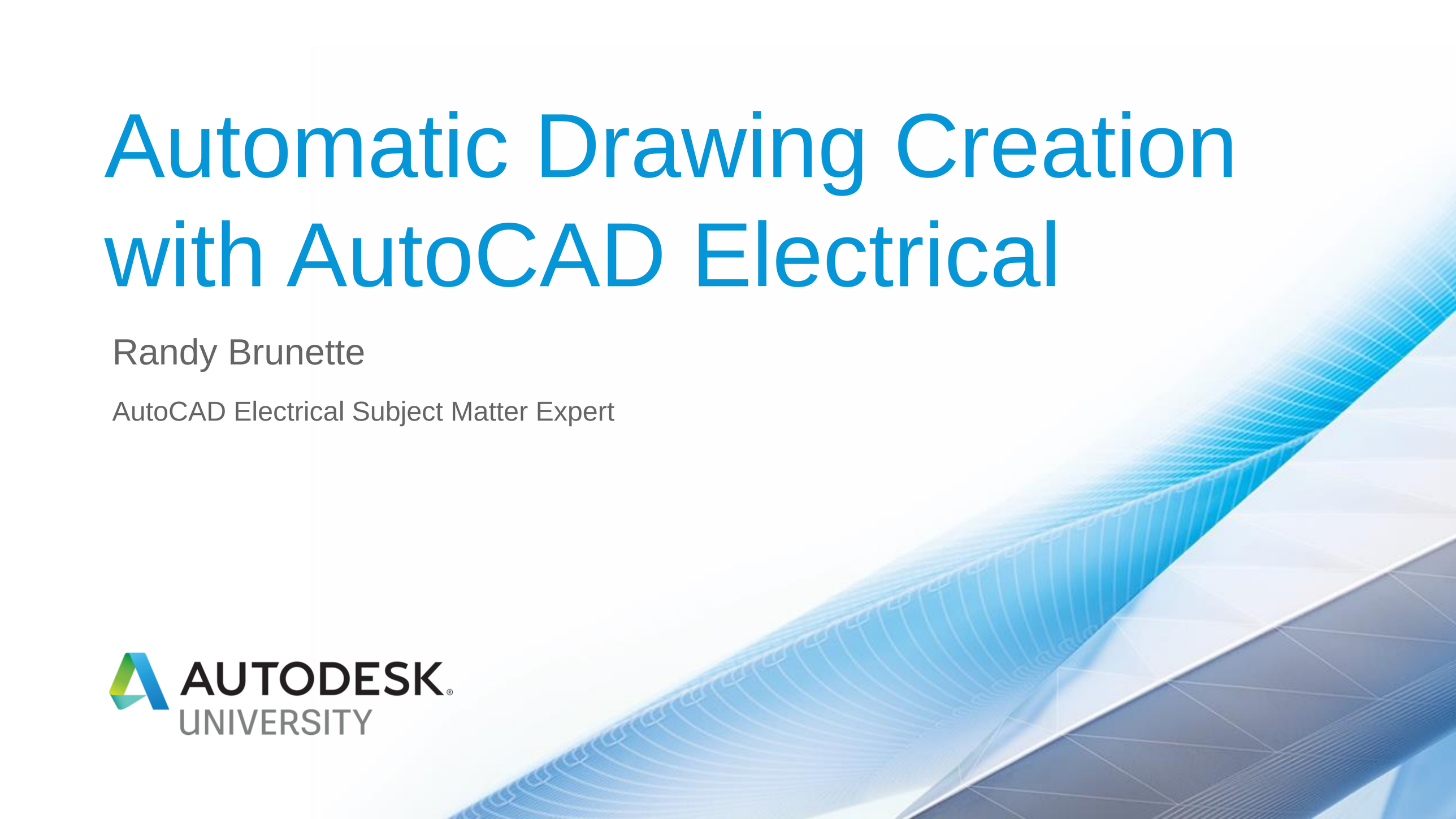
Automatic Drawing Creation with AutoCAD Electrical

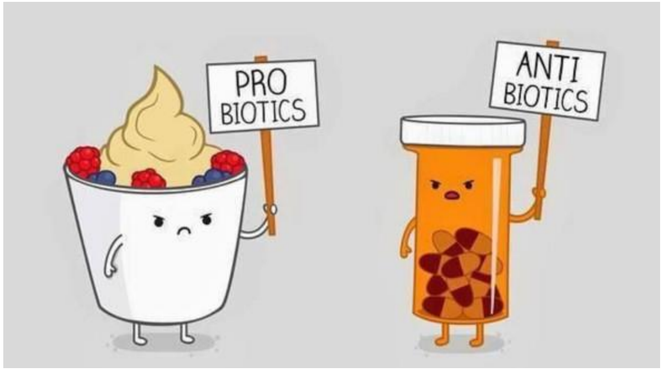
Randy Brunette

AutoCAD Electrical Subject Matter Expert



Agenda

- Introduction
- Review default Spreadsheet to PLC (SS2PLC) Files
  - Mapping and Settings for the SS2PLC
  - Automatically create drawings
- Non-PLC style Drawings set-up
  - Standard ladder style drawings
  - Multi-Line drawings
- SS2PLC does not work for point-to-point style drawings

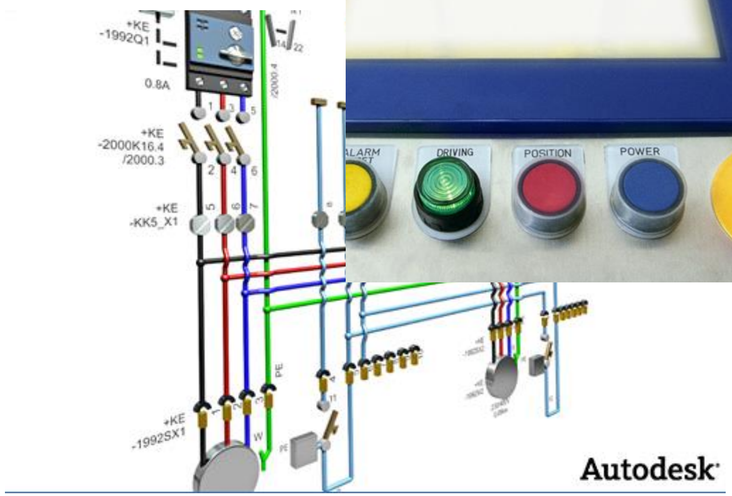


About me (technical)

- 11 years owner of Brunette Technologies, LLC

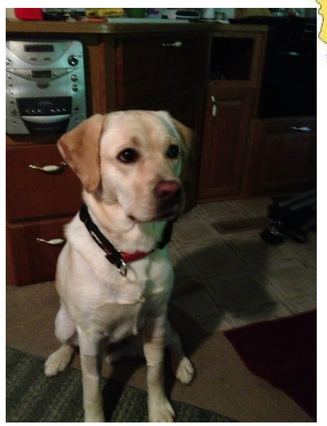
  Now with Spatial Business Systems, Inc.
- 34 years in industry as worker and designer
- AutoCAD since 1984
- AutoCAD Electrical since 1996
- 23 years as Application Engineer
- 12+ years authoring AutoCAD

Electrical materials, including AOTC



About Me… (personal)

- Hometown – Chilton, Wisconsin, USA
- Married, two daughters, two son-in-laws, one grand child, and a dog

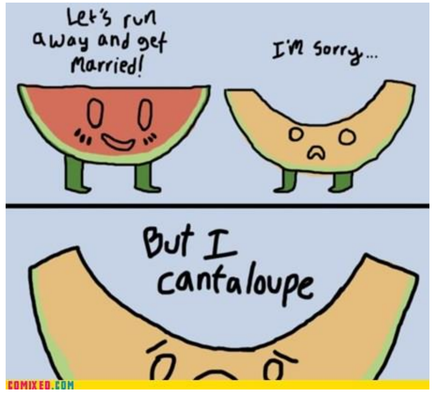


Fly Radio Control Aircraft

First rule of flying:
Takeoffs are optional,
Landings are mandatory.

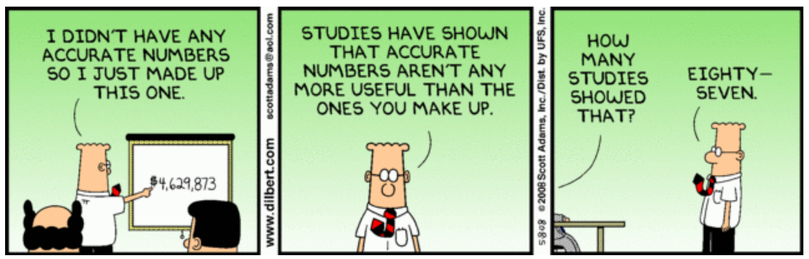
Default Spreadsheet to PLC Files

- The DemoPLC.XLS and DemoPLC_IEC.XLS files are included in standard AcadE installation
- Mapping Files
  - Settings for DemoPLC.XLS are hard coded in WDIO.LSP file, WDI file is optional
  - The WDI file for DemoPLC_IEC.XLS is included in standard AcadE installation
  - All other *PLC.XLS files will need WDI files created for them
- Any Excel file can be used, the WDI will enable mapping to the correct data



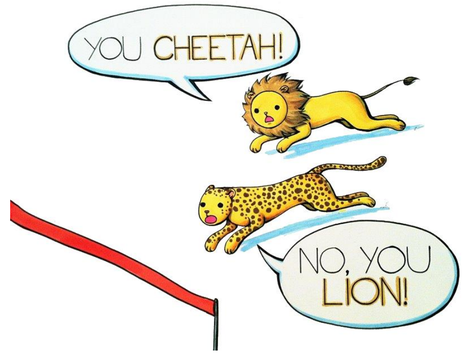
Codes Used in Spreadsheet

- BREAK – Breaks PLC at this rung
- SPACER – Add space between rungs
- SKIP – Skips a ladder before next module
- NEW_DWG – Starts next module on new drawing
- * (Asterisk) – Triggers Insert Circuit in place of Insert Component



67% of all statistics are made up on the spot.

Review of DemoPLC.XLS

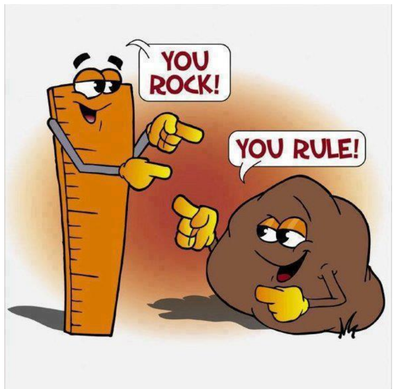


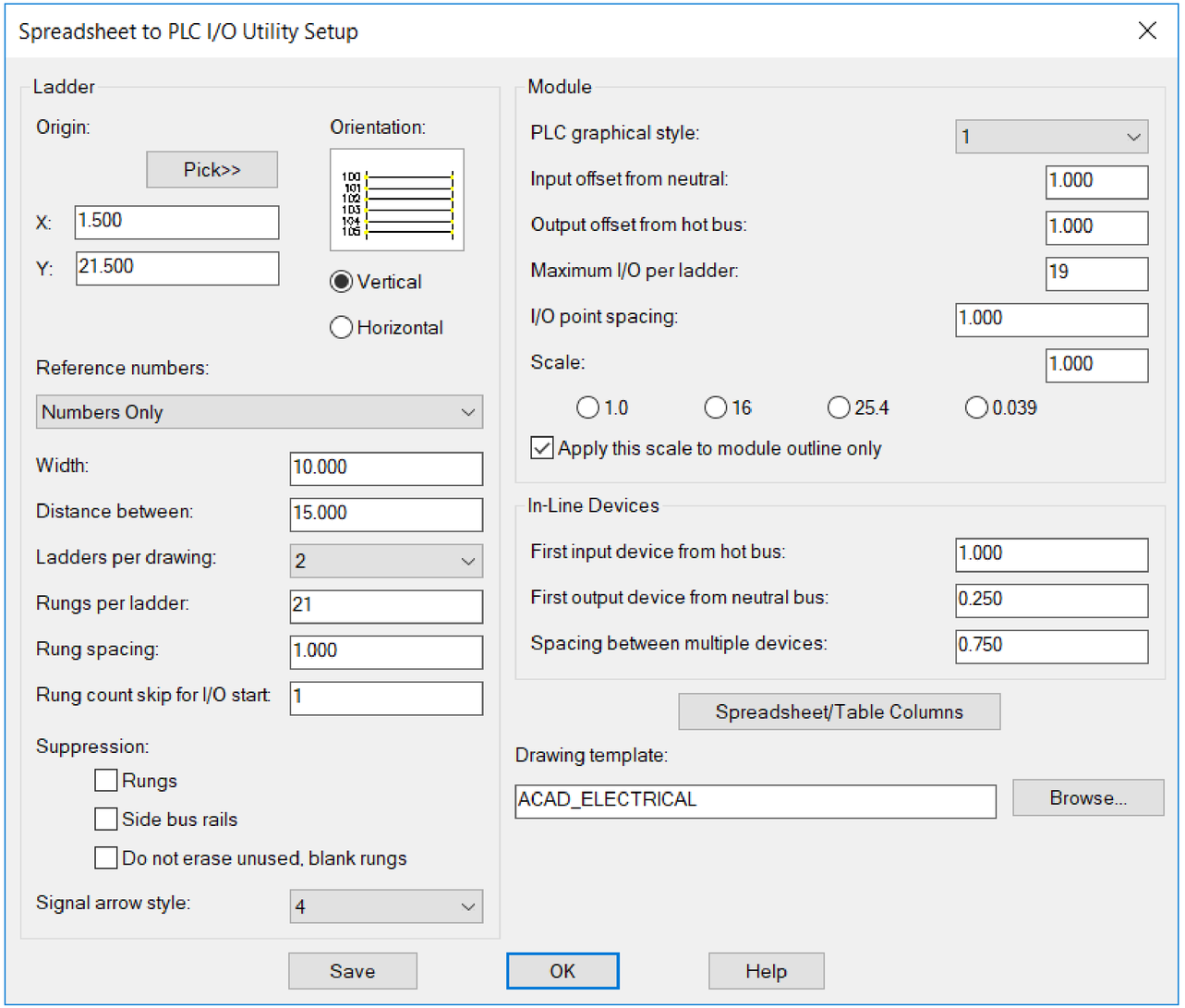
- Working sample to demonstrate functionality
- Creates 3 drawings, all containing PLC modules
- Up to 9 symbols on each rung, (only 6 shown)
- More component columns can be used, (only 4 shown)
  - Installation, Manufacturer, Catalog, and Assembly

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
1	CODE	R1	S2	G3	ADDR	RTP	DESC1	DESC2	DESC3	DESC4	DESC5	VOLTAGE	D1TAG	D1DESC	D1BLK	D1LOC	D2TAG	D2DESC	D2BLK	D2LOC	D3
2	1771-IAD	1	2	0	I:002/00	TB20	BANK #1 FIBER	WASTE REMOVAL BLOWER	START HS100BR	REMOTE		120VAC INPUTS	TB1		HT0001	JBOX1	HS100BR	CYCLE|START	HPB11	FIELD	TB
3					I:002/01		BANK #1 FIBER	WASTE REMOVAL BLOWER	STOP HS100BS				TB1		HT0001	JBOX1	HS100BS	STOP	HPB11	FIELD	TB
4					I:002/02		BANK #2 FIBER	WASTE REMOVAL BLOWER	START HS1001BR	REMOTE			TB1		HT0001	JBOX1	HS1001BR	START	HPB11	FIELD	TB
5					I:002/03		BANK #2 FIBER	WASTE REMOVAL BLOWER	STOP HS1001BS				TB1		HT0001	JBOX1	HS1001BS	STOP	HTS11	FIELD	TB
6					I:002/04		TUB OUTLET TEMPERATURE	NOT LOW(ALARM)					TB1		HT0001	JBOX1	D568TS	TUB OUTLET|TEMP	HTS12	FIELD	TB
7					I:002/05		TUB INLET TO HEATER FLOW	NOT LOW (TRIP)					TB1		HT0001	JBOX1	D2150FS	TUB INLET	HFS11	FIELD	TB
8					I:002/06		SPARE														
9					I:002/07		COMBUSTION BLOWER	RUNNING					TB1		HT0001	JBOX1	MS101		HMS21	MCC	TB
10					I:002/10		INSTRUMENT AIR PRESSURE	NOT LOW (IPS)					TB1		HT0001	JBOX1	D006PS	AIR PRESS OKAY	HPS11	CAB5	TB
11					SPACER												D007PS	ALT AIR OKAY	HPS11	FIELD	
12					I:002/11		AIR DAMPER	AT HIGH FIRE (>80%)(PFS)					TB1		HT0001	JBOX1	D003WS2	HIGH FIRE	HLS11	FIELD	TB
13					I:002/12		AIR DAMPER	AT LOW FIRE (<20%)(LFS)					TB1		HT0001	JBOX1	D003WS1	LOW FIRE	HLS11	FIELD	TB
14					I:002/13		PURGE AIR FLOW	NOT LOW (PAS)					TB1		HT0001	JBOX1	D581FS	PURGE OKAY	HFS11	CAB5	TB
15					I:002/14		COMBUSTION AIR PRESSURE	NOT LOW (AS)					TB1		HT0001	JBOX1	D582PS	COMB AIR|OKAY	HPS11	FIELD	TB
16					I:002/15		SPARE														
17					I:002/16		STACK TEMPERATURE	NOT HIGH					TB1		HT0001	JBOX1	D004TS	STACK TEMP	HTS12	FIELD	TB
18					SPACER																
19					I:002/17		STEAM PRESSURE	NOT LOW (>20PSIG)					TB1		HT0001	JBOX1		STEAM PRESS	HPS12	FIELD	TB
20																					
21	1771-IAD	1	2	1	I:003/00	TB21	FLAME DETECTED NO.1					120VAC INPUTS	TB1		HT0001	JBOX1	D576WT1	FLAME No. 1	HTS11	FIELD	
22					I:003/01		FLAME DETECTED NO.2						TB1		HT0001	JBOX1	D576WT2	FLAME No. 2	HTS11	FIELD	

Review of WDI Settings…

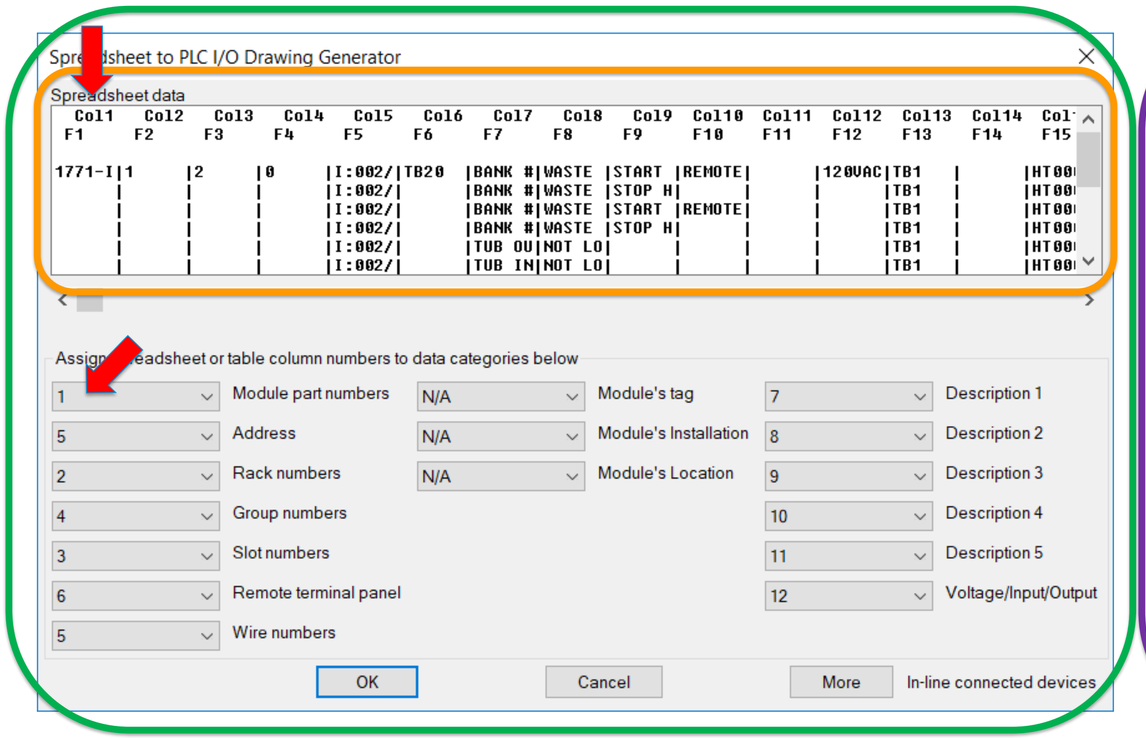
- Spreadsheet defines data
- WDI define graphics and locations
  - Ladder dimensions
  - Rung spacing
  - Component locations

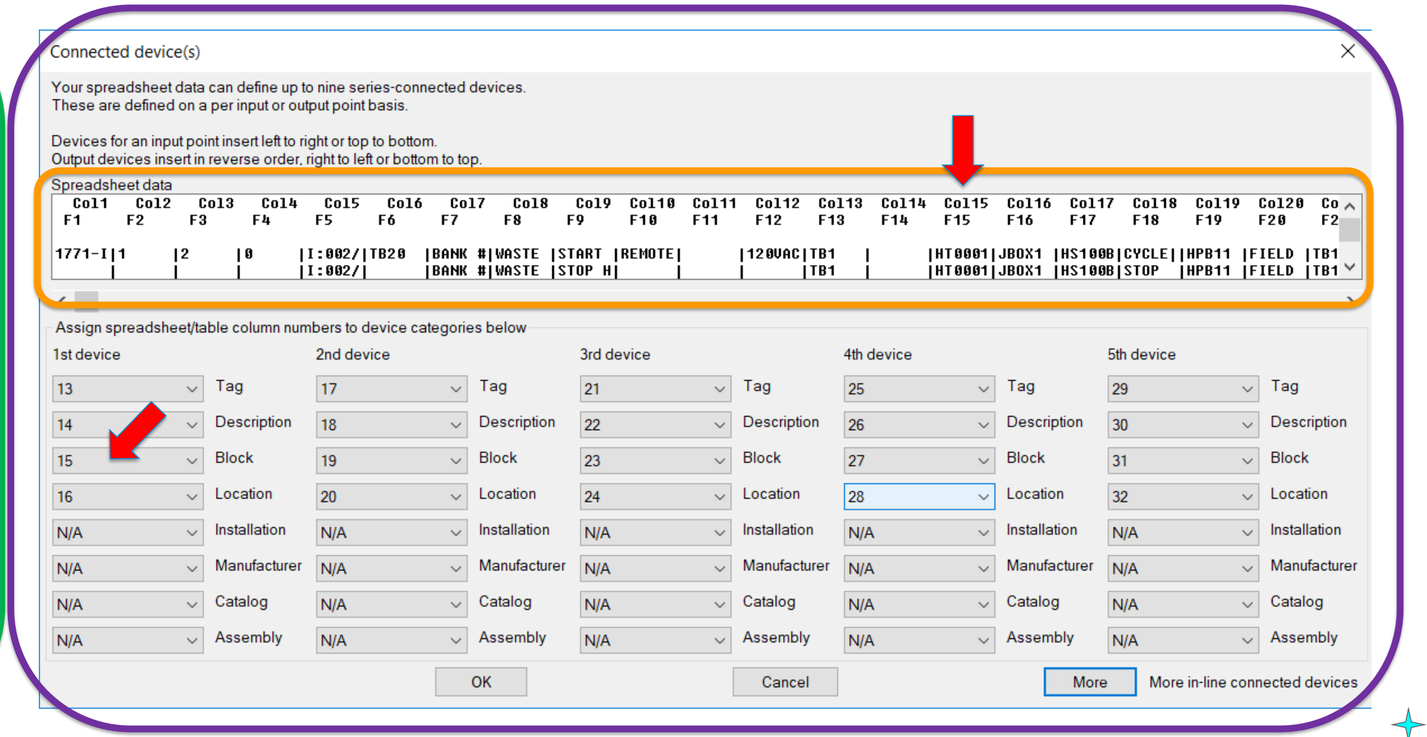




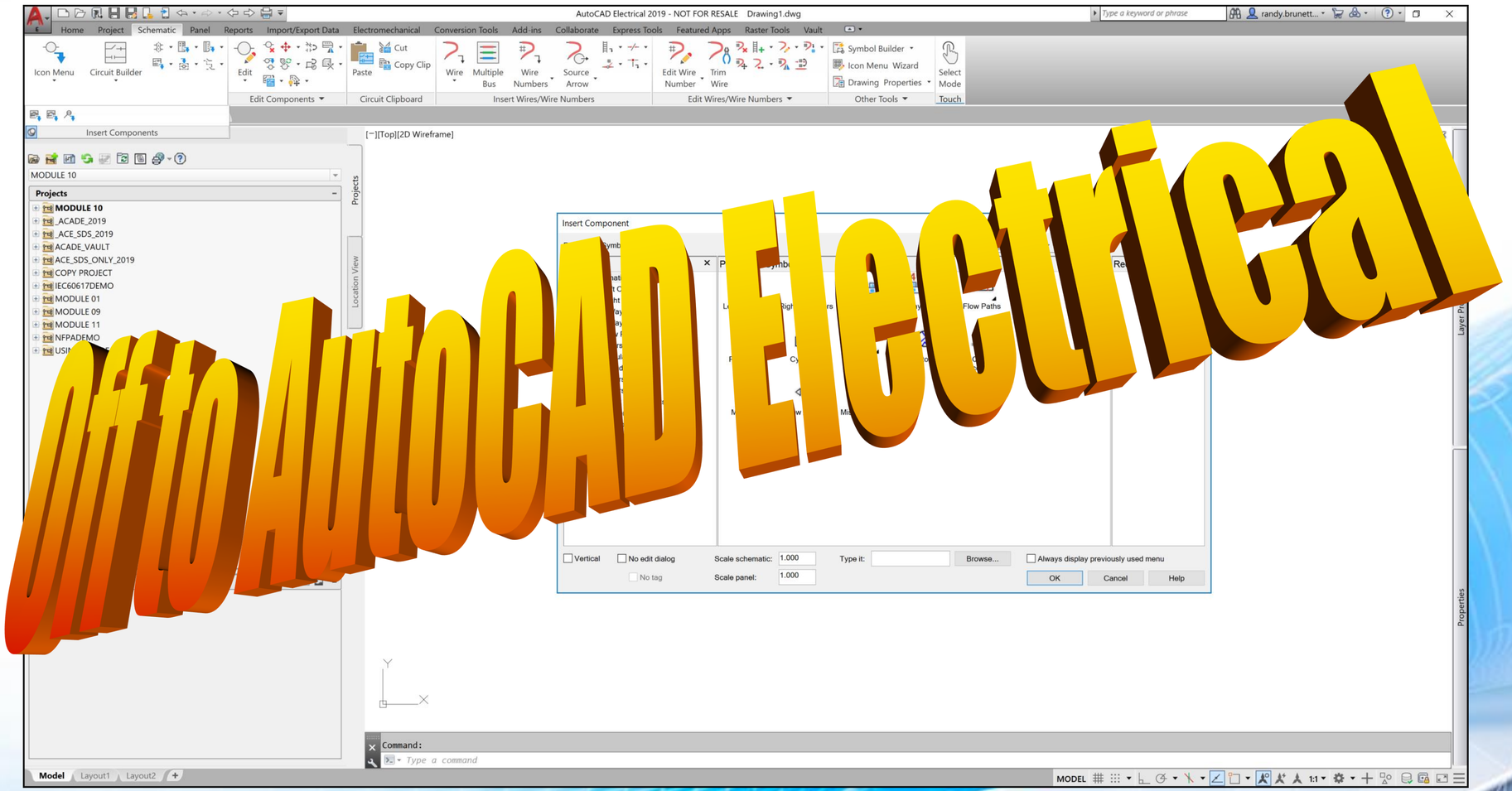
Mapping Spreadsheet/Table Columns…

- Virtual view of selected spreadsheet
- First page is PLC data
- Addition pages are in-line connected devices
- Select column of data to match to AcadE





Auto-create Drawings and Compare to Settings



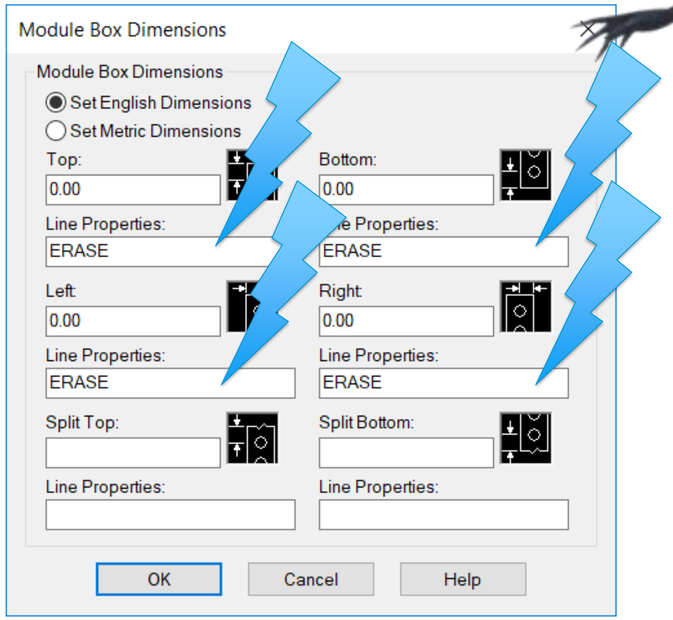
First Rule of the Spreadsheet to PLC Tool

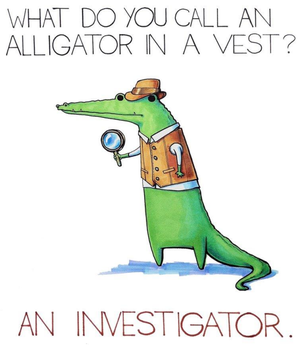
- To create non-PLC drawings, we need to bend the rule…
- Or implement outright skullduggery…
- Is a PLC *really* required? (Yes)
- What happens when a PLC is inserted?
  - Component (PLC) is inserted
  - Wires are trimmed
- Do these things have to happen?
  - What is needed to insert a PLC??
  - What does a PLC look like?
  - Does it have to look this way?

PLC Module is required for creation of ladder

Defining a Phantom PLC

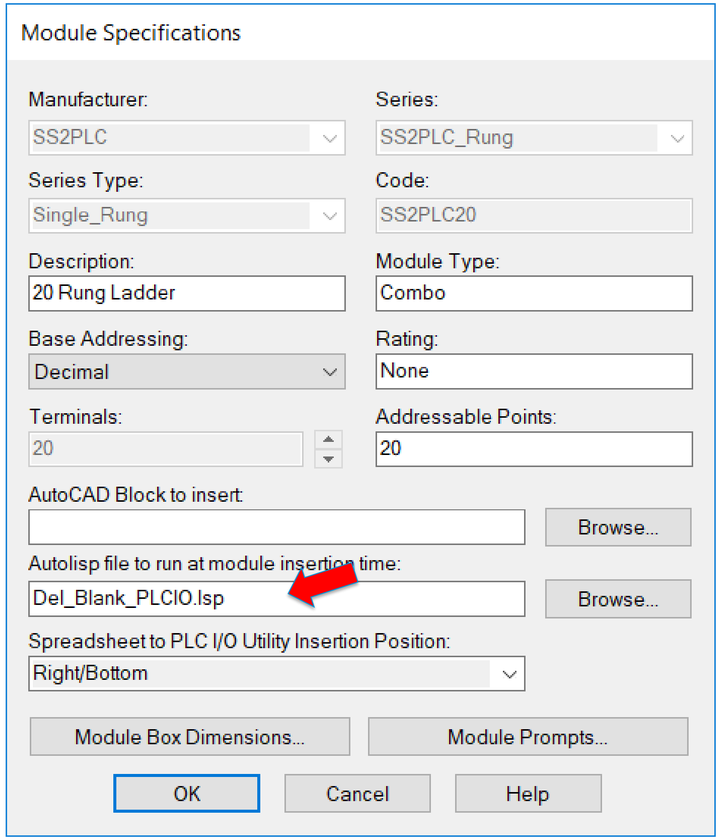
- A PLC that's there, but not there
- Phantom I/O point
  - Only three attributes, all invisible
    - TAGX_ – address tag
    - X?Term?? – wire connection
    - DELETE_ME – flag for later deletion
- Define a PLC using Phantom I/O points
- Remove boundary of PLC
  - Erase in Module Box Dimensions





First you see, then you don't…

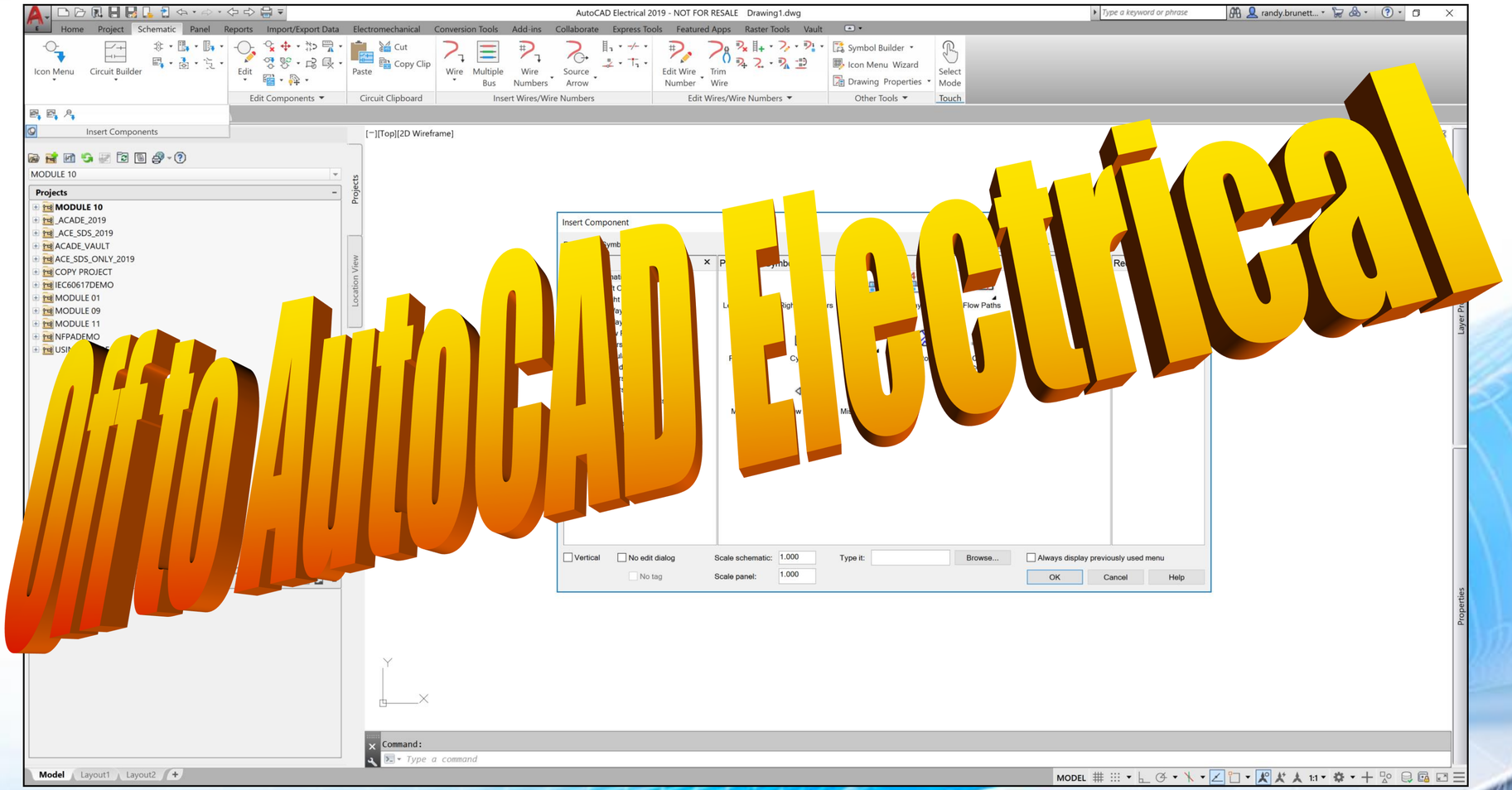
- Delete unneeded PLC
  - Del_Blank_PLCIO.lsp



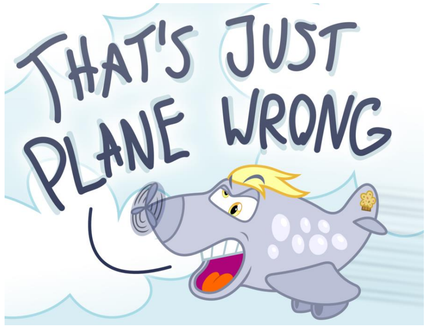
All that is left is an empty ladder,

it's … auto-magical

Create Phantom PLC Module and Auto-create Single Phase Ladder Drawings



Two-line, Three-line, or Mour-line



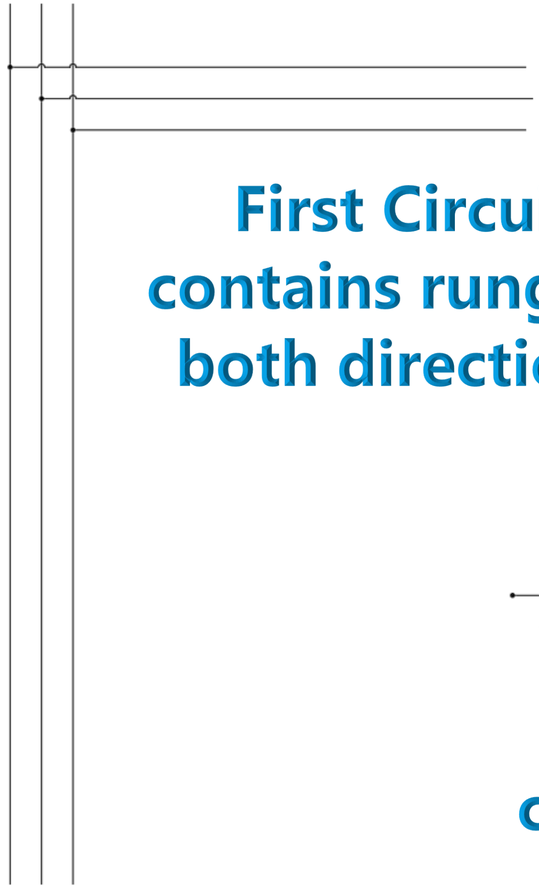
- More chicanery is required for multi-line schematics…

Challenge #1

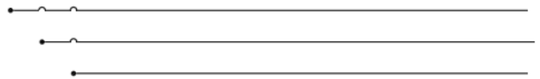
- The spreadsheet tool was designed for single-phase ladders, so all X-phase wires attach to one bus wire

Solution:

- Circuits are inserted containing X-phase wires



First Circuit contains rungs in both directions



2nd+ Circuits contains rungs in single direction

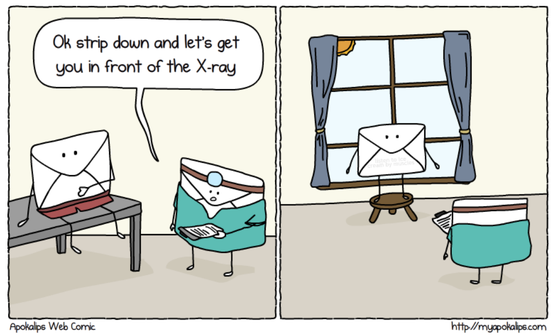
Two-line, Three-line, or Mour-line *(cont.)*

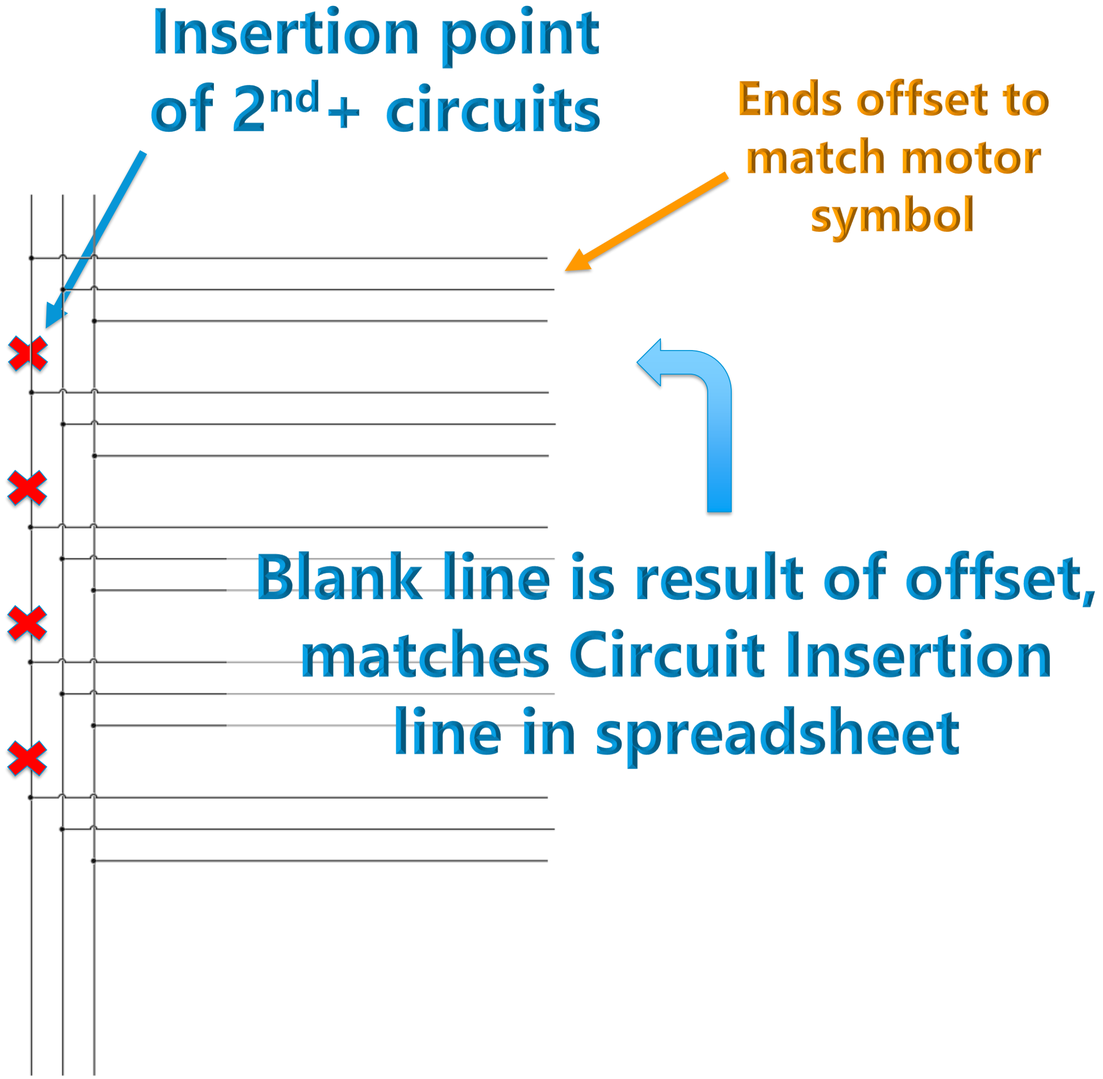
Challenge #2

- Wires must exist before components can be inserted

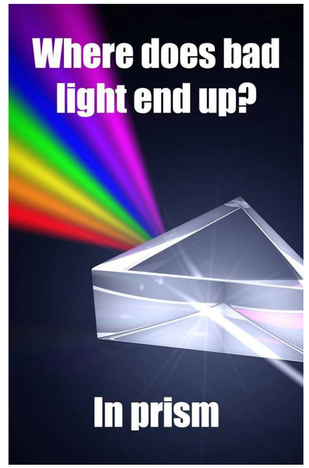
Solution:

- Offset insertion point of circuits
- Draw back is that a single blank line is required between X-phase busses
- Notice the offset end points





Two-line, Three-line, or Mour-line *(cont.)*

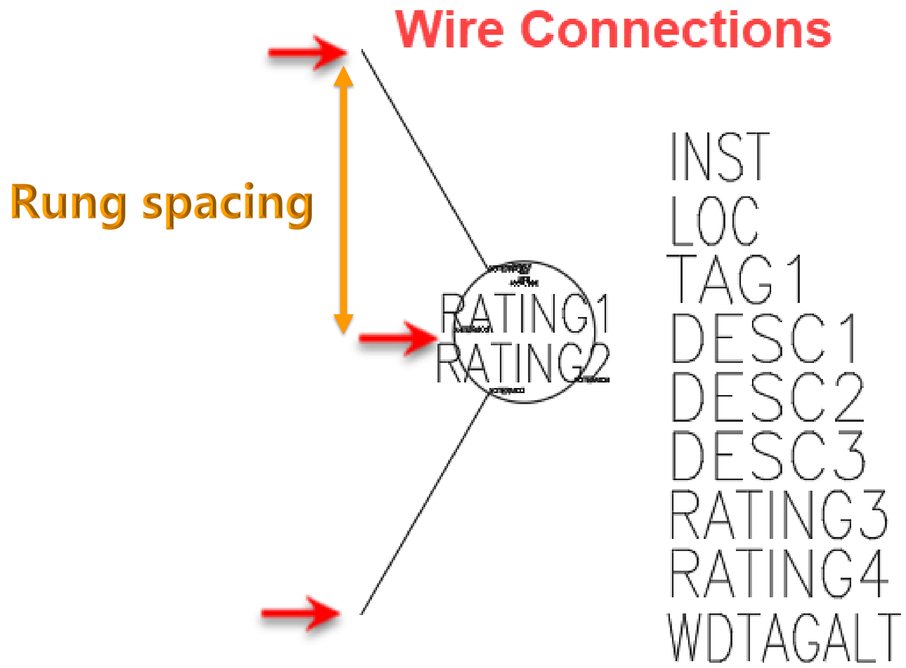


Challenge #3

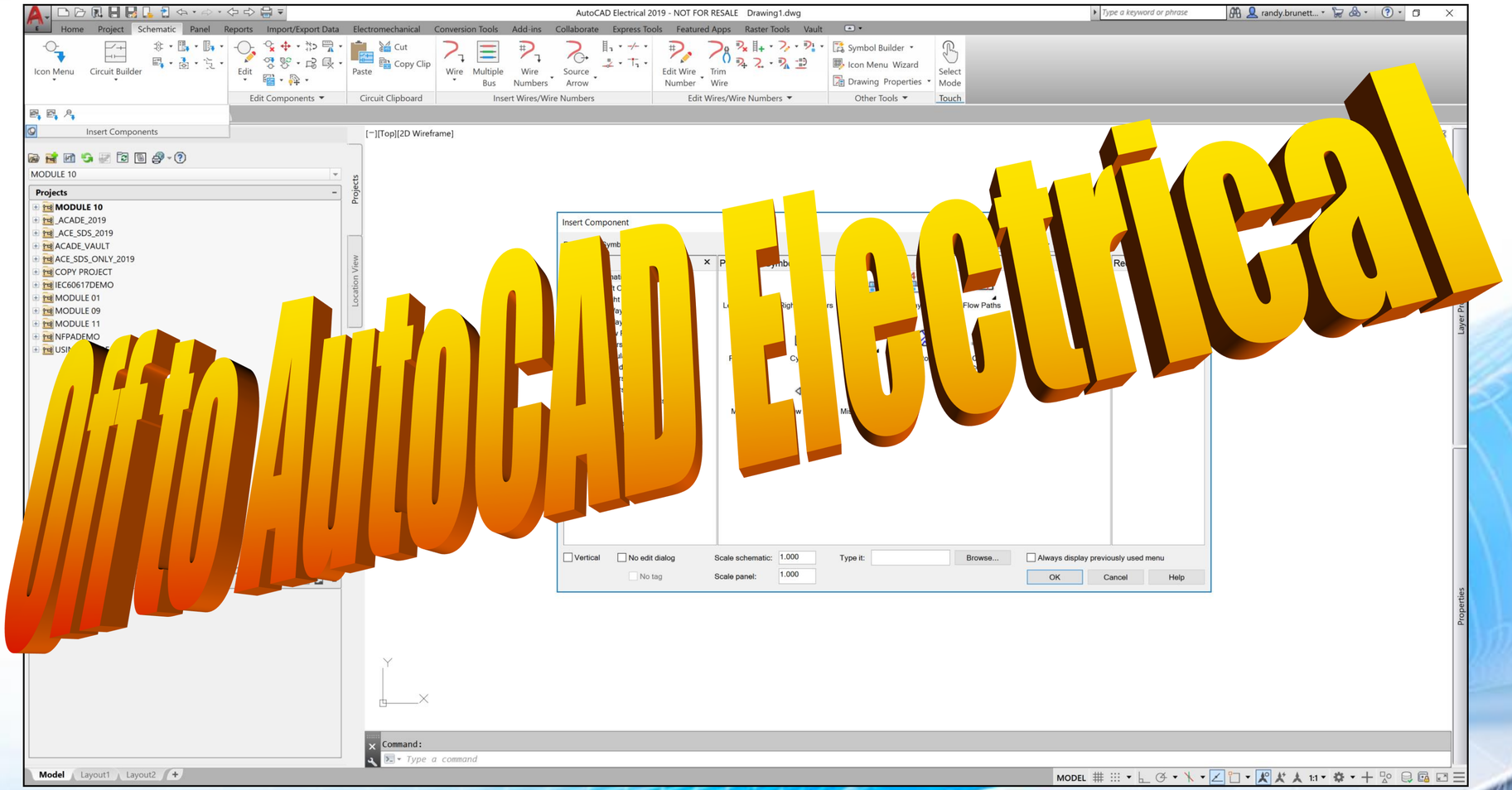
- Standard 3PH motor symbol with radial attributes doesn't work in PLC spreadsheet.

Solution:

- Create custom motor symbols that include wires for each rung spacing used.
- End points of rungs in previous step must match wire connection point offsets.



Auto-create Multiple Phase Ladder Drawings



Summary

Today we…

- Reviewed and edited the Spreadsheet to PLC (SS2PLC) Excel file
- Created mappings and settings for the SS2PLC
- Automatically created drawings
- Reviewed shenanigan’s needed to create non-PLC ladder style drawings
- Reviewed the subterfuge needed to create 3-Line drawings

Any questions?

Please, please, please
fill out class evaluations.

Remember,
the correct
answer is...

Randy Brunette IM226475

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