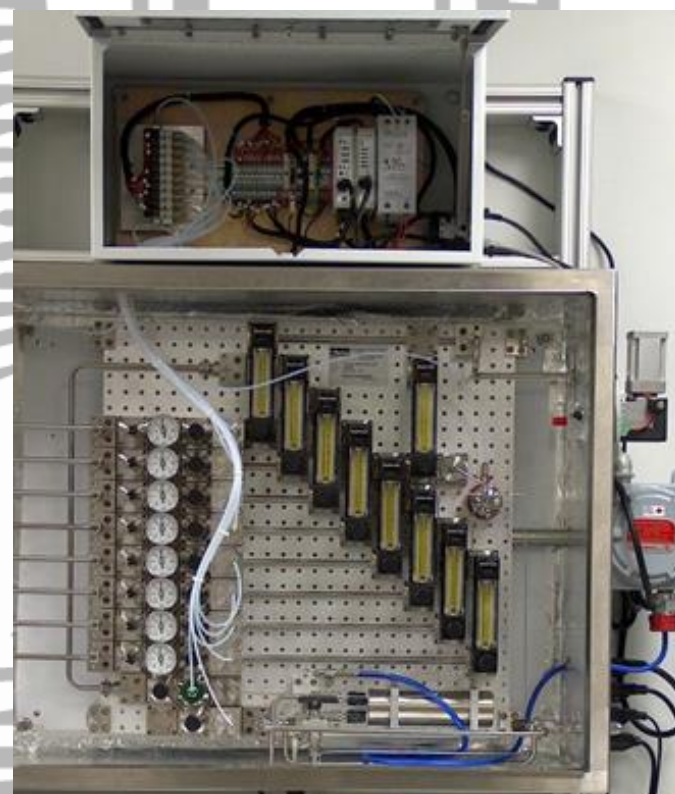
Cancel



## Sampling Control

### Automated Sample Streams

- Off the Shelf
- Custom Configured



## Process Control

- **OPC**

- Chromperfect OLE for Process Control

- **Analog Output**

- Chromperfect Analog Output
- Unlimited Speciated Component Values

- **Modbus Output**

- Chromperfect Process Control
- Custom Built Repository that's Local or Cloud Based

Data Control

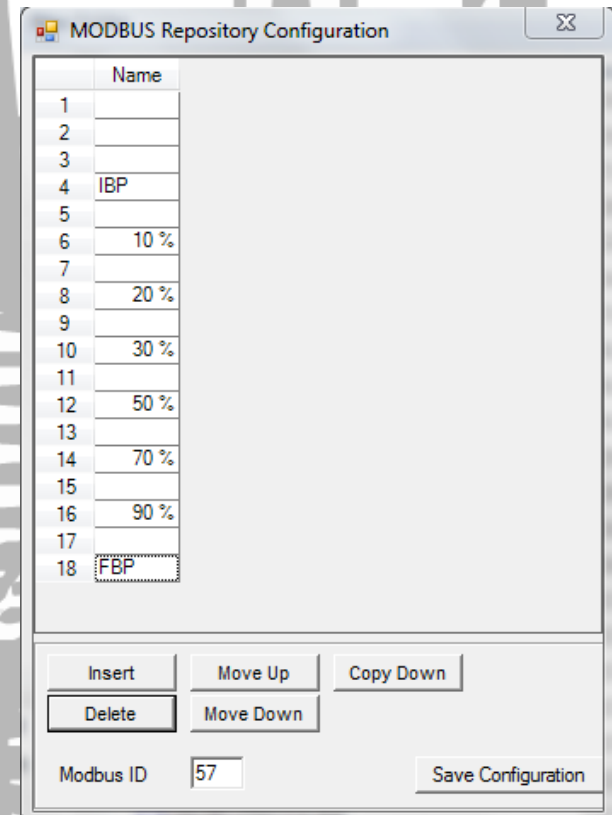
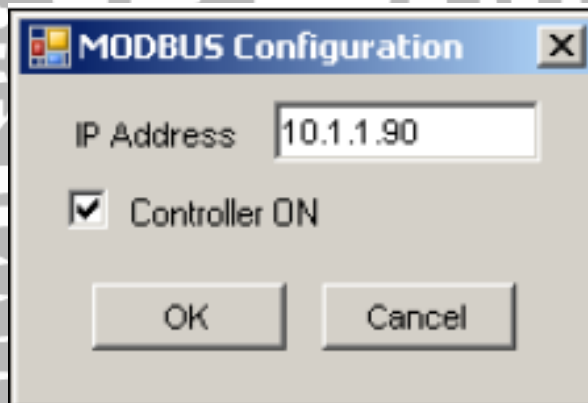
## Analog Output

- Current loop -- 4-20ma
- Voltage output -- Various
- PLC



## Data Control

Modbus Coil/Register population

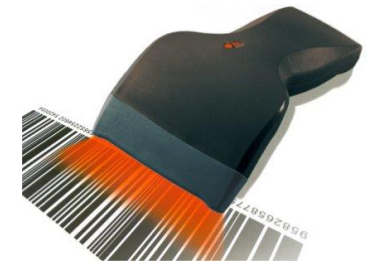


## Data Control

- OPC
- OLE for Process Control
- Open Platform Communications (1996)
- Integrate into Existing DCS Systems

# chromperfect

## Plant to Laboratory



- NatGas

### NatGas

**Instrument**

Selected Instrument: Digital Data

Instrument Status: Free

**Method**

Governing Method file name: C:\CPData\SampleData\Atest.smt

**Sample**

Sample Name: NatGas 7AM

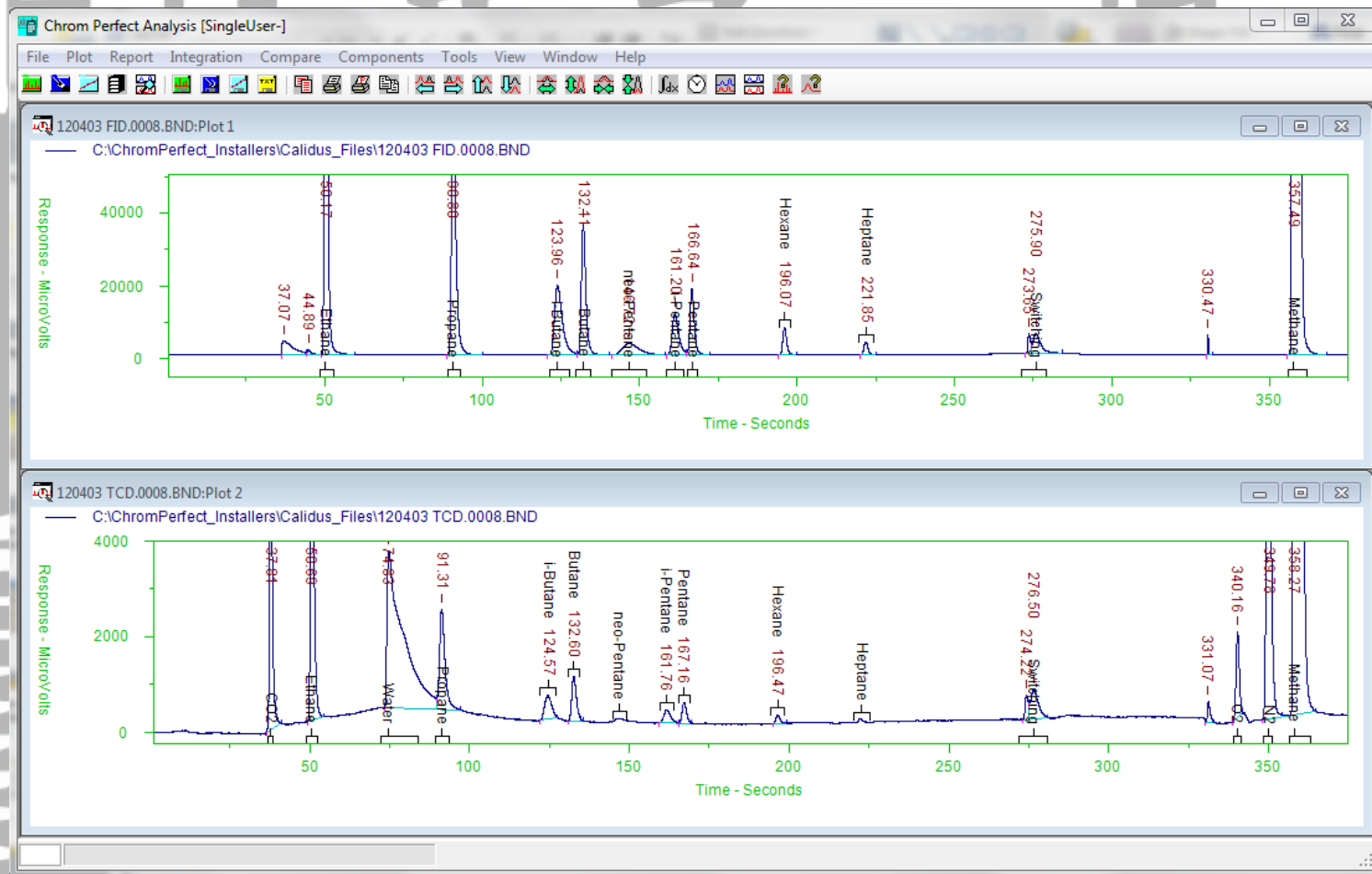
Disk File Base Name: NatGas7

Calibration run      Calibration Level: 1

Download    Start    Stop

# chromperfect

## Plant to Laboratory



# chromperfect

Raw File Name = C:\CPData\NatGasTest\NatGasStd.1.raw  
Sample Name = NatGas Standard  
Method File Name = C:\CPData\NatGasTest\NatGas.MET

| Name | RT     | Amt    | W Amt  |
|------|--------|--------|--------|
| N2   | 1.000  | 5.000  | 5.000  |
| O2   | 1.500  | 1.000  | 1.000  |
| CO2  | 2.000  | 1.000  | 1.000  |
| C1   | 3.000  | 63.000 | 63.000 |
| C2   | 4.000  | 9.000  | 9.000  |
| C3   | 5.000  | 6.000  | 6.000  |
| C4   | 6.000  | 3.000  | 3.000  |
| ic4  | 6.500  | 3.000  | 3.000  |
| C5   | 7.000  | 1.000  | 1.000  |
| ic5  | 7.500  | 1.000  | 1.000  |
| C6   | 8.500  | 0.500  | 1.000  |
| C7   | 9.500  | 0.500  | 1.000  |
| C8   | 10.500 | 0.500  | 1.000  |
| C9   | 11.500 | 0.500  | 1.000  |
| C10  | 12.500 | 0.500  | 1.000  |
| C11  | 13.500 | 0.500  | 1.000  |
| C12  | 14.500 | 0.500  | 1.000  |

Total Amount = 100  
Total Table Amt = 96.5  
Total Table w Amt = 100

# chromperfect

| Name | Mole % | Normalized Mole % |
|------|--------|-------------------|
| C1   | 63.00  | 63.00             |
| C2   | 9.00   | 9.00              |
| C3   | 6.00   | 6.00              |
| C4   | 3.00   | 3.00              |
| ic4  | 3.00   | 3.00              |
| C5   | 1.00   | 1.00              |
| ic5  | 1.00   | 1.00              |
| C6   | 1.00   | 1.00              |
| C7   | 1.00   | 1.00              |
| C8   | 1.00   | 1.00              |
| C9   | 1.00   | 1.00              |
| C10  | 1.00   | 1.00              |
| C11  | 1.00   | 1.00              |
| C12  | 1.00   | 1.00              |
| N2   | 5.00   | 5.00              |
| O2   | 1.00   | 1.00              |
| CO2  | 1.00   | 1.00              |

Total Mole % 100.00 PASS

BTU/CF at 14.65 PSI

|            |          |
|------------|----------|
| Ideal, Dry | 1,708.03 |
| Ideal, Wet | 1,678.14 |
| Real, Dry  | 1,723.07 |
| Real, Wet  | 1,692.92 |

Specific Gravity

|       |       |
|-------|-------|
| Ideal | 1.089 |
| Real  | 1.098 |

|              |         |
|--------------|---------|
| Z for sample | 0.99127 |
| Z for air    | 0.99963 |

WOBBE Index

|            |          |
|------------|----------|
| Ideal, Dry | 1,637.09 |
| Ideal, Wet | 1,608.45 |
| Real, Dry  | 1,651.50 |
| Real, Wet  | 1,622.60 |

Reid vapor Pressure 934.08

Mass % in liquid phase 54.550  
 Mass % in gas phase 45.450  
 Calculated sample density 0.607  
 Z for gas phase 0.79763

AdjVolumeRatio 3.94  
 SampleVolG 233.29

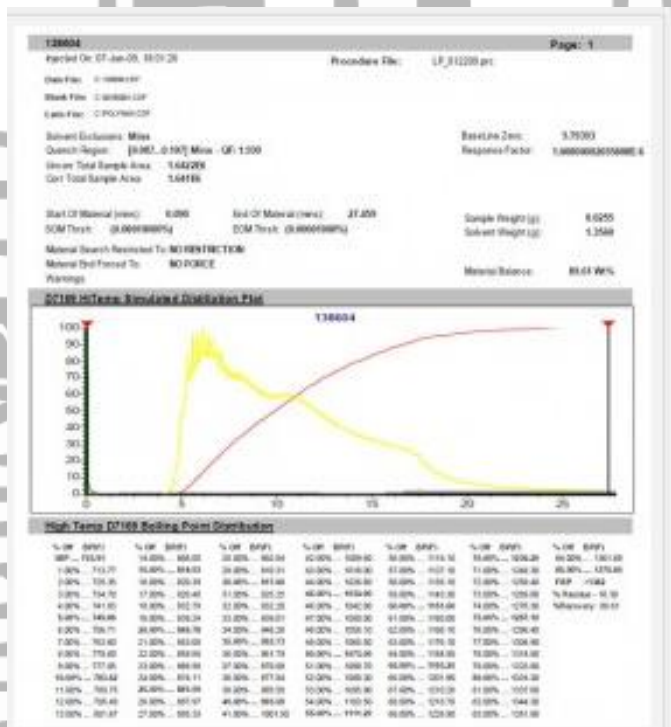
| Name | Liq Mole% | Gas Mole% | VP 100    | Partial Pressure |
|------|-----------|-----------|-----------|------------------|
| C1   | 18.81     | 79.46     | 4,947.31  | 930.50           |
| C2   | 11.85     | 7.94      | 784.87    | 92.97            |
| C3   | 15.29     | 2.54      | 194.59    | 29.75            |
| C4   | 9.84      | 0.45      | 53.63     | 5.28             |
| ic4  | 9.43      | 0.61      | 75.42     | 7.11             |
| C5   | 3.56      | 0.05      | 14.81     | 0.53             |
| ic5  | 3.50      | 0.07      | 22.74     | 0.80             |
| C6   | 3.65      | 0.01      | 3.73      | 0.14             |
| C7   | 3.68      | 0.00      | 0.96      | 0.04             |
| C8   | 3.68      | 0.00      | 0.27      | 0.01             |
| C9   | 3.68      | 0.00      | 0.06      | 0.00             |
| C10  | 3.68      | 0.00      | 0.02      | 0.00             |
| C11  | 3.68      | 0.00      | 0.00      | 0.00             |
| C12  | 3.68      | 0.00      | 0.00      | 0.00             |
| N2   | 0.84      | 6.55      | 9,140.19  | 76.70            |
| O2   | 0.15      | 1.32      | 10,553.77 | 15.43            |
| CO2  | 0.97      | 1.01      | 1,215.11  | 11.83            |

| Average MW   | Mn    | Mw    | P. I. |
|--------------|-------|-------|-------|
| Sample       | 31.53 | 61.61 | 1.954 |
| Liquid phase | 63.38 | 93.74 | 1.479 |
| Gas phase    | 19.67 | 23.04 | 1.171 |



## Plant to Laboratory

- SimDist



### SimDist

Instrument

Selected Instrument: Digital Data

Instrument Status: Free

Method

Governing Method file name: C:\CPData\SampleData\Atest.smt

Sample

Sample Name: Total Sulfur

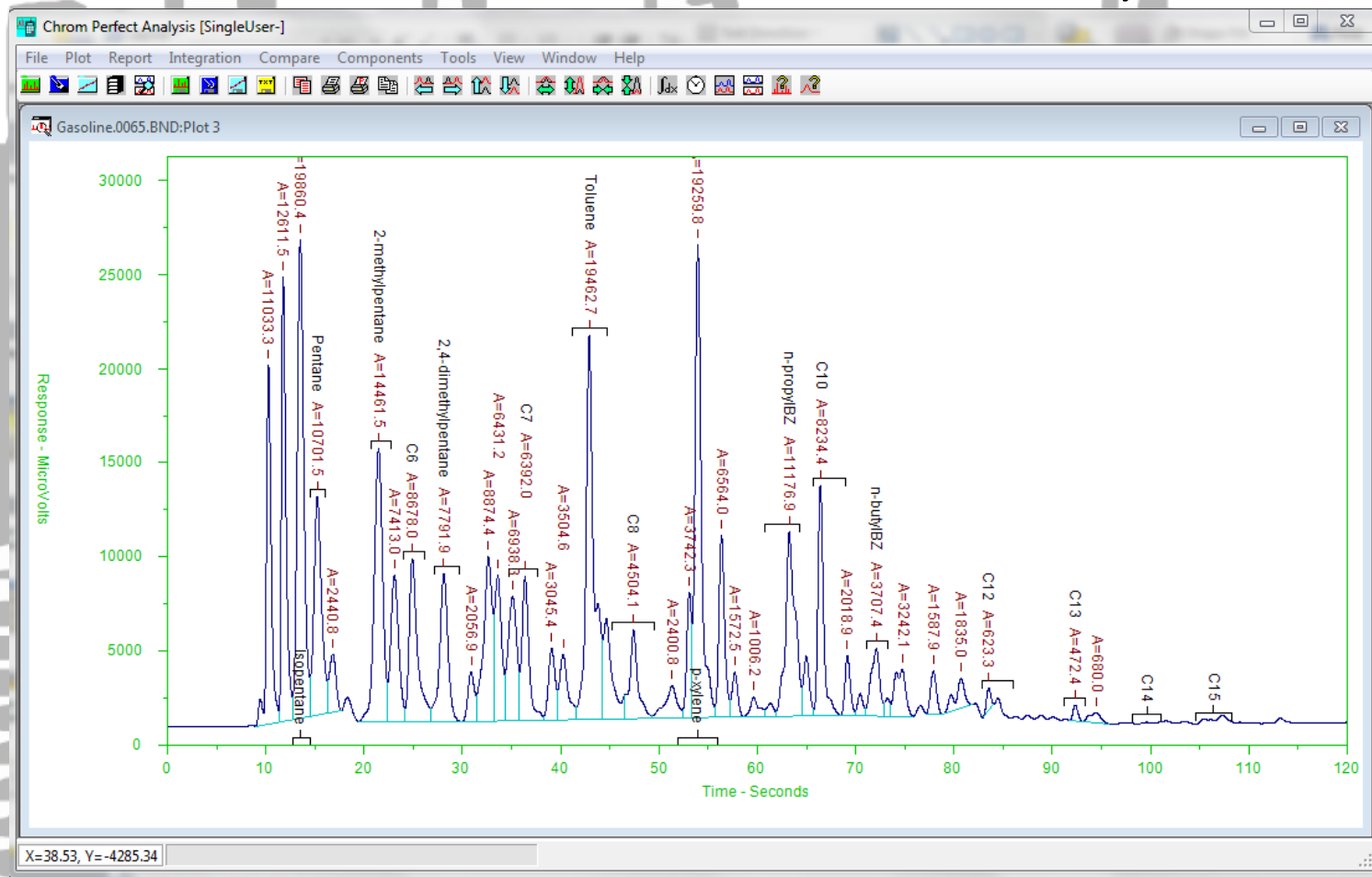
Disk File Base Name: Sulfur100

Calibration run

Calibration Level: 1

Download Start Stop

## Plant to Laboratory





## Plant to Laboratory

- Sulfur

### Sulfur

**Instrument**

Selected Instrument: Digital Data

Instrument Status: Free

**Method**

Governing Method file name: C:\CPData\SampleData\Atest.smt

**Sample**

Sample Name: Sulfur

Disk File Base Name:

Calibration run      Calibration Level: 1

Download    Start    Stop

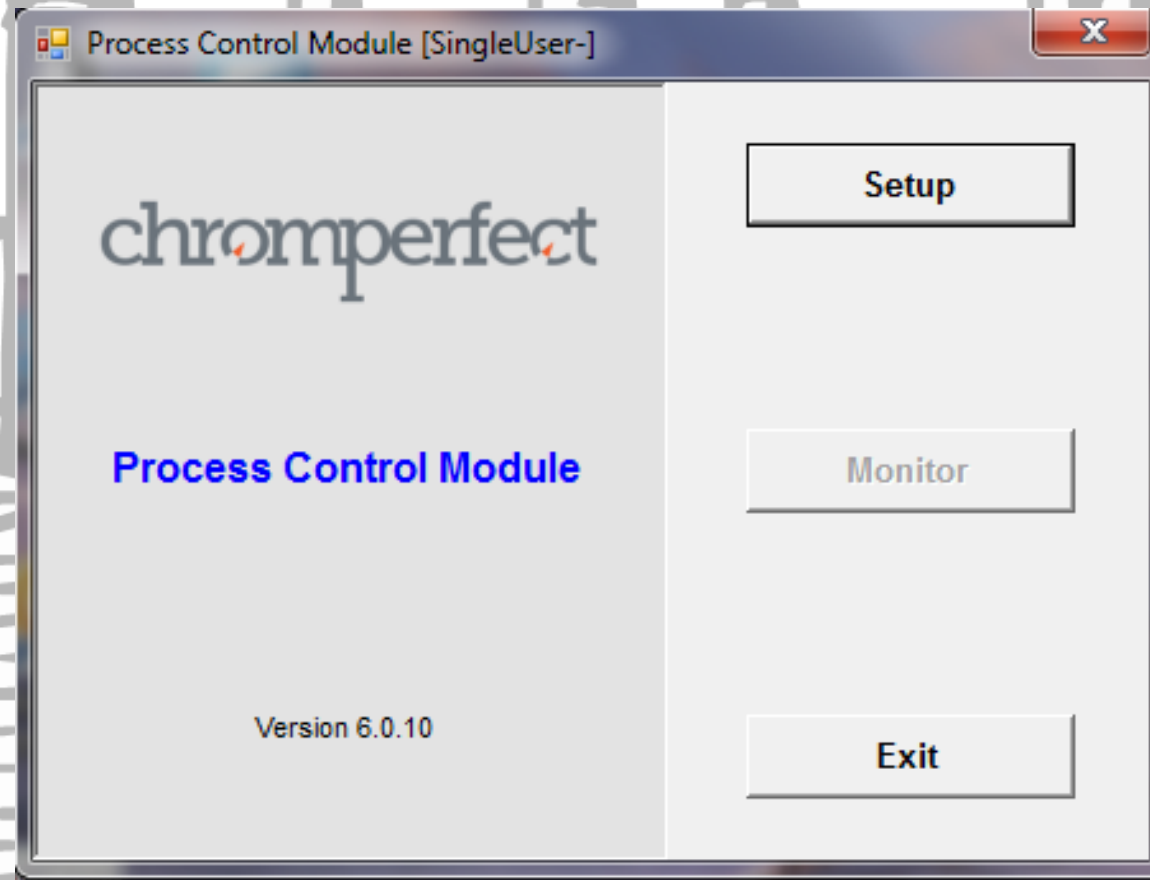


Laboratory to Plant

- Analytical Methods
- File compatibility
- Result correlation
- Chromperfect Process Control

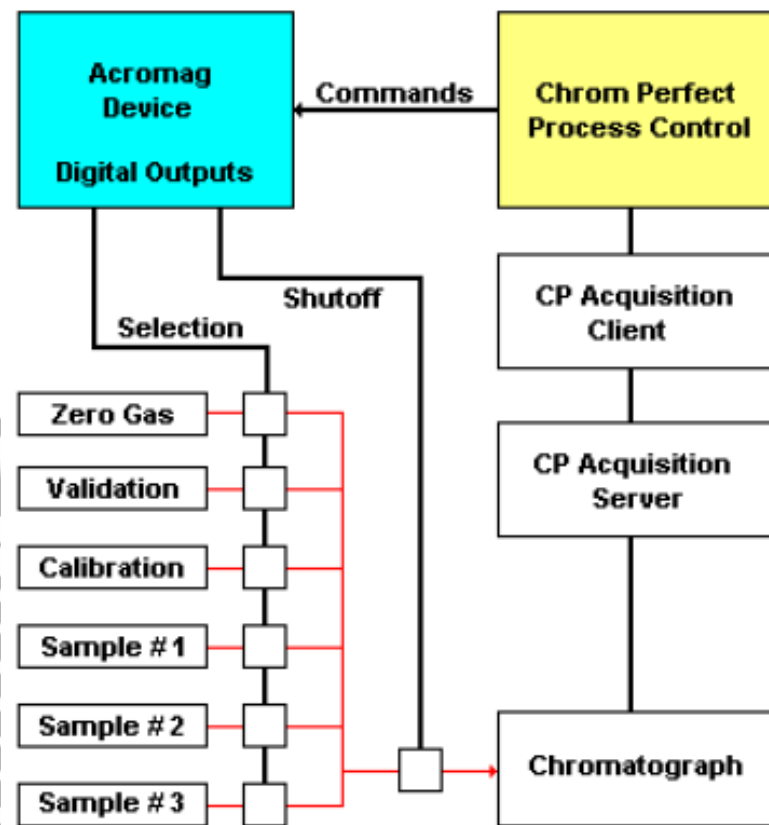
# chromperfect

## CPPC



# chromperfect

## CPPC



# chromperfect

## CPPC

Instrument #1 Configuration

General | AcroMag | Special Ports | Scheduled Streams | Temperature Sensing and Control | External Alarms | Internal Alarms

Instrument Name: Digital Data

Injection Delay Time, sec.: 2

Recovery Delay Time, sec.: 4

Message Background Color: White

OK Cancel

### General Instrument Selection

# chromperfect

## CPPC

|                            | Model      | IP Address     |
|----------------------------|------------|----------------|
| Digital I/O "A" (required) | 983EN      | 192.168.20.101 |
| Digital I/O "B" (optional) | 951EN      | 192.168.20.102 |
| RTD Module (optional)      | 966EN-6006 | 192.168.20.103 |

### I/O Gear Configuration

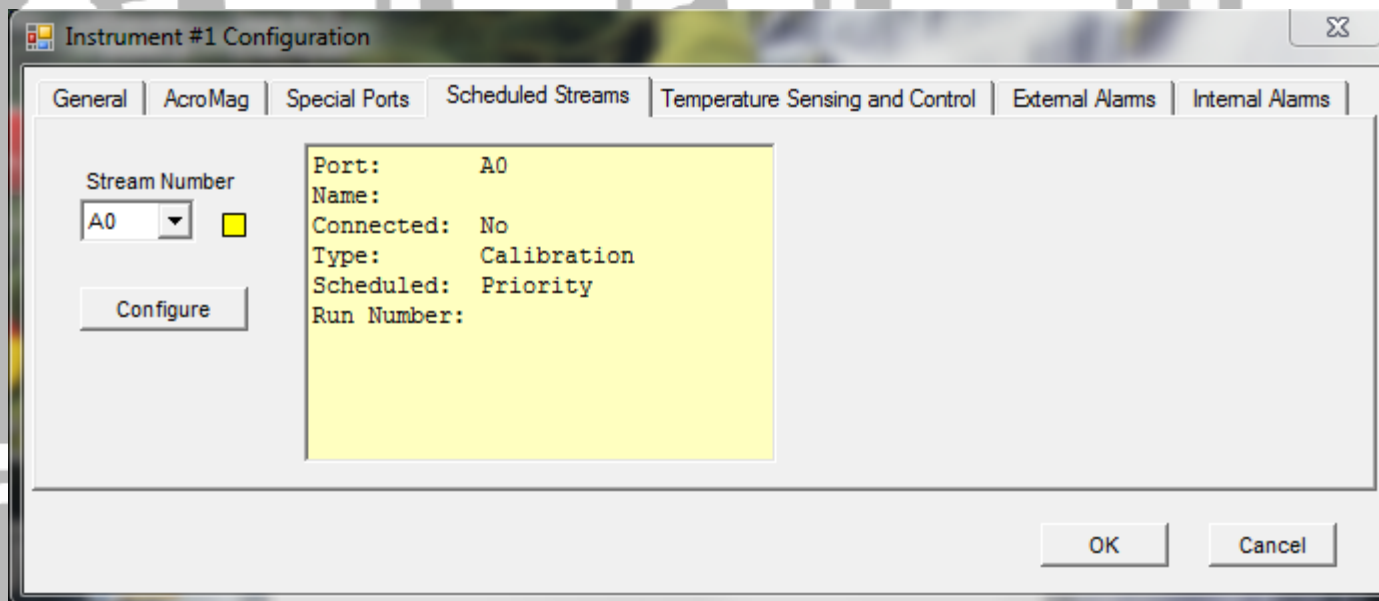
Instrument #1 Configuration

General | AcroMag | Special Ports | Scheduled Streams | Temperature Sensing and Control | External Alarms | Internal Alarms

|                              |      |  |                              |    |   |
|------------------------------|------|--|------------------------------|----|---|
| Zero Gas Stream Port Number  | A1   | ■  | Maintenance Mode Port Number | A4 | ■ |
| Shutoff Valve Port Number    | None | ■  | Priority Stream Port Number  | A5 | ■ |
| Shutoff Valve Duration, sec. | 1    | <input checked="" type="checkbox"/> Use MFL file | Priority Stream Number       | B0 |   |
| Heater Control Port Number   | A2   | ■  |                              |    |   |
| Cooler Control Port Number   | A3   | ■  |                              |    |   |

OK Cancel

### Specialized Ports



### Scheduled Stream Configuration



## CPPC

Instrument #1 Configuration

General | AcroMag | Special Ports | Scheduled Streams | Temperature Sensing and Control | External Alarms | Internal Alarms

|                        |    |          |     |   |    |
|------------------------|----|----------|-----|---|----|
| RTD Port Number (Main) | 0  | (Backup) | 1   | <input checked="" type="checkbox"/> Controller ON |    |
| Upper Alarm Limit      | 65 | HR Addr  | 200 | Upper Threshold (cool ON)                         | 55 |
| Lower Alarm Limit      | 35 |          |     | Lower Threshold (heat ON)                         | 45 |
|                        |    |          |     | Refractory Time, min.                             | 1  |

OK Cancel

### Analyzer Enclosure Conditions

|         | Port Number | HR Addr | Function    |
|---------|-------------|---------|-------------|
| Alarm A | B1          | 101     | Validation  |
| Alarm B | B2          | 102     | Calibration |
| Alarm C | None        | 0       |             |
| Alarm D | None        | 0       |             |

OK Cancel

External Alarms from SCADA

# chromperfect

## CPPC

Instrument #1 Configuration

General | AcroMag | Special Ports | Scheduled Streams | Temperature Sensing and Control | External Alarms | Internal Alarms

HR Address

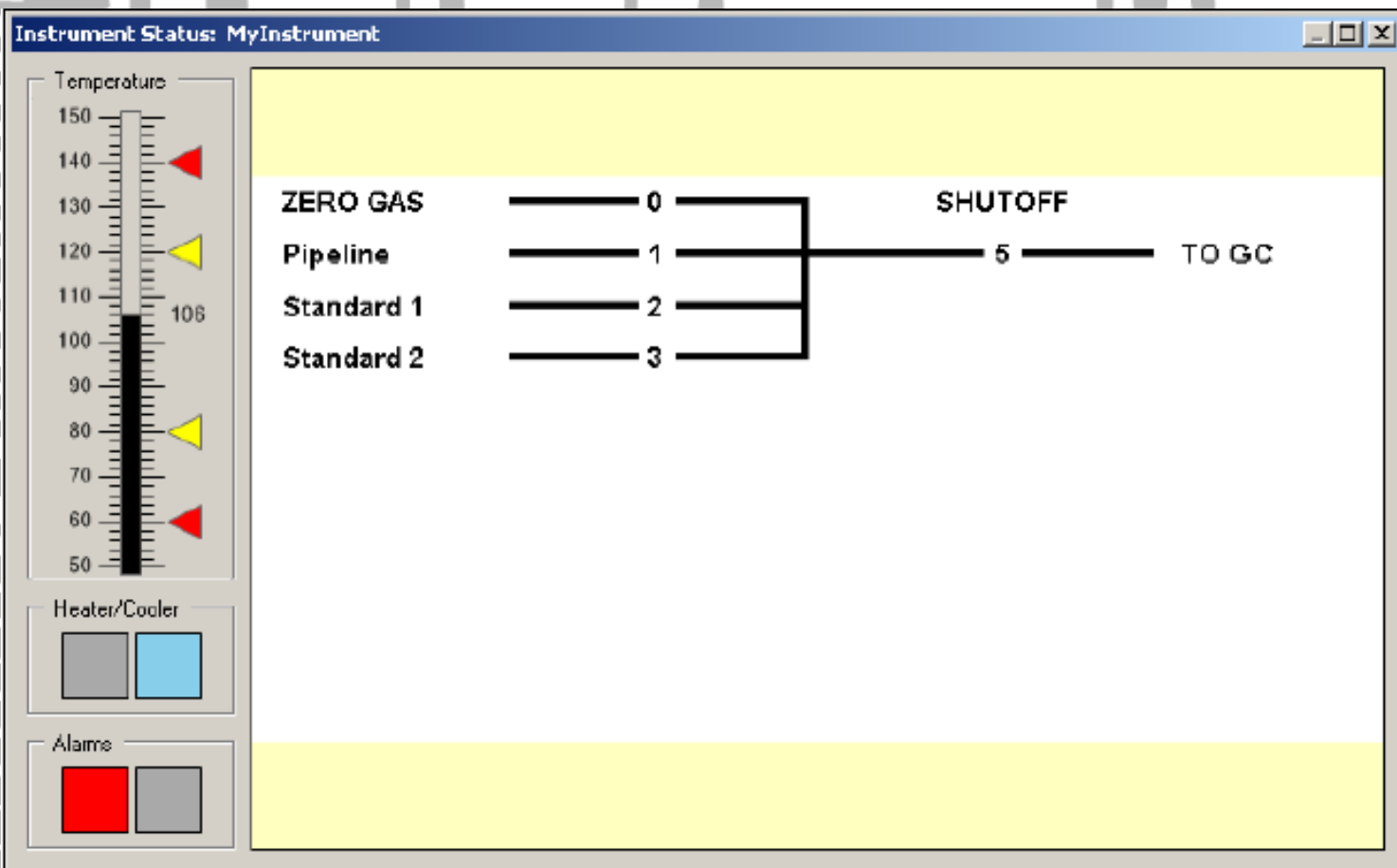
|                               |                                  |
|-------------------------------|----------------------------------|
| Out-Of-Service Flag           | <input type="text" value="104"/> |
| Calibration / Validation Flag | <input type="text" value="105"/> |

OK Cancel

Internal Alarms visible to SCADA

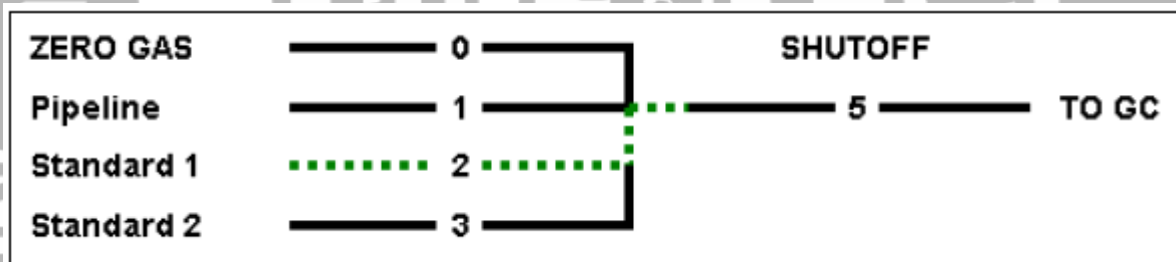
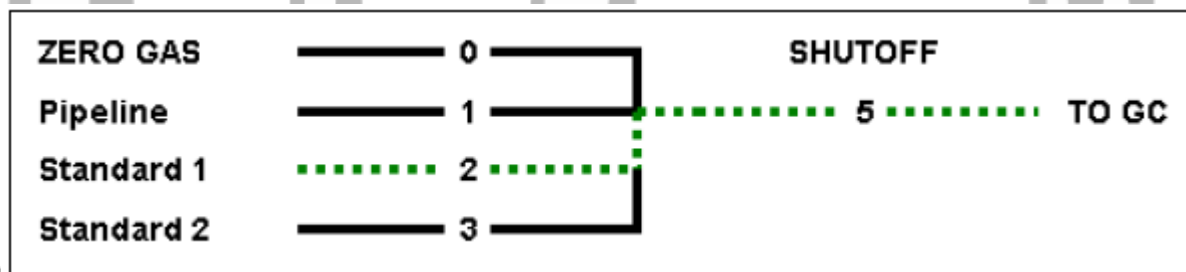
# chromperfect

CPPC



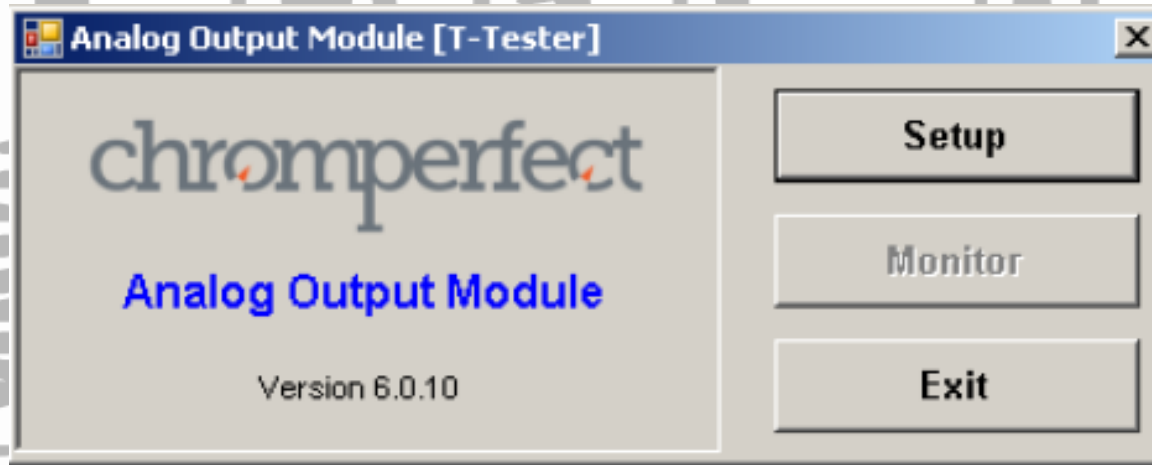
# chromperfect

## CPPC



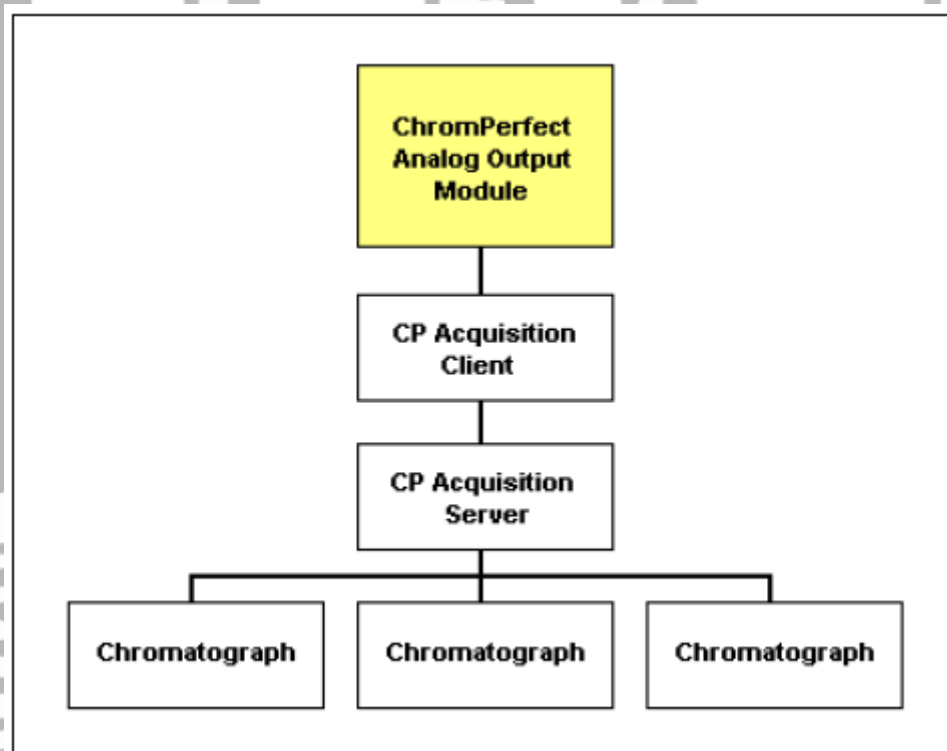
# chromperfect

## Chromperfect Analog Output CPAO





## Chromperfect Analog Output CPAO



# chromperfect

## Chromperfect Analog Output CPAO

Configuration

Programmed Hardware I/O Ports

|   | Port Type      | IP Addr   | Port # | Zero | Span | Default | Tag Name |
|---|----------------|-----------|--------|------|------|---------|----------|
| 1 | Analog Input   | 10.1.1.90 | 1      | 0    | 2    |         | ana1in   |
| 2 | Analog Input   | 10.1.1.90 | 2      | 0    | 2    |         | ana2in   |
| 3 | Digital Input  | 10.1.1.90 | 1      |      |      |         | dg1in    |
| 4 | Digital Input  | 10.1.1.90 | 2      |      |      |         | dg2in    |
| 5 | Analog Output  | 10.1.1.90 | 1      | 0    | 2    | 1       |          |
| 6 | Analog Output  | 10.1.1.90 | 2      | 0    | 2    | 1       |          |
| 7 | Digital Output | 10.1.1.90 | 2      |      |      | Lo      |          |

Available Port Types

Port Type

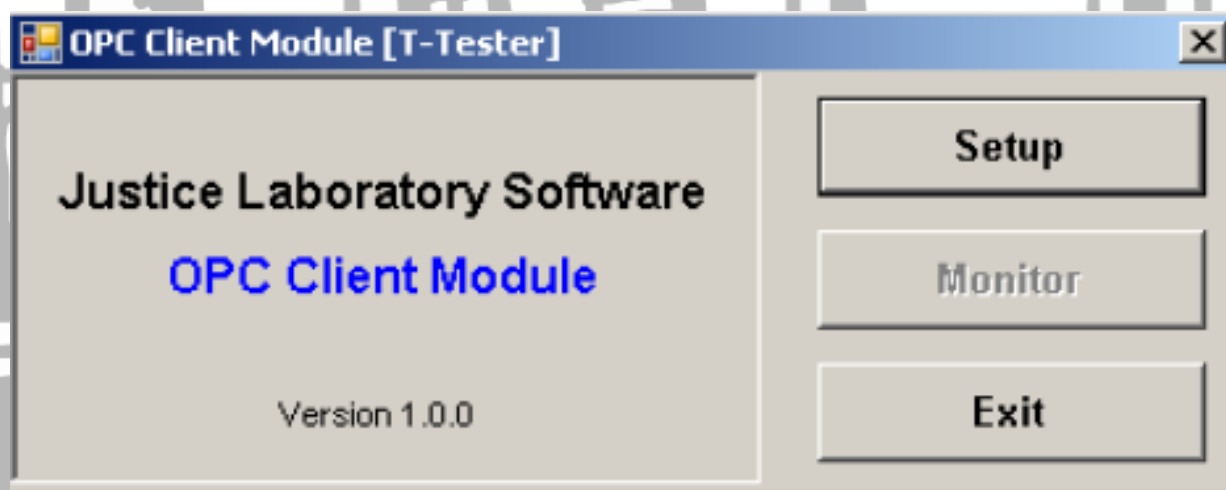
- Analog Input
- Digital Input
- Analog Output
- Digital Output

Insert Delete Move Up Move Down Copy Down Assign OK Cancel



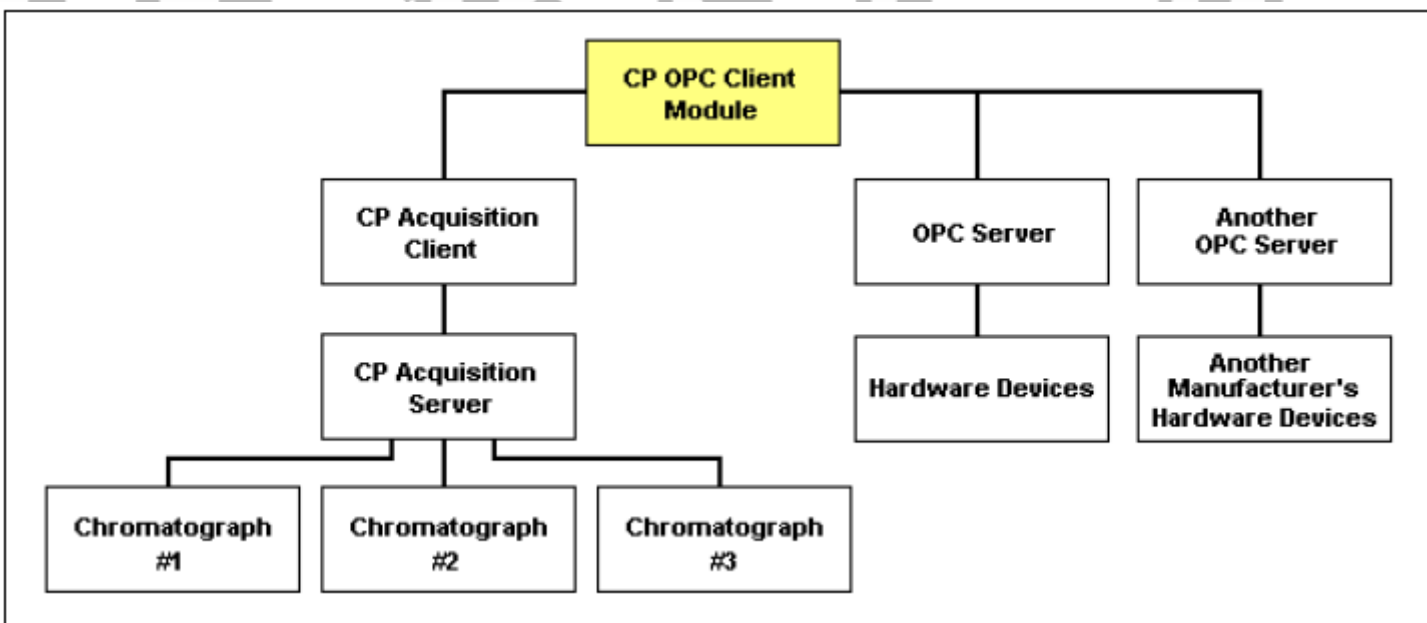
# chromperfect

## Chromperfect Open Platform Communications CPOPC



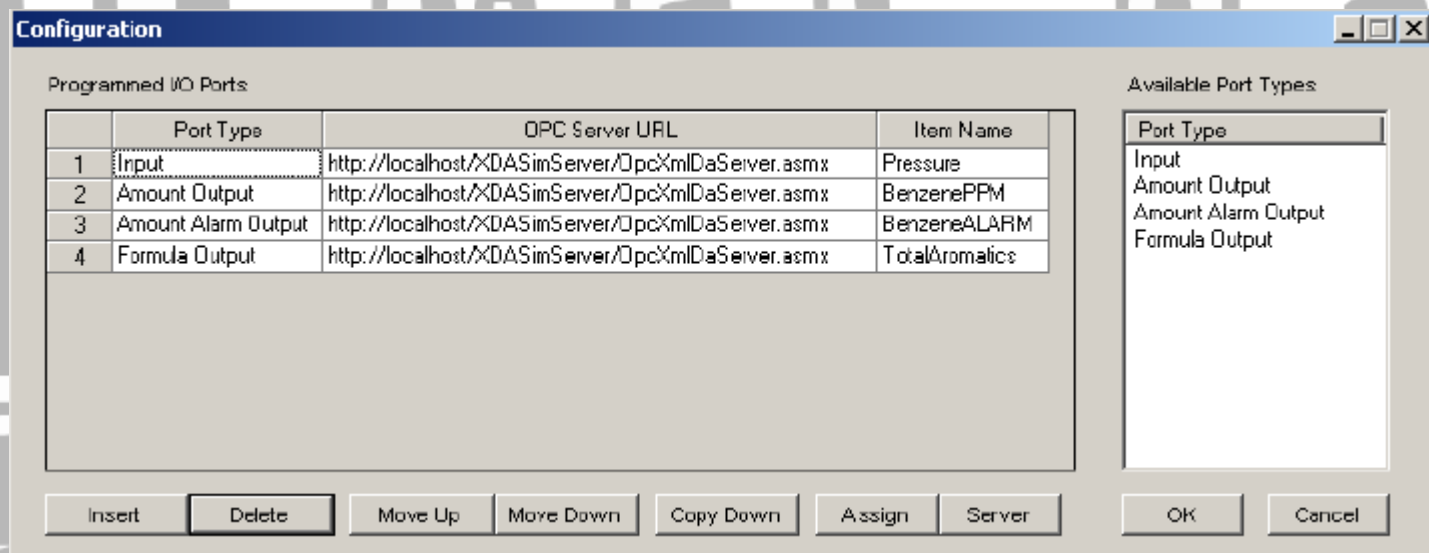
# chromperfect

## Chromperfect Open Platform Communications CPOPC



# chromperfect

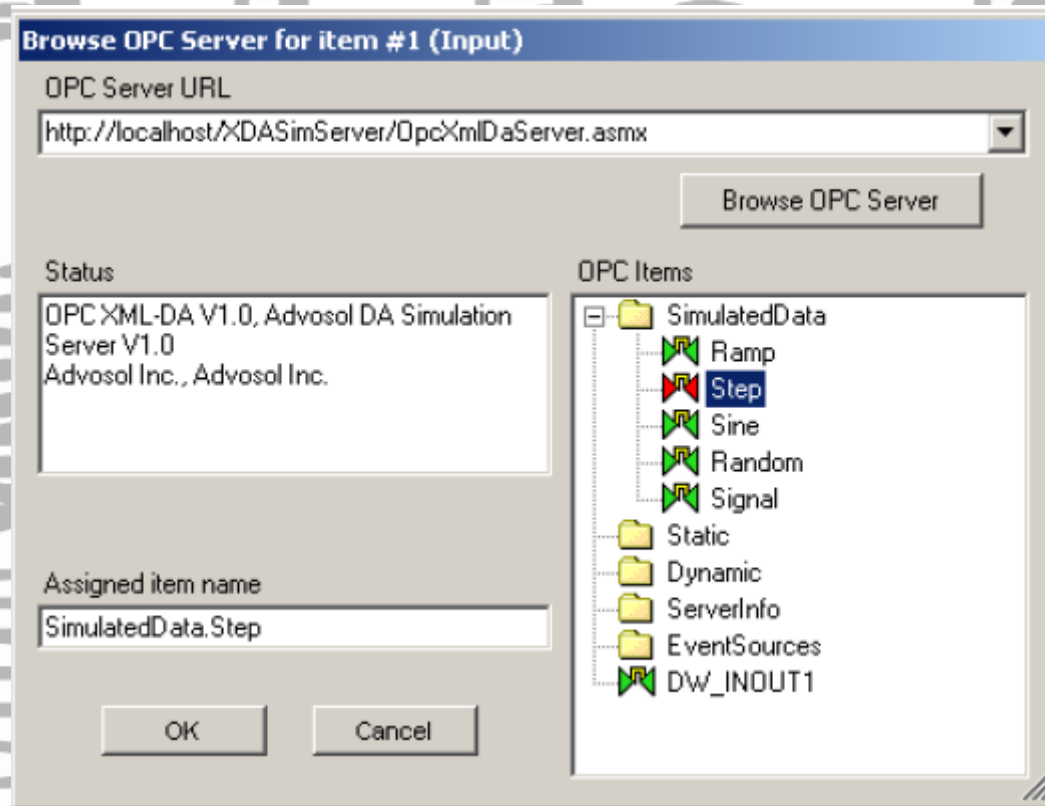
## Chromperfect Open Platform Communications CPOPC



Configure Client

# chromperfect

## Chromperfect Open Platform Communications CPOPC



Browse for OPC Server

# chromperfect

Plant and Laboratory

