



CAD-FlowManager

Dirk Müller, Tomasz Górecki

Customer Situation

- Users want to attach eCAD tools to PLM / ERP
- EDA tool licenses and training are required for data-admin to manage component meta data
- Component Information Management
 - Different alternate manufacturing parts for same component
 - Different BOM strategies (scrubbing)
 - Where is? / Where used?
 - Corporate wide working model for multiple locations

Reduce Cost by Managed Library Quality

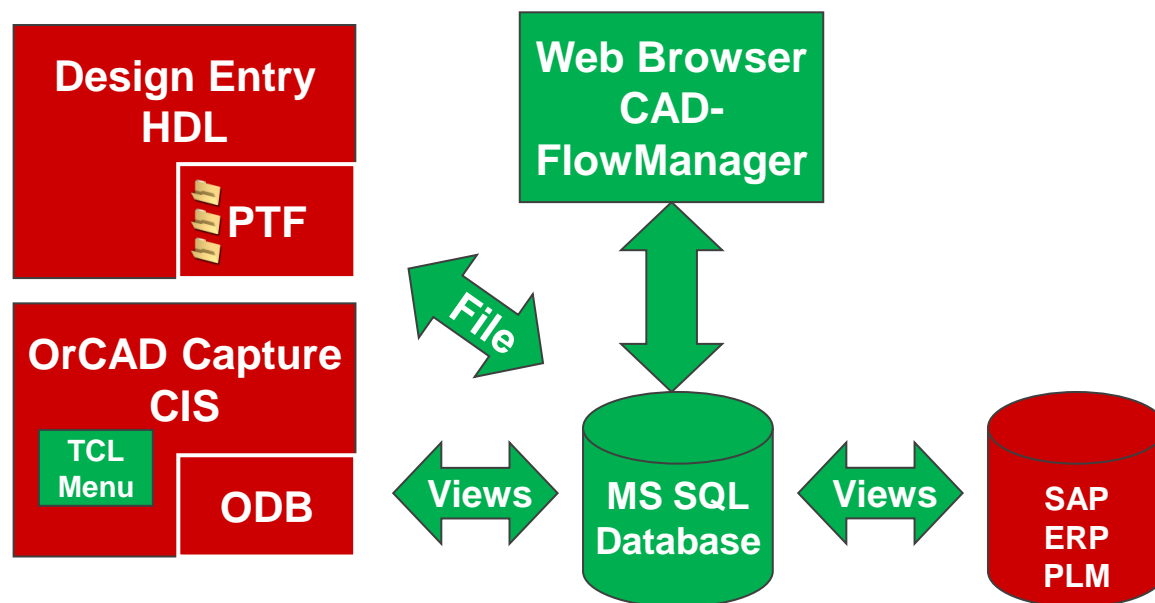
- Minimizing the number of parts used over all designs
 - Avoid double entries with similar parts
- Limiting the part use
 - Re-use already existing parts
 - Reduce library size
- Processes provide data quality
 - Flow to request a new part
 - Users need to approve a new part
 - EOL and PCN flows
- **Maintaining one library part costs \$500 – \$15.000**

FlowCAD Solutions

- OrCAD Capture CIS
- „Small/Medium“ eCAD Groups (5-35)
 - CAD-FlowManager
- Enterprise Integration
 - DEHDL Enovia PLM Connector
 - DEHDL SAP Connector
 - Allegro Design Workbench

CAD-FlowManager Solution

- Manage CAD data for small and medium size companies
- Reduce cost by manage library data quality
- Configurable flow for company's Design & Part processes
- Optimize BOM with different purchasing strategies
- Single source of data in a "corporate cloud"



User Interface

- Web based
 - No Client installation
 - Available in intranet
 - User access permission
 - Dynamic views
 - Technology used:
 - .net on server, C#
 - HTML5, CSS, Javascript, AJAX
 - Corporate cloud

The screenshot shows the 'Part Manager' tab in FlowCAD. On the left, a 'Parts category tree' lists categories like Capacitor, Resistor, ResistorArray, Inductor, Semiconductor, and ICAnalog. The 'Resistor' category is selected, showing a count of 426. On the right, a 'List of "Resistor" parts' table is displayed with columns for Part number and Part type.

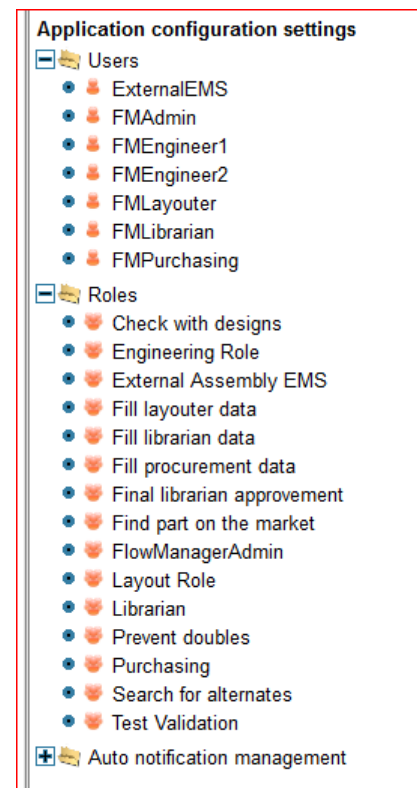
Part number	Part type
FC-RES-0001	Poti
FC-RES-0002	Thick Film 1206
FC-RES-0003	Thick Film 0805
FC-RES-0005	Thick Film 0603
FC-RES-0006	Thick Film 0603
FC-RES-0007	Thick Film 0603
FC-RES-0008	Thick Film 0603
FC-RES-0009	Thick Film 0603
FC-RES-0010	Thick Film 0603
FC-RES-0011	Thick Film 0603
FC-RES-0012	Thick Film 0603

The screenshot shows a detailed view of the resistor parts list. The table includes columns for Part number, Part type, Revision, Set type, Stocking level, Value [Ω], Tolerance [%], Rating [V], Description, and Schematic Part. The list contains 24 rows of data for various resistor types and values.

Part number	Part type	Revision	Set type	Stocking level	Value [Ω]	Tolerance [%]	Rating [V]	Description	Schematic Part
FC-RES-0001	Poti	Rev001	PART	1	220Ω	10%	0.25W	Poti 220Ω 22k 10% 0.25W SMD	K_possawRES_POTI_RK_possawRES_POTI_RK
FC-RES-0002	Thick Film 1206	Rev001	PART	1	1.2kΩ	1%	0.25W	Thick Film Resistor 1.2k 1% 0.25W 1206 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0003	Thick Film 0805	Rev001	PART	1	50Ω	1%	0.125W	Thick Film Resistor 50 1% 0.125W 0805 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0005	Thick Film 0603	Rev001	PART	1	10Ω	1%	0.063W	Thick Film Resistor 10 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0006	Thick Film 0603	Rev001	PART	1	1.1kΩ	1%	0.063W	Thick Film Resistor 1.1k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0007	Thick Film 0603	Rev001	PART	1	1.2kΩ	1%	0.063W	Thick Film Resistor 1.2k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0008	Thick Film 0603	Rev001	PART	1	1.1kΩ	1%	0.063W	Thick Film Resistor 1.1k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0009	Thick Film 0603	Rev001	PART	1	1.6kΩ	1%	0.063W	Thick Film Resistor 1.6k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0010	Thick Film 0603	Rev001	PART	1	1.8kΩ	1%	0.063W	Thick Film Resistor 1.8k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0011	Thick Film 0603	Rev001	PART	1	20Ω	1%	0.063W	Thick Film Resistor 20 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0012	Thick Film 0603	Rev001	PART	1	2.2kΩ	1%	0.063W	Thick Film Resistor 2.2k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0013	Thick Film 0603	Rev001	PART	1	2.4kΩ	1%	0.063W	Thick Film Resistor 2.4k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0014	Thick Film 0603	Rev001	PART	1	2.7kΩ	1%	0.063W	Thick Film Resistor 2.7k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0015	Thick Film 0603	Rev001	PART	1	3kΩ	1%	0.063W	Thick Film Resistor 3k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0016	Thick Film 0603	Rev001	PART	1	3.3kΩ	1%	0.063W	Thick Film Resistor 3.3k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0017	Thick Film 0603	Rev001	PART	1	3.6kΩ	1%	0.063W	Thick Film Resistor 3.6k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0018	Thick Film 0603	Rev001	PART	1	3.9kΩ	1%	0.063W	Thick Film Resistor 3.9k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0019	Thick Film 0603	Rev001	PART	1	4.3kΩ	1%	0.063W	Thick Film Resistor 4.3k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0020	Thick Film 0603	Rev001	PART	1	4.7kΩ	1%	0.063W	Thick Film Resistor 4.7k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0021	Thick Film 0603	Rev001	PART	1	5.1kΩ	1%	0.063W	Thick Film Resistor 5.1k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0022	Thick Film 0603	Rev001	PART	1	5.6kΩ	1%	0.063W	Thick Film Resistor 5.6k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0023	Thick Film 0603	Rev001	PART	1	6.2kΩ	1%	0.063W	Thick Film Resistor 6.2k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0024	Thick Film 0603	Rev001	PART	1	6.8kΩ	1%	0.063W	Thick Film Resistor 6.8k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0025	Thick Film 0603	Rev001	PART	1	7.5kΩ	1%	0.063W	Thick Film Resistor 7.5k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0026	Thick Film 0603	Rev001	PART	1	8.2kΩ	1%	0.063W	Thick Film Resistor 8.2k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0027	Thick Film 0603	Rev001	PART	1	9.1kΩ	1%	0.063W	Thick Film Resistor 9.1k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0028	Thick Film 0603	Rev001	PART	1	10kΩ	1%	0.063W	Thick Film Resistor 10k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0029	Thick Film 0603	Rev001	PART	1	11kΩ	1%	0.063W	Thick Film Resistor 11k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0030	Thick Film 0603	Rev001	PART	1	12kΩ	1%	0.063W	Thick Film Resistor 12k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0031	Thick Film 0603	Rev001	PART	1	15kΩ	1%	0.063W	Thick Film Resistor 15k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0032	Thick Film 0603	Rev001	PART	1	16kΩ	1%	0.063W	Thick Film Resistor 16k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0033	Thick Film 0603	Rev001	PART	1	18kΩ	1%	0.063W	Thick Film Resistor 18k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES
FC-RES-0034	Thick Film 0603	Rev001	PART	1	18kΩ	1%	0.063W	Thick Film Resistor 18k 1% 0.063W 0603 SMD	K_possawRES_VK_possawRES_VK_possawRES

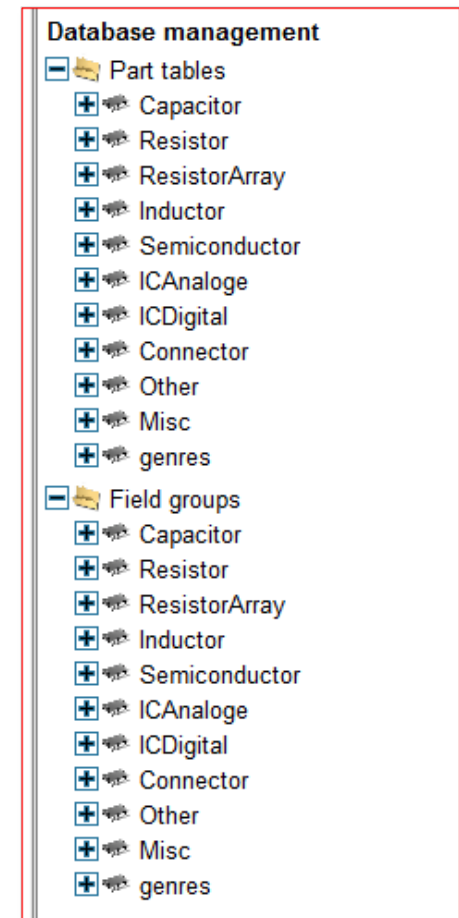
Supervisor

- Definition of roles
 - Manage user rights
 - Assign tasks to user groups
- User setting
 - Email setting for notifications
 - Mapping to roles
- Auto notification management
 - General settings for emails
 - Windows email service



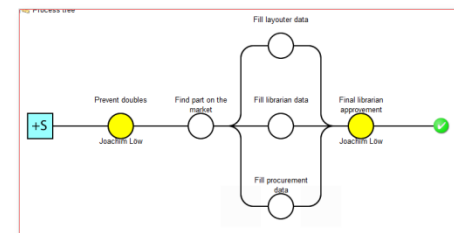
Database Manager

- Configure library structure
 - Synchronized with eCAD library
 - (i.e. Key property)
 - Additional fields from PLM/ERP
 - (i.e. UL, EOL dates)
 - Configuration for each component category
- Configuration made once
 - Administrator can edit / update



Part Manager

- Show all data in one table
 - Categories like database
 - eCAD and PLM/ERP data
 - Smart filtering
 - Generic parts
 - Sets of parts
- Work Flows
 - New Part request
 - EOL (last buy, last ship)
 - PCN (new revision)



Parts category tree

[-] Capacitor	130
• ELEC	7
• ELEC_SMD	4
• FILM	6
• NPO	4
• TAJ	19
• X5R	8
• X7R	81
• Y5V	1
[+] Resistor	426
[+] ResistorArray	62
[+] Inductor	27
[+] Semiconductor	22
[+] ICAanaloge	14
[+] ICDigital	100
[+] Connector	6
• Other	0
[+] Misc	7
[+] genres	51

Generic Parts

- For Capacitors, Resistors, (Inductors, Diodes)
- When certain parameters are equal [i.e. 2Ω, 5%, 0603, (Volt)] are identical generic parts are created
- Which manufacturing part will be assembled is decided by purchasing department or EMS

List of "genericresistors" parts

Part number	Part type	Set type	Value [Ω]	Tolerance [%]	Jedec_Type
GEN_RES_8943	Poti	GEN	22kΩ	10%	res_3269w
GEN_RES_8944	Thick Film 1206	GEN	1.2kΩ	1%	res_1206
GEN_RES_8945	Thick Film 0805	GEN	51Ω	1%	res_0805
GEN_RES_8946	Thick Film 0603	GEN	1Ω	1%	res_0603
GEN_RES_8947	Thick Film 0603	GEN	1.1Ω	1%	res_0603
GEN_RES_8948	Thick Film 0603	GEN	1.2Ω	1%	res_0603
GEN_RES_8951	Thick Film 0603	GEN	1.6Ω	1%	res_0603
GEN_RES_8952	Thick Film 0603	GEN	1.8Ω	1%	res_0603
GEN_RES_8953	Thick Film 0603	GEN	2Ω	1%	res_0603
GEN_RES_8958	Thick Film 0603	GEN	3.3Ω	1%	res_0603
GEN_RES_8959	Thick Film 0603	GEN	3.6Ω	1%	res_0603
GEN_RES_8960	Thick Film 0603	GEN	3.9Ω	1%	res_0603
12 records total					

Sets of Parts

- For one component only a selection of different manufacturer parts is allowed:
 - i.e. 1N4001 only from ON, STM, NXP (but no other)
 - EMS can pick from „approved“ manufacturer parts
 - Set can be assigned per RefDes

Part number	Part type	Value [F]	Tolerance [%]	Vol [V]	Description	Jedec_Type	Height [m]	EMBEDDED_PLACEMENT
SET-PN-Cap-8925	X7R	100nF	10%	16V	X7R Ceramk Capacitor 100n 10% 16V 0402 SMD	cap_0402	0.5mm	Optional
SET-PN-Cap-8927	X7R	100nF	10%	16V	X7R Ceramk Capacitor 100n 10% 16V 0402 SMD	cap_0402	0.5mm	Optional
SET-PN-Cap-8928	X7R	100nF	10%	16V	X7R Ceramk Capacitor 100n 10% 16V 0402 SMD	cap_0402	0.5mm	Optional
SET-PN-Cap-8929	X7R	100nF	10%	16V	X7R Ceramk Capacitor 100n 10% 16V 0402 SMD	cap_0402	0.5mm	Optional
SET-PN-Cap-8938	FILM	470nF	10%	40V		cap_th_s_rm5_08x7_5x3_2x8_0	8mm	External_only
SET-PN-Cap-8940	FILM	220nF	10%	40V	tg	cap_th_s_rm5_08x7_5x2_5x6_5	6.5mm	External_only
SET-PN-Cap-8942	FILM	220nF	10%	40V	tg001	cap_th_s_rm5_08x7_5x2_5x6_5	6.5mm	External_only

7 records total

CIS/HDL Integrated Part Selection

SETs and GENeric parts are available in part browser when a design is checked out.

The screenshot displays the FlowCAD interface with the CIS Explorer on the left and a table of part data in the center. A red box highlights a table with the following columns: Table, Alternate_P, PART_NUM, Datasheet, Manufacturer, and Manufacturer. A red arrow points from this table to a larger table below. The larger table has the following columns: Table, PART_NUM_REF, PART_TYPE, REVISION, SET_TYPE, REV_LEVEL, Value, Tolerance, Vol, Impedance, Description, Schematic_Part, PCB Footprint, Height, ALT_SYMB_OLS, Datasheet, and Manufacturer. The first row of the larger table is highlighted in green, with 'Capacitor' in the Table column and 'SET' in the SET_TYPE column.

Table	Alternate_P	PART_NUM	Datasheet	Manufacturer	Manufacturer	
1	AltSets	PN-CAP-714	SET-PN-CAP	tdk_caps.pdf	TDK Corpora	C1005X7R1C
2	AltSets	PN-CAP-715	SET-PN-CAP	taivo_yuden	Taiyo-Yuden	EMK105B710
3	AltSets	PN-CAP-715	SET-PN-CAP	UPY-GPHC	Yageo	CC0402KRX
4	AltSets	PN-CAP-715	SET-PN-CAP	epcos_caps	Epcos	B37921C910
5	AltSets	PN-CAP-715	SET-PN-CAP	murata_caps	muRata	GCM155R71
6	AltSets	PN-CAP-715	SET-PN-CAP	Cap_panaso	Panasonic	ECJ0EB1C10

Table	PART_NUM_REF	PART_TYPE	REVISION	SET_TYPE	REV_LEVEL	Value	Tolerance	Vol	Impedance	Description	Schematic_Part	PCB Footprint	Height	ALT_SYMB_OLS	Datasheet	Manufacturer
1	Capacitor	SET-PN-CAP	X7R	Rev0001	SET	1	100nF	10%	16V	X7R Ceramic	fc_passiv	cap_0402	0.5mm			
2	Capacitor	SET-PN-CAP	X7R	Rev0001	SET	1	100nF	10%	16V	X7R Ceramic	fc_passiv	cap_0402	0.5mm			
3	Capacitor	PN-CAP-715	X7R	Rev0001	PART	1	100nF	10%	16V	X7R Ceramic	fc_passiv	cap_0402	0.5mm		Cap_panaso	ECJ0E
4	Capacitor	PN-CAP-715	X7R	Rev0001	PART	1	100nF	10%	16V	X7R Ceramic	fc_passiv	cap_0402	0.5mm		murata_caps	GCM1
5	Capacitor	PN-CAP-715	X7R	Rev0001	PART	1	100nF	10%	16V	X7R Ceramic	fc_passiv	cap_0402	0.5mm		epcos_caps	B3792
6	Capacitor	PN-CAP-715	X7R	Rev0001	PART	1	100nF	10%	16V	X7R Ceramic	fc_passiv	cap_0402	0.5mm		UPY-GPHC	CC040

Requests

- ToDo list for requests
 - Notification for new task
- Features
 - Own/disown a request
 - Details will show what needs to be done (from flow)
 - Approve
 - Disapprove with notes
 - Escalation

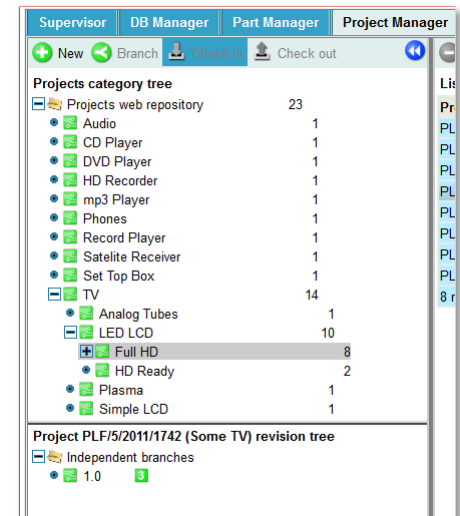
	Part number	Part type	Revision	Set type	Re
▼	FC-IC-0001	Regulator	Rev0001	PART	1
▼	FC-IC-0003	Analog	Rev0001	PART	1
▼ !	FC-IC-0004	Converter	Rev0001	PART	1
▼	FC-IC-0005	OPAMP	Rev0001	PART	1
▼	FC-IC-0006	Regulator	Rev0001	PART	1
▲	FC-IC-0007	Regulator	Rev0001	PART	1
▲	FC-IC-0008	OPAMP	Rev0001	PART	1
7 records total					

Product Change Notification PCN

- Upload external .csv file with changes
 - EOL last buy date
 - EOL last ship date
 - other
- Approve changes
- Auto-Create new revision when major change

Project Management

- Create new project
- Check out project
 - BOM
 - Files (.brd, pdf, .zip)
 - Check in project revision number 1.0
- Check out for redesign
 - Check in new project revision 1.1
- Branch
 - Create project based on existing one
 - New revision 2.0



Reports

- Where used
- Alternate manufacturing parts
- User reports
 - Store any filter setting as report
- Context aware reports

"Event log" report result

Event time	Message	Executor	Parameters	Values
2012-04-17 02:08:29	Part data update successful	fadmin	Part number Part table name	FC-CAP-0001 Capacitor
2012-04-17 02:08:29	Part data update successful	fadmin	Part number Part table name	FC-CAP-0002 Capacitor
2012-04-17 02:08:29	Part data update successful	fadmin	Part number Part table name	FC-CAP-0003 Capacitor
2012-04-17 02:08:29	Part data update successful	fadmin	Part number Part table name	FC-CAP-0004 Capacitor
2012-04-17 02:08:29	Part data update successful	fadmin	Part number Part table name	FC-CAP-0005 Capacitor
2012-04-17 02:08:29	Part data update successful	fadmin	Part number Part table name	FC-CAP-0006 Capacitor
2012-04-17 02:08:29	Part data update successful	fadmin	Part number Part table name	FC-CAP-0007 Capacitor

Reports view and manage

- [-] Part database reports
 - Where used
 - Obsolete parts still in use
 - Event log
- [-] BOM analysis reports
 - BOM alternates
- [-] Reports management
 - Reports personalization
 - User reports history

eCAD FlowManager Summary



- Easy installation (1day with telephone support)
- Easy integration with existing eCAD Flow (Capture CIS/DE HDL)
- Part revisions
- New part request process
- Full support for ICA and CIS derived parts
- Part history (revisions)
- Parametric part search
- Homologation process (request part)
- Based on MS SQL Express 2008

FlowCAD