WHITE PAPER

Increase Your Sales Opportunities with Automated Quoting

Learn the Key Steps to Increase Profitability with Automated Quoting

LOGIC DESIGN corporation

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Executive Summary

The principal driver for the success of a manufacturing company in a competitive global marketplace is to produce innovative products better, faster and cheaper. Low cost foreign labor has contributed to the outsourcing of US production to foreign countries. When countries like China grow their world market share, the primary driver of that growth has been driven more by low labor costs, and less by innovation. Most US products that are outsourced to foreign countries, like China, tend to be commodity products. As the costs for foreign countries increases (labor and fuel costs), the advantages of outsourcing start to decrease.

The objective of automated quoting is to generate accurate and timely sales quotes for non-commodity type products that provide a value added benefit to the customer. These value added benefits include offering a wider range of product options at lower cost which can be accomplished by integrating your quoting process with the capabilities of engineering and the machines on your shop floor. This white paper will discuss and explain how automated quoting can increase your sales opportunities and increase the profitability of your company.

The five key areas of automating your quoting process include:

1.0: Automated CAD Drawing Analysis

2.0: Automated Machine Tool Selection

3.0: Automated Routing Generation

4.0: Automated Cost Roll-Ups

5.0: Automated CAD Drawing Generation

Objectives of Automated Quoting

The primary objective of automated quoting is to deliver a manufacturing environment that integrates the quoting process with engineering and the shop floor to deliver the following objectives:

- ☑ **Increase Quoting Capacity with Better Cost Accuracy**
- ☑ **Greater Product Flexibility with Shortened Delivery Times**
- ☑ **Generate Faster & Better Information at Quoting Stage**
- ☑ **Expanded Customer Product Offerings at Lower Cost**
- ☑ **More Efficient Use of People / Machine Tools**
- ☑ **Achieve Economy of Scale for Small / Short Production Runs**
- ☑ **Gain Market Share in Global Marketplace / Increase Profitability**
- ☑ **Rapid Return On Investment**

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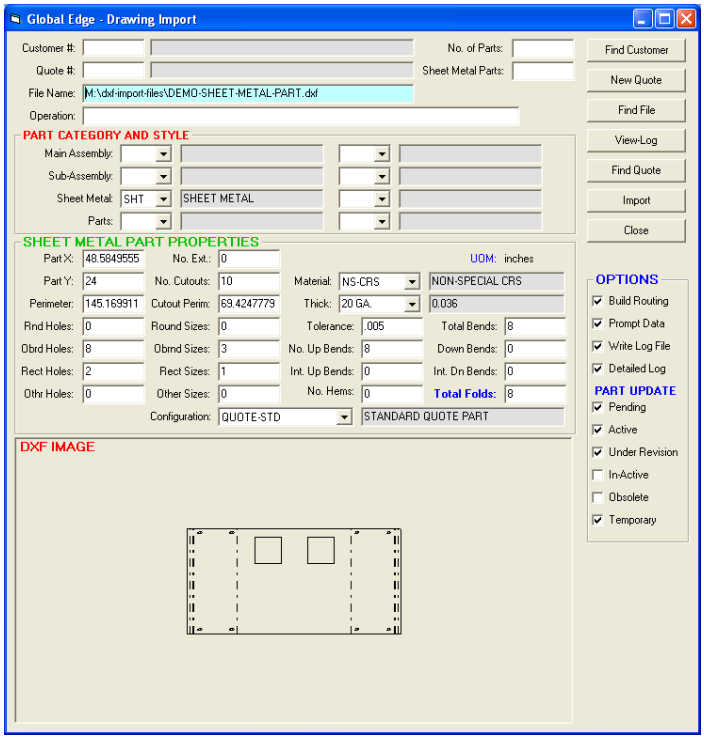
Automated Quoting

1.0: Automated CAD Drawing Analysis

Automated CAD Drawing Analysis is the ability to automatically analyze a sheet metal CAD drawing to determine the attributes without manually analyzing it. Sheet metal part drawing attributes included in the analysis process include:

☑ **Part Length**	☑ **Total Number of Cutouts**
☑ **Part Width**	☑ **Cutout Cut Perimeter**
☑ **Thickness**	☑ **Number of Up Bends**
☑ **Part Perimeter**	☑ **Number of Internal Up Bends**
☑ **Round Hole Count**	☑ **Number of Down Bends**
☑ **Number of Round Hole Sizes**	☑ **Number of Internal Down Bends**
☑ **Obround Hole Count**	☑ **Total Bend Count**
☑ **Number of Obround Hole Sizes**	☑ **Total Hem Count**
☑ **Number of Rectangular Holes**	☑ **Total Extrude Count**
☑ **Number of Rectangular Hole Sizes**	☑ **Bend Radius**
☑ **Number of Other Holes**	☑ **Material Type**
☑ **Number of Other Hole Sizes**	☑ **Embossed Part**

Automatically capturing the above sheet metal drawing attribute information provides a foundation of information that makes it possible to automatically select the proper machine tool on the shop floor to fabricate the sheet metal part based on the capabilities of the machine tool. It also provides a foundation of information that makes it possible to automatically generate routings, all of which provides the ability to generate an accurate sales quote based of the optimal route to fabricate a sheet metal part.



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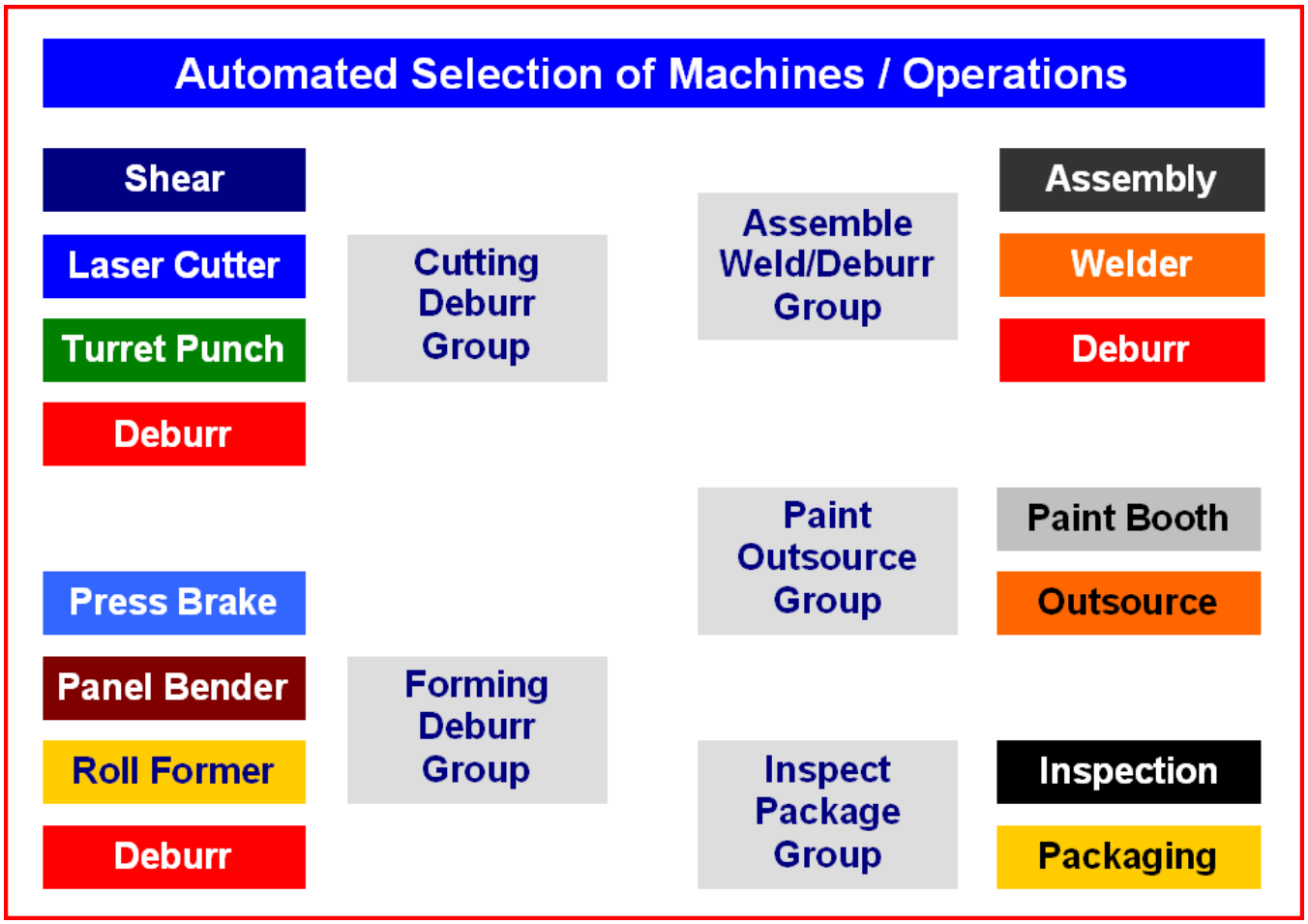
2.0: Automated Machine Tool Selection

Automated Machine Tool Selection is the ability to automatically determine the proper machine tool by selecting the optimal machine tool based on the sheet metal part attributes / characteristics. This type of machine tool selection can determine if it makes more cost effective sense to turret punch or laser cut a sheet metal part based on production quantity. It can also help determine whether it makes sense to utilize a press brake or panel bender. Automated Machine Tool Selection also includes the ability to determine at the quoting stage if a sheet metal part fits the parameters of a specific machine tool before it even reaches the shop floor.



Automated Machine Tool Selection automates the quoting process by automatically selecting or eliminating a machine tool that is not capable of fabricating the sheet metal part. A potential costly process with Engineered to Order products is finding out a part cannot be manufactured until it reaches the shop floor. Automated Machine Tool Selection can provide the proper information at the quoting stage to help make sure a part can be successfully manufactured before a quote becomes an order. By making machine parameters available at the quoting stage, quoted parts can be validated before they end up costing your company money. This process helps insure that your quoting costs accurately reflect the optimal machine tool and the costs specifically associated with that machine tool.

Eliminate the Manual Process of Determining How Parts are Manufactured

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3.0: Automated Routing Generation

Automated Routing Generation is the next sequence in the automated quoting process. Many manufacturing companies spend a significant amount of time generating routings based on the tribal knowledge of engineers. This process can be automated by incorporating Configuration software that can generate routings based on the capabilities and the costs of the various machine tools on the shop floor. The ability to automatically generate routings based on speed and/or profitability of a machine tool can significantly speed up the routing generation process and provide your company with accurate costs for the quoting process.

Automated Routing Generation is made possible after it is determined the valid machine tools to fabricate a sheet metal part. After valid machine tools are determined, the Automated Routing Generation process can automatically determine the best route to fabricate a sheet metal part based on the specific characteristics of that part. Additionally, the Automated Routing Generation process helps the estimator determine the most cost-effective route to fabricate the part at the quoting level including automatic material size selection for nestings.

Automatically Determines Best Route to Fabricate Part

PART A	PART B	PART C
SHEAR	LASER	PUNCH-PART
PUNCH-PART	PANEL-BEND-FORM	DEBURR-HAND
DEBURR-AUTO	GRAIN	ROLLFORM
FORM-4	INSTALL-PEM-STUD	VIBRA-DEBURR
HEM-AND-FLATTEN	TIG-WELD	RIVET
INSTALL-PEM-NUTS	JITTERBUG	SCREW
MIG-WELD	PAINT	GRIND
GRIND	FINAL-INSPECT	GRAIN
FINAL-INSPECT	PACKAGE	OUTSOURCE-PAINT
PACKAGE		FINAL-INSPECT
		PACKAGE

Automatically Determine Most Cost Effective Route to Fabricate Part

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4.0: Automated Cost Roll-Ups

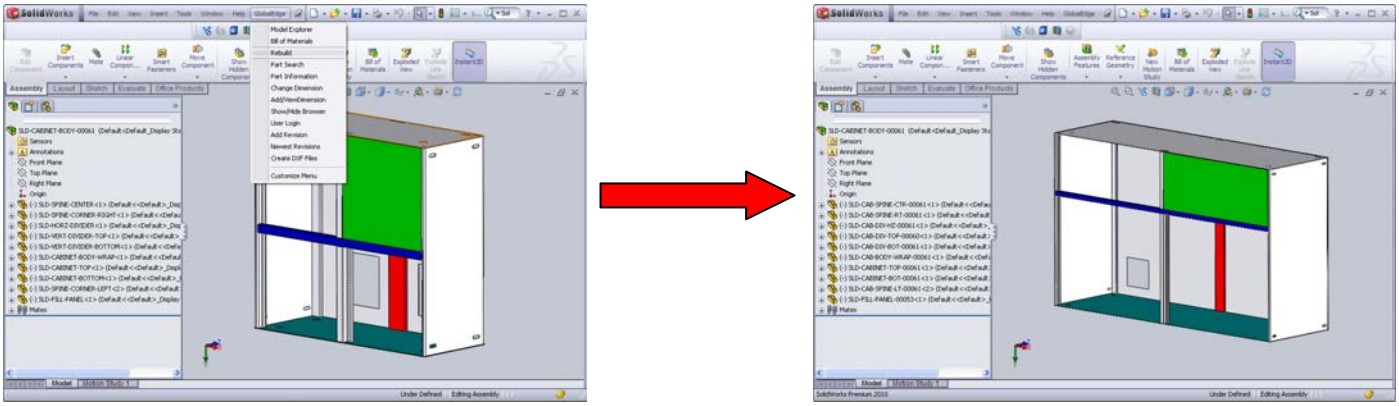
Automated Cost Roll-Ups is made possible by automatically and accurately calculating the manufacturing process times by each specific machine tool. This is accomplished with process formulas that generate quote costs based on machine performance.

Shear Time:	**Calculates Based on Material Type & Cut Length**
Laser Cut Time:	**Calculates Based on Perimeter/Cutout Cut Speed, Pierce Time, Load/Unload Time**
Turret Punch Time:	**Calculates Based on Number of Hits, Approach & Return, Tool Change Count, Scrap Removal, Machine Speed, Number of Repositions, Load/Unload Time**
Deburr Time:	**Calculates Based on Part Size, Material Type, Percent of Part Empty, Conveyor Rate, Need to Catch Part**
Press Brake Time:	**Calculates Based on Tolerance Class, Number of Rotations, Number of Strokes**
Panel Bender Time:	**Calculates Based on Pieces Per Container, 90/180 Degree Turns, Number of Regular Bends, Number of Hems, Number of Bend Inversions, Number of Repositions**
Roll Former Time:	**Calculates Based on Part Size and Material**
Assembly Time:	**Calculates Based on Assembly Rules**
Welding Time:	**Calculates Based on Weldment Length, Material Type & Thickness**
Painting Time:	**Calculates Based on Painting Rules**
Outsource Costs:	**Calculates Based on Vendor Quantity Costs**
Inspection Time:	**Calculates Based on Inspection Rules**
Packaging Time:	**Calculates Based on Packaging Rules**

The main objective when generating a sales quote should be to include accurate costs to manufacture a part. Many times it is difficult for a manufacturing company to accurately generate the time and material required to produce a part. This is generally the result of not having the proper updated information available at the quoting level.

5.0: Automated CAD Drawing Generation

Automated CAD Drawing Generation is made possible by utilizing Product Configurator Dimensions that are automatically driven into template CAD drawings. This allows your company to include CAD drawings with your sales quotes that are generated based on customer requirements in a matter of minutes.



There are a variety of methods that can enable your company to automatically generate CAD drawings from either a home grown Configurator or a variety of tools that are commercially available to supplement and/or replace this process.

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Sample Fabrication Routing Report

Automatic generation of a Fabrication Routing Report is made possible with the capabilities of an Automated Quoting system:

---- FABRICATION ROUTING REPORT ---- **PAGE: 001**

REPORT DATE: [01/05/2011] PART NUMBER: [DEMO-SHEET-METAL-PART][Demonstration Sheet Metal Part] TYPE: [COMPONENT]
TIME: [17:15:18] CATEGORY: [SHT][SHEET METAL] ORIGIN: [MANUFACTURED]
STYLE: [CVR][COVER] UOM: [each]

Material Status — Confidentiality Agreement in Effect — Quote Price: _____
M.O. Due: _____ I.D. #: _____

P.O. #: _____ S.O. #: _____ DUE DATE: _____
QUOTE #: 1184 CUSTOMER: TOOL & DIE SUPPLY COMPANY
QUOTE ITEM #: 001 PART #: DEMO-SHEET-METAL-PART
QUOTE DATE: 01/05/2011 REV #:
ESTIMATOR: DESCRIPTION: Demonstration Sheet Metal Part
B.O.M. LEVEL: 0
JOB NUMBER: _____
PARENT PART #:
QUANTITY: PARENT PART REV #:
RUN QTY: _____ LAST EDITED BY: LAST EDIT DATE:

OPER #	WORK CENTER #	WORK CENTER NAME / OPERATION DESCRIPTION	PC/HR	HR/PC	SETUP	SETUP COST w/MU	OPERATION COST/PC w/MU
10	530	LASER-CUT	10.000000	0.050000	0.250000	$25.0000	$5.0000
20	30	DEBURR-AUTO	20.000000	0.035000	0.250000	$18.7500	$2.6250
30	42	FORM-3	28.571429	0.010546	0.500000	$25.0000	$0.5273
40	42	FORM-5	94.822682	0.016653	0.850000	$42.5000	$0.8327
50	902	INSTALL-PEM-STUDS	60.049240	0.003333	0.350000	$17.5000	$0.1667
60	902	INSTALL-STANDOFFS	300.030003	0.004167	0.350000	$17.5000	$0.2084
70	902	RIVET	239.980802	0.005556	0.250000	$12.5000	$0.2778
80	902	GRIND	179.985601	0.100000	0.250000	$12.5000	$5.0000
90		PACKAGE	10.000000	0.100000	0.000000	$0.0000	$5.0000

Allowable Over-Shipment Percentage: 00.00 %

Other Stock Material Component Part(s) List: (Note: All Length units in inches. Stock Length in feet.)

BOM LEVEL	PART NUMBER	PART	BLANK	SHEET	OTHER STOCK
		Length: 48.5850	Length: 120.0000	Length: 120.0000	Stock Len: 000.0000 ft Dia: 000.0000
	Mtl. Code: NS-CRS	Width: 24.0000	Width: 060.0000	Width: 060.0000	Leg1 Len: 000.0000 Width: 000.0000
	Mtl. Thickness: 00.036000	Wt(lbs): 11.9199	Wt(lbs): 065.5000	Wt(lbs): 065.5000	Leg2 Len: 000.0000 Depth: 000.0000
			Pcs/Blank: 004.0000	Pcs/Sheet: 004.0000	Web Len: 000.0000
		Cost$/lb: 0.6500	Quoted As: Gross	# Sheets: 000.0000	CERTIFIED MATERIAL
				Sheets/Pc: 0.250000	

PART #	DESCRIPTION	QTY	UOM	COST	EXTENDED
NS-CRS	NON-SPECIAL CRS	11.9199	lbs	$0.6500	$7.7479
PEM-NUT	Pem Nut	5.0000	each	$0.0500	$0.2500
STANDOFF	Standoff	3.0000	each	$0.0600	$0.1800
PEM-STUD	Pem Stud	4.0000	each	$0.0700	$0.2800

Other Purchased Component Part(s) List:

BOM LEVEL	PART NUMBER	PART REV.	DESCRIPTION	UNIT COST
	BOX-32X24X24		BOX, 32 X 24 X 24 (S-4453)	$0.0300
	PACKAGING		PACKAGING	$0.0100

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Automated Quoting

The World's Most Advanced Quoting System …

Global Edge® 2011 – Automated Workflow is the world's most advanced quoting system for the sheet metal fabrication industry. ***Global Edge 2011 – Automated Workflow*** automates and significantly speeds up the time it normally takes to design, quote and configure custom products. In addition, ***Global Edge 2011 – Automated Workflow*** automates the analysis of CAD drawings to determine the best and most cost effective routings to manufacture parts. ***Global Edge 2011 – Automated Workflow*** incorporates innovative software technology that helps reduce the cost of short-run products to that of massed produced products by reducing labor intensive design and engineering tasks associated with the quoting process from hours to minutes.

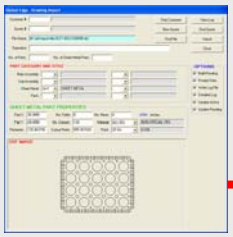
Reduce Your Quoting Time from Hours to Minutes

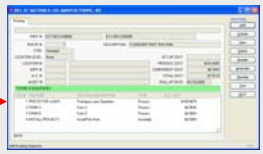
3D CAD Drawings

2D CAD Drawings

Automated CAD Drawing Analysis

Automated Machine Tool Selection





Automated Routing Generation

Produce More Accurate Sales Quotes, Faster

Automated Cost & Weight Roll-Ups

Automatically Generate Sales Quotes from Your CAD Drawings

Key Features & Benefits

- ☑ **Increase Your Sales Opportunities**
- ☑ **Increase Quoting Capacity with Better Cost Accuracy**
- ☑ **Automated Proposal Drawing Generation**
- ☑ **Simplifies & Automates Quoting Process**
- ☑ **Expanded Product Offerings at Lower Cost**
- ☑ **Provides Rapid Return On Investment**

To Schedule Demonstration, Please Visit: http://www.ldcglobal.com/demo.html

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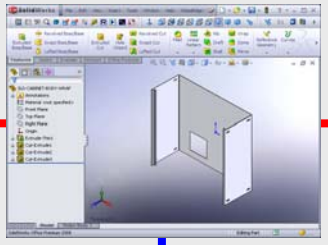
Automated Quoting

Automated Quoting Workflow Process

Incoming CAD Drawing

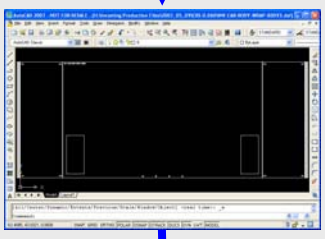
Inventor | Solid Works | Pro Engineer | Solid Edge



ERP System

Global Edge
CAD / ERP Interface

- 3D Sheet Metal Part Converted to 2D DXF
- Sheet Metal Part File Attributes Imported
- Sheet Metal Part Loaded into Work Queue



Updated Part Data / BOM / Routings Sent to ERP

Global Edge
Work Queue / Configurator

- Sheet Metal Part Attributes Analyzed
- Automated Machine Tool Selection
- Automated Routing Generation
- Automated Cost & Weight Roll-Ups

Automated Machine Selection

- Shear / Laser Cutter
- Turret Press
- Deburring
- Folder / Panel Bender
- Press Brake
- Welding
- Assembly / Outsourcing
- Inspect / Package

Machine Tool Automatically Selected by Machine Parameters, Performance, Price or Both

Reduce the Process of Generating Accurate Sales Quotes from Hours to a Few Minutes!

Sales Quote Automatically Produced

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Founded in 1983, Logic Design Corporation is a Software Development and Technology Integration Company that specializes in innovative, leading edge software solutions that help Engineer-To-Order manufacturing companies transform engineering and manufacturing to design and build products better, faster and cheaper. LDC helps your company stay ahead of the competition with proven products and services that are practical to implement and deliver a Rapid, Significant Return On Investment. LDC enables manufacturing companies to achieve high levels of engineering and manufacturing productivity and help attain an "INTEGRATED DIGITAL FACTORY" environment with products and services that include:

- ***Global Edge® 2011 – Automated Workflow***
- INTEGRATED DIGITAL FACTORY
- **2D / 3D CAD Programming**
- **Shop Floor Integration / Automation Planning**
- **Technology Integration Programming**

Johnson Controls, Cooper Power Systems, Siemens, and Lambda Electronics are some of the many companies that have benefited from the products and services of Logic Design Corporation. Benefits provided have included significantly reducing engineering and manufacturing cycle times by automating many of the manual time consuming workflow tasks that range from product configuration to drawing generation, to providing the shop floor with complete information when and where needed. For more information on how the products and services of Logic Design Corporation can help your company achieve significant productivity gains, faster delivery times, improved product quality, and reduced costs.

Please visit **www.ldcglobal.com** or contact Logic Design Corporation to schedule a demonstration of the ***Global Edge® 2011 – Automated Workflow***.

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Mission Statement

"Our Goal is to provide manufacturers with innovative, cost-effective solutions for reducing costs, improving productivity and streamlining operations to achieve a competitive global edge."