Karl Kachigan
Peyman Motlagh
April 27, 2000

Web-Facilitated PCB Design and Design Transfer

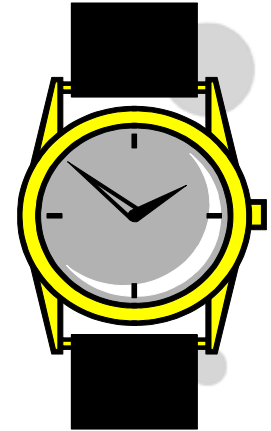**Agilent Technologies**
Innovating the HP Way
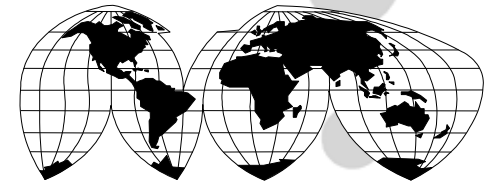
Goal For Today

Help You Design Faster By
Providing Quality CAD Data
Online

Agilent Technologies

Agenda

- Today's Challenges
- PCB Design Process
- Parts Library Approaches
- An Agilent/HP Perspective
- Using The CAD Data Store
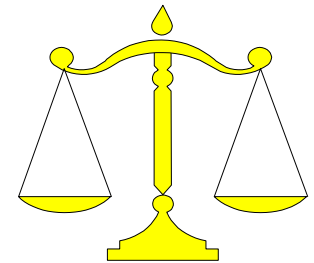- Questions & Answers
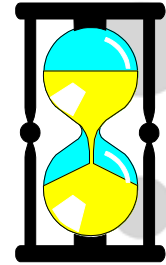
Agilent Technologies

Today's Challenges

- Time-to-Market Pressures:
  - Rapid Part Turnover (>20%)
  - Growing Part Complexity
  - Overwhelmed CAD Teams
- Outsourcing of Design
- Outsourcing of Manufacturing
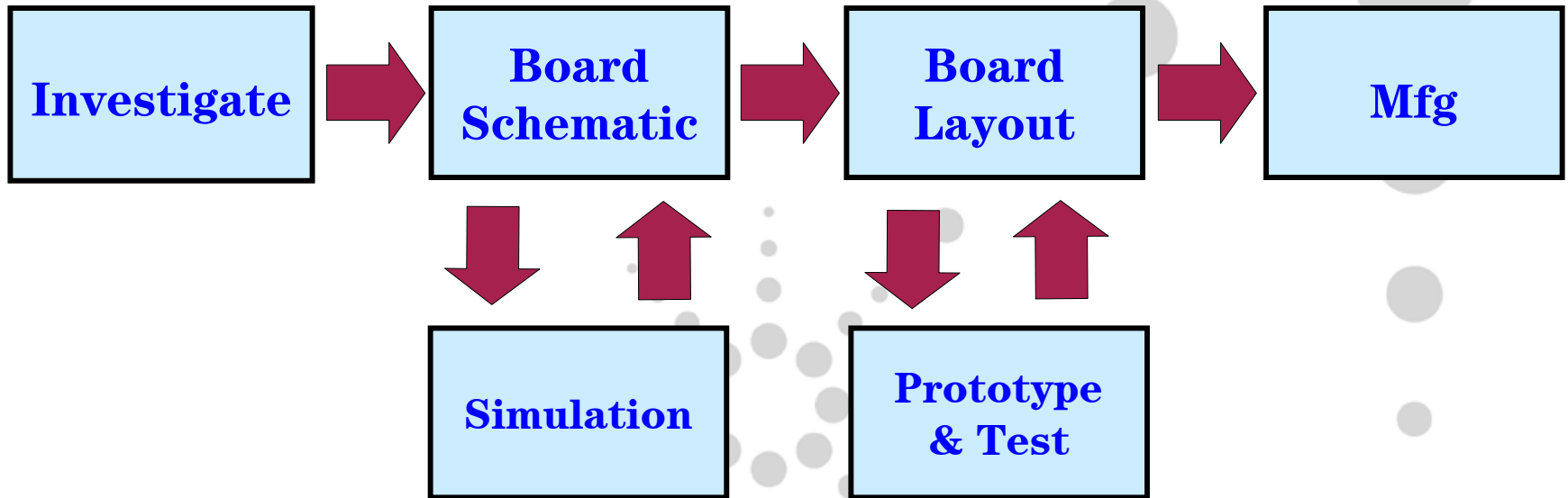- Multiple Sites and Design Teams
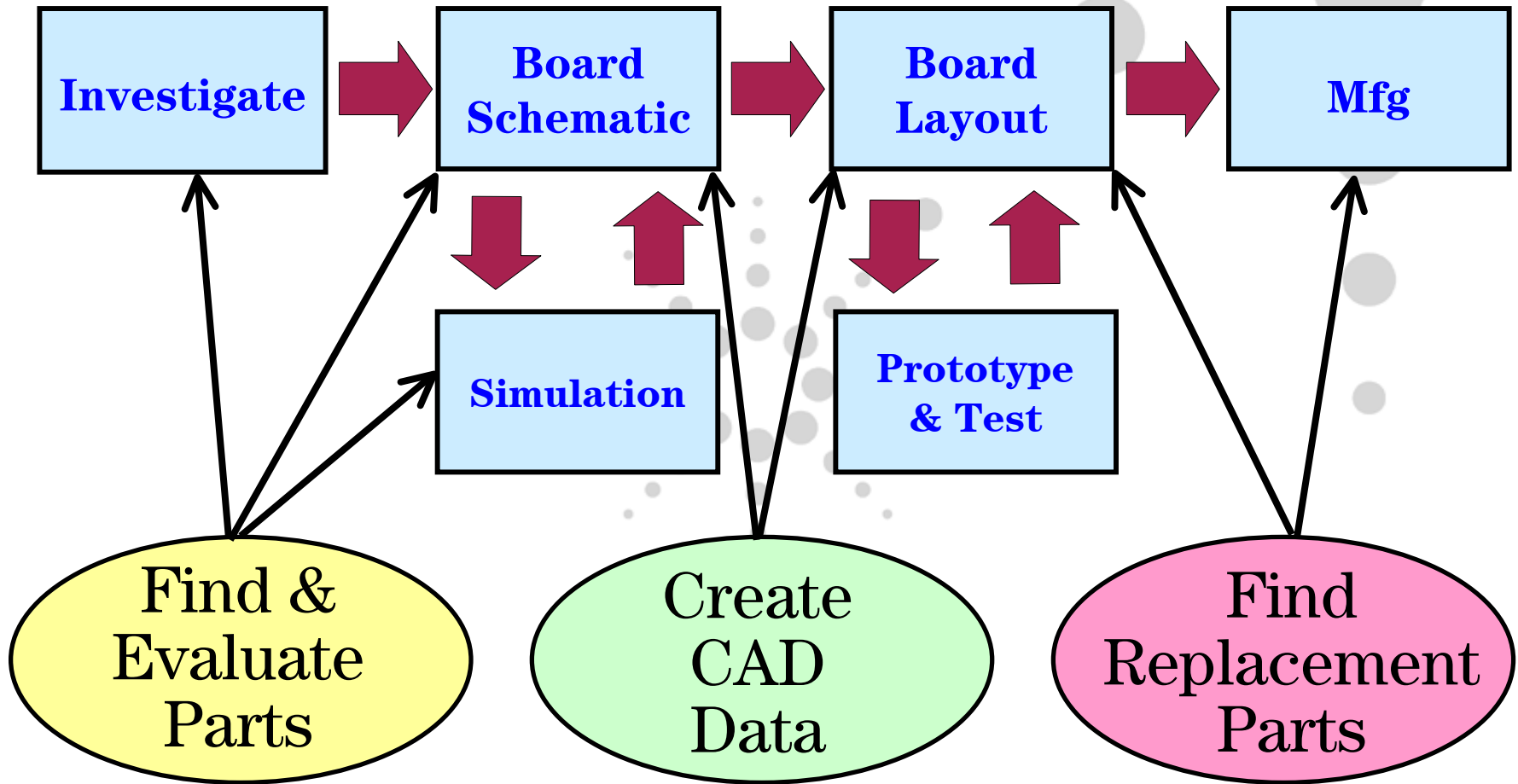
Agilent Technologies
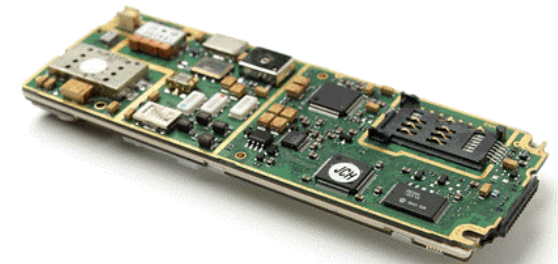
Some Typical Costs

- Parts Search Time:
  - 2 Hours/Part
- Symbol and Footprint Creation:
  - 2 Hours to 2 Weeks
- Library Maintenance:
  - $200/Part-Year
- Time to Market Issues:
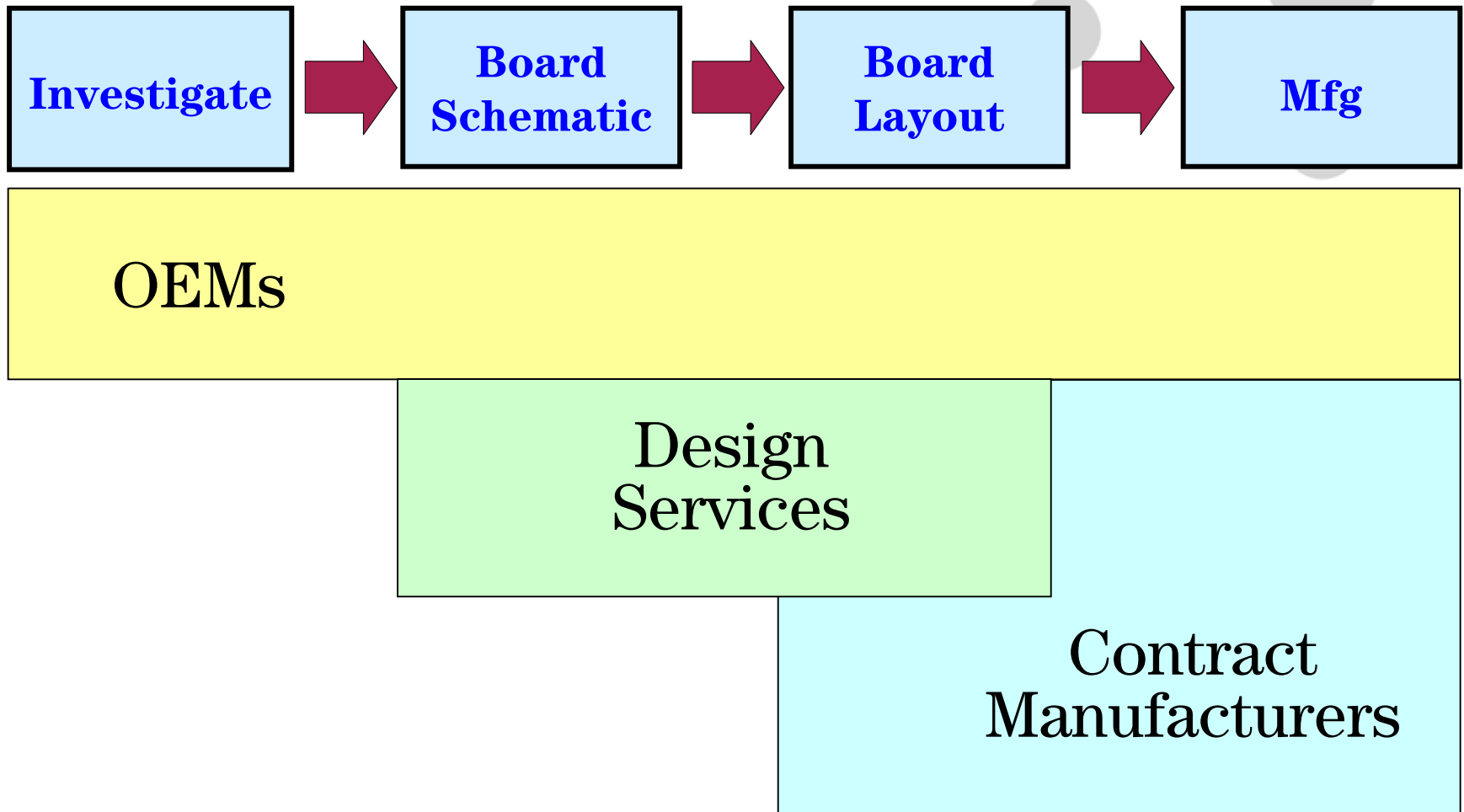 - 2%/Week Loss of Lifetime Revenue Getting Into Mfg.

Agilent Technologies

The Board Design Process

```
┌──────────────┐      ┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│ Investigate  │ ──▶  │   Board      │ ──▶  │   Board      │ ──▶  │     Mfg      │
│              │      │  Schematic   │      │   Layout     │      │              │
└──────────────┘      └──────────────┘      └──────────────┘      └──────────────┘
                         │      ▲              │      ▲
                         ▼      │              ▼      │
                      ┌──────────────┐      ┌──────────────┐
                      │  Simulation  │      │  Prototype   │
                      │              │      │   & Test     │
                      └──────────────┘      └──────────────┘
```

Agilent Technologies

Needs for Part Information

Agilent Technologies

Shifting Needs for Part Information

Investigate	→	Board Schematic	→	Board Layout	→	Mfg

OEMs

Design Services

Contract Manufacturers

Agilent Technologies

Finding Part Information

- Data Sheet
- Passed Experience
- Reference Articles
- WWW

Agilent Technologies

Part Information Needs

Symbol, Footprint

Specifications, Simulation Model

Price, Availability, Vendors

Quality, Reliability

time
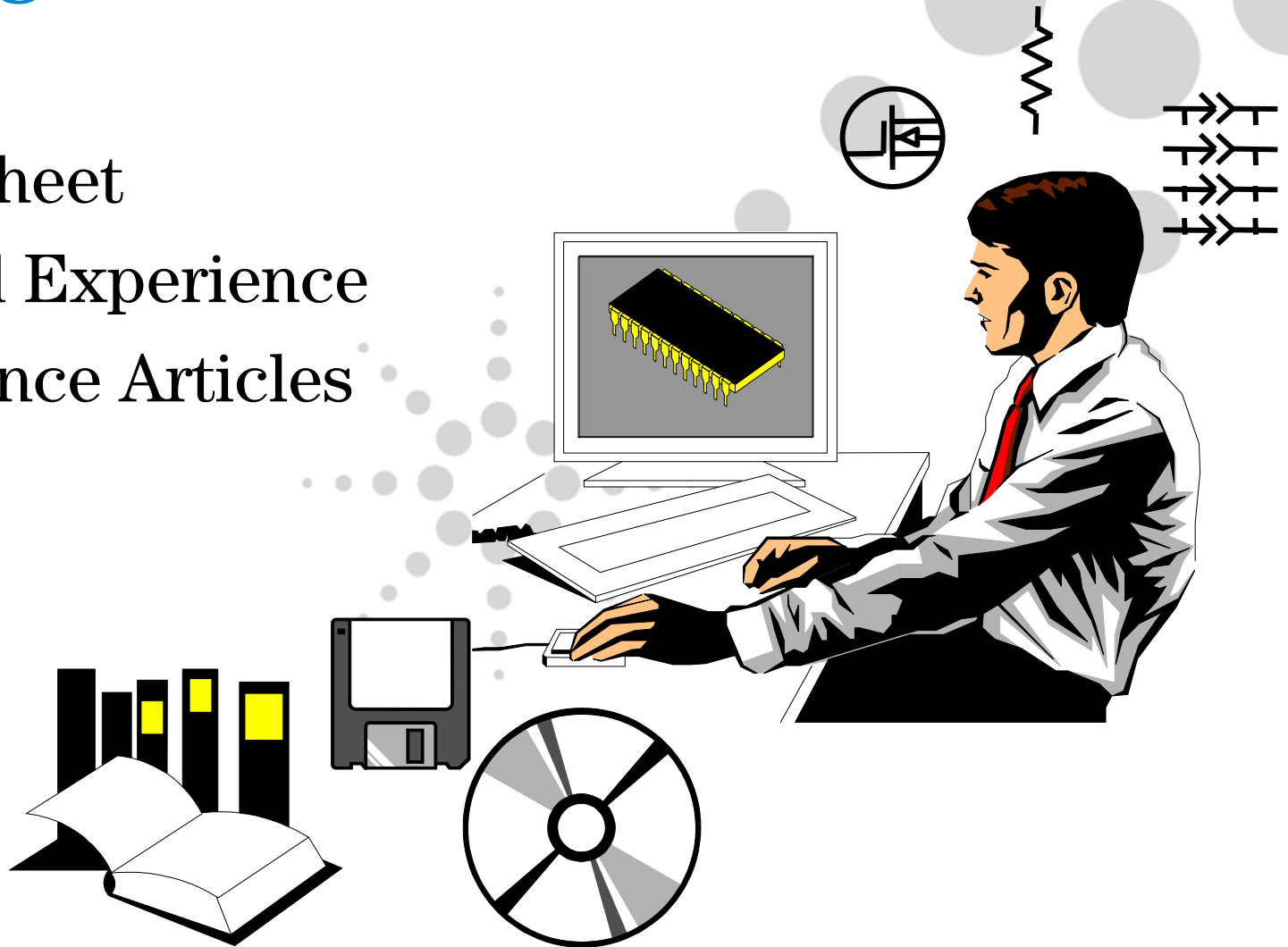
Agilent Technologies
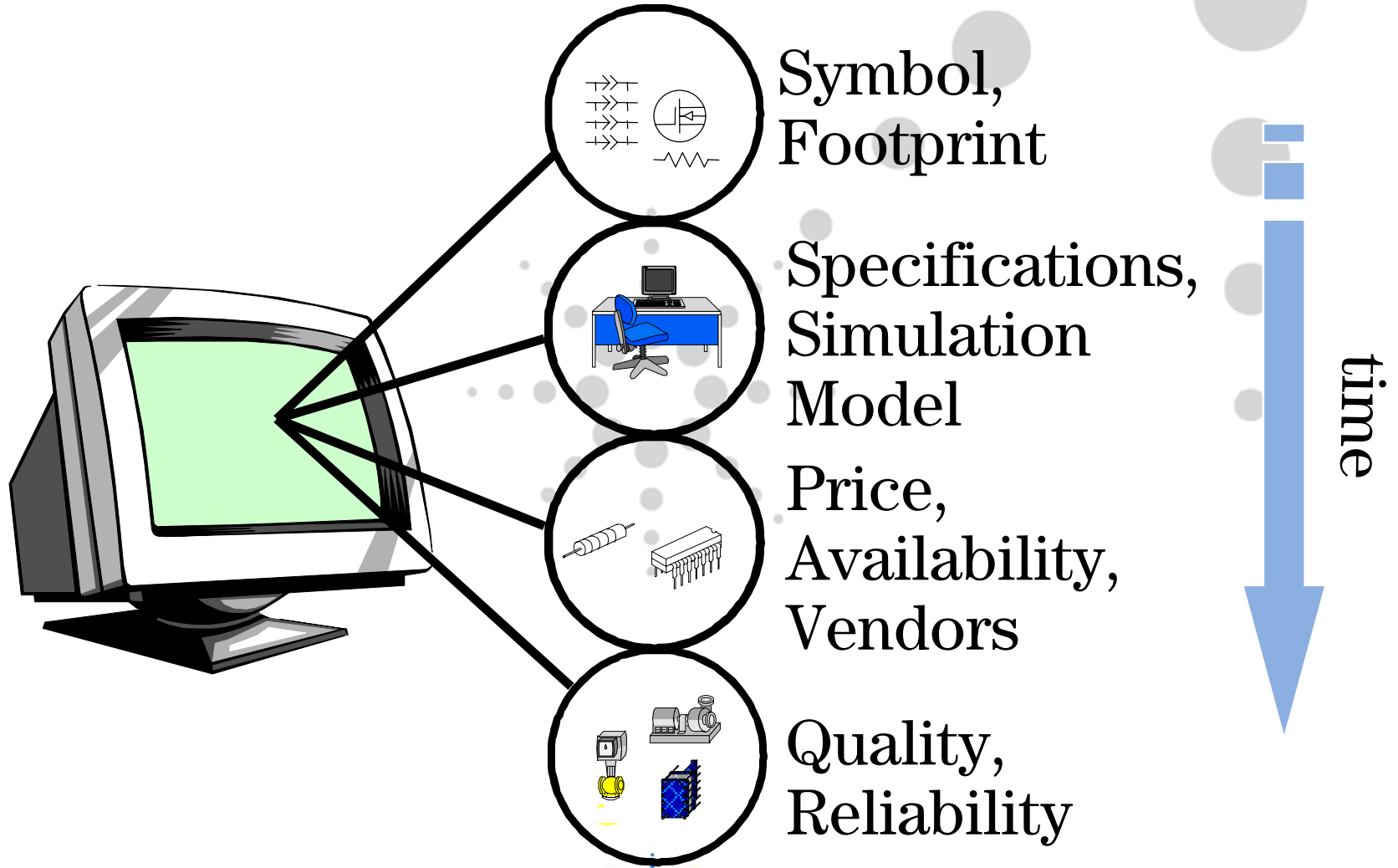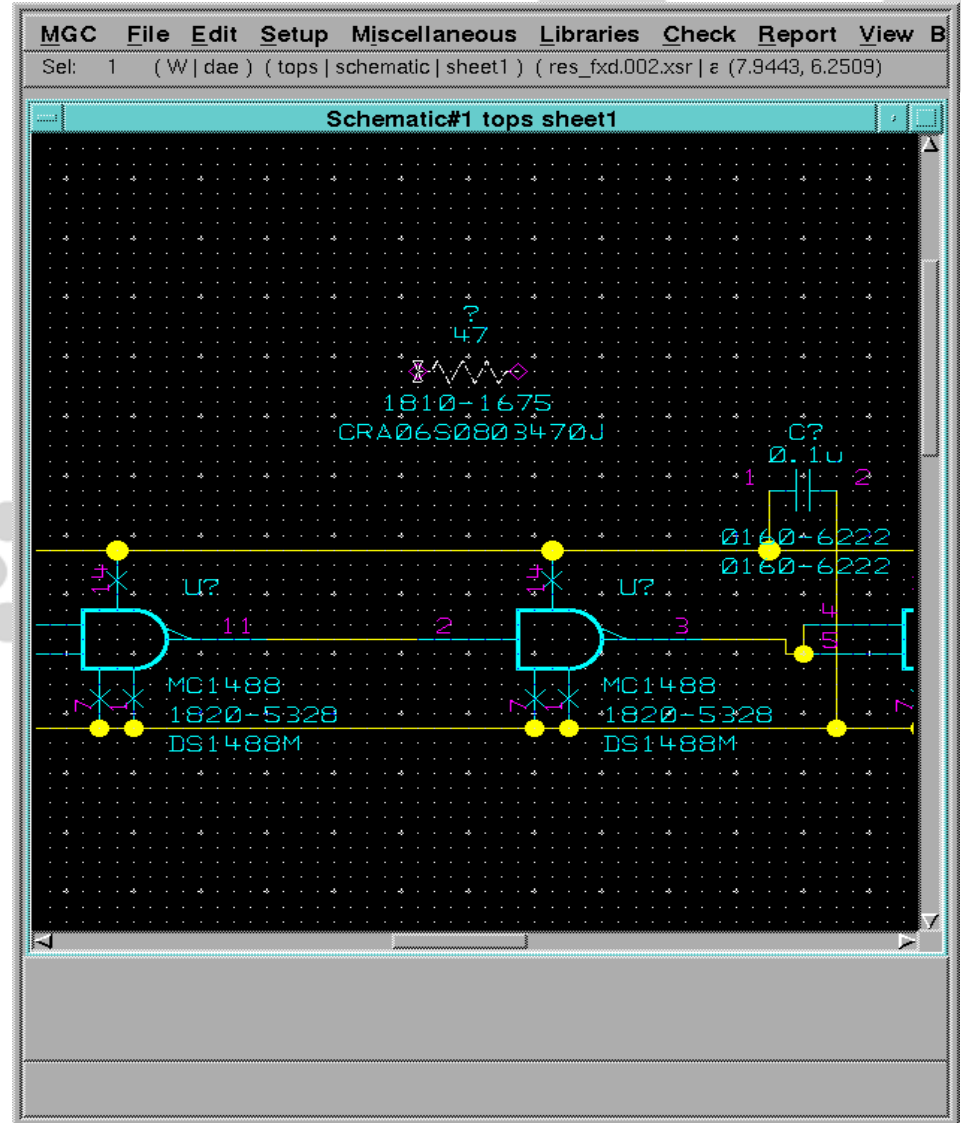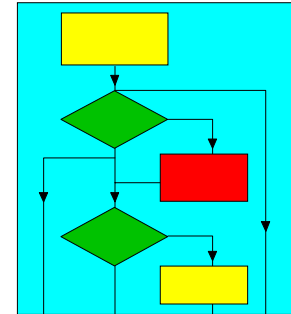
Initial Design

- Get Symbol from Library

- Create Symbol from Data Sheet

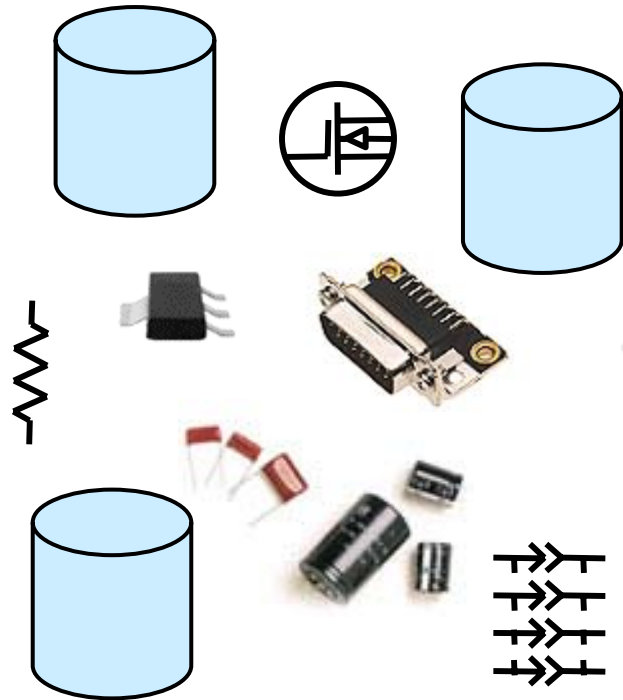- Find Simulation Model (Spice, IBIS, RF)

- Analyze the Design

Agilent Technologies

Parts Library Approaches

- Do It Yourself:
  - Engineer Focused

- Corporate Library:
  - Process Focused

Agilent Technologies
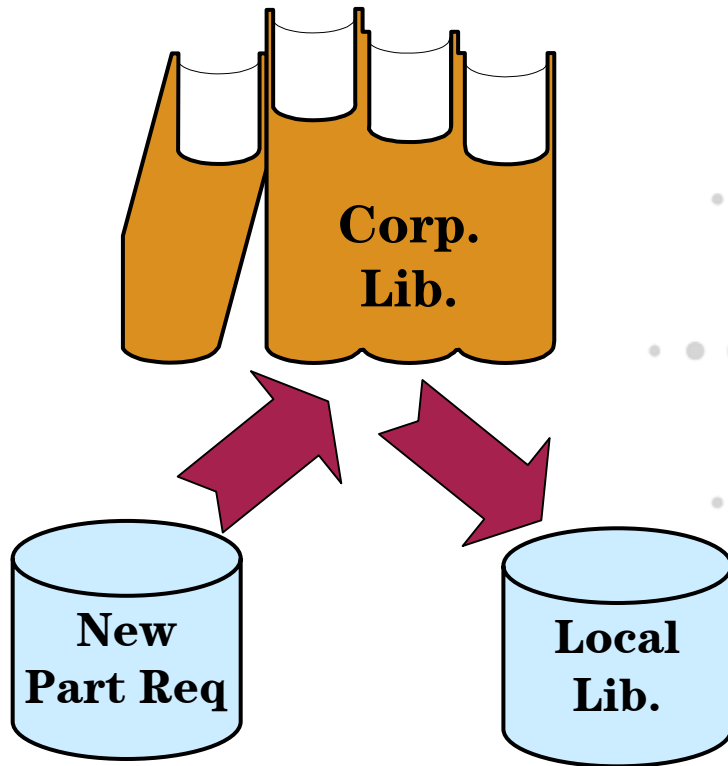
Do It Yourself Library

- ***Engineer Owns the "Process":***
  - Create the Basic Symbol
  - Leverage the Symbol from Another Part
  - Find the Footprint Later
  - Use Spreadsheet, Stack of CDs, Databooks, …
  - Islands of Information
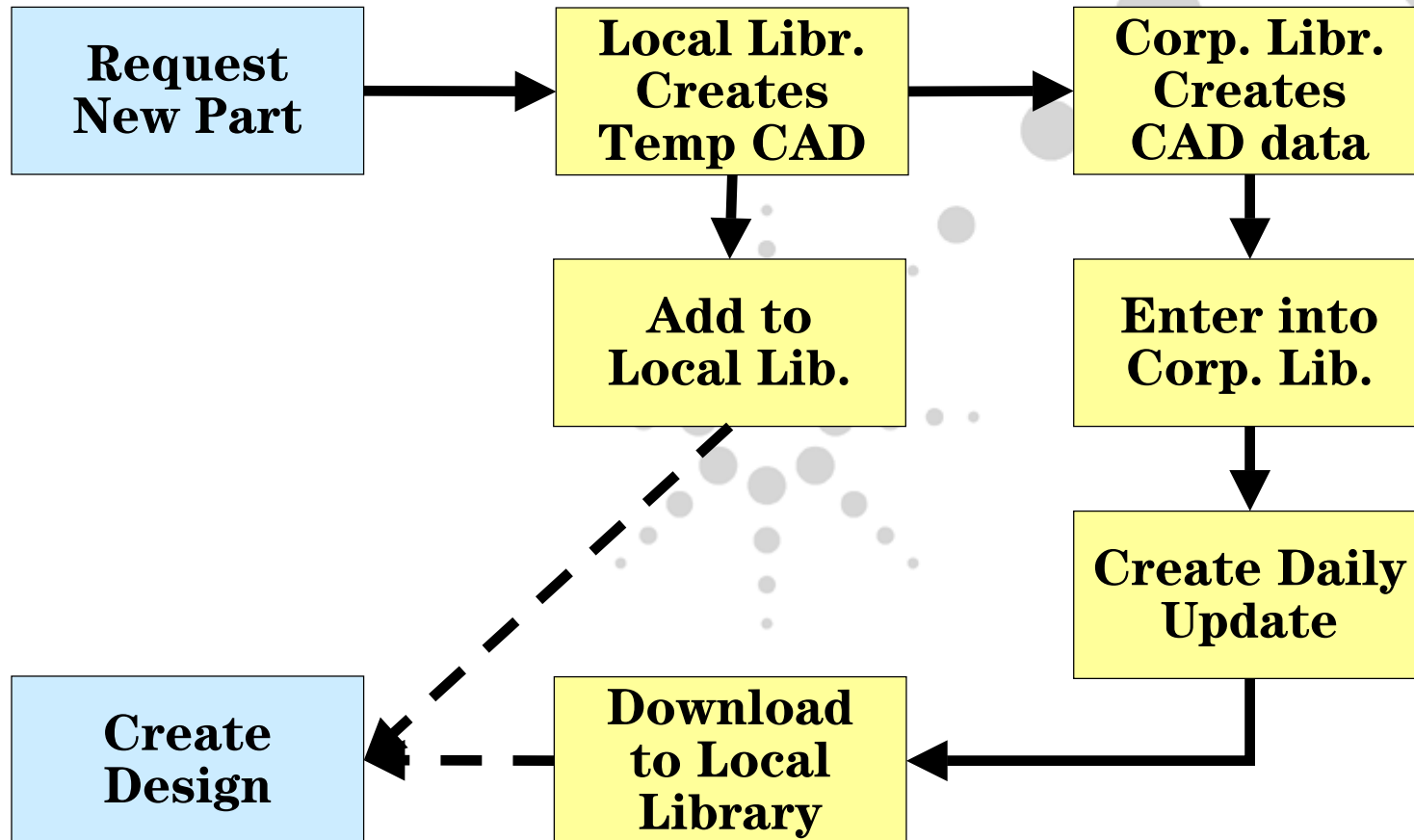
Agilent Technologies

Corporate Libraries
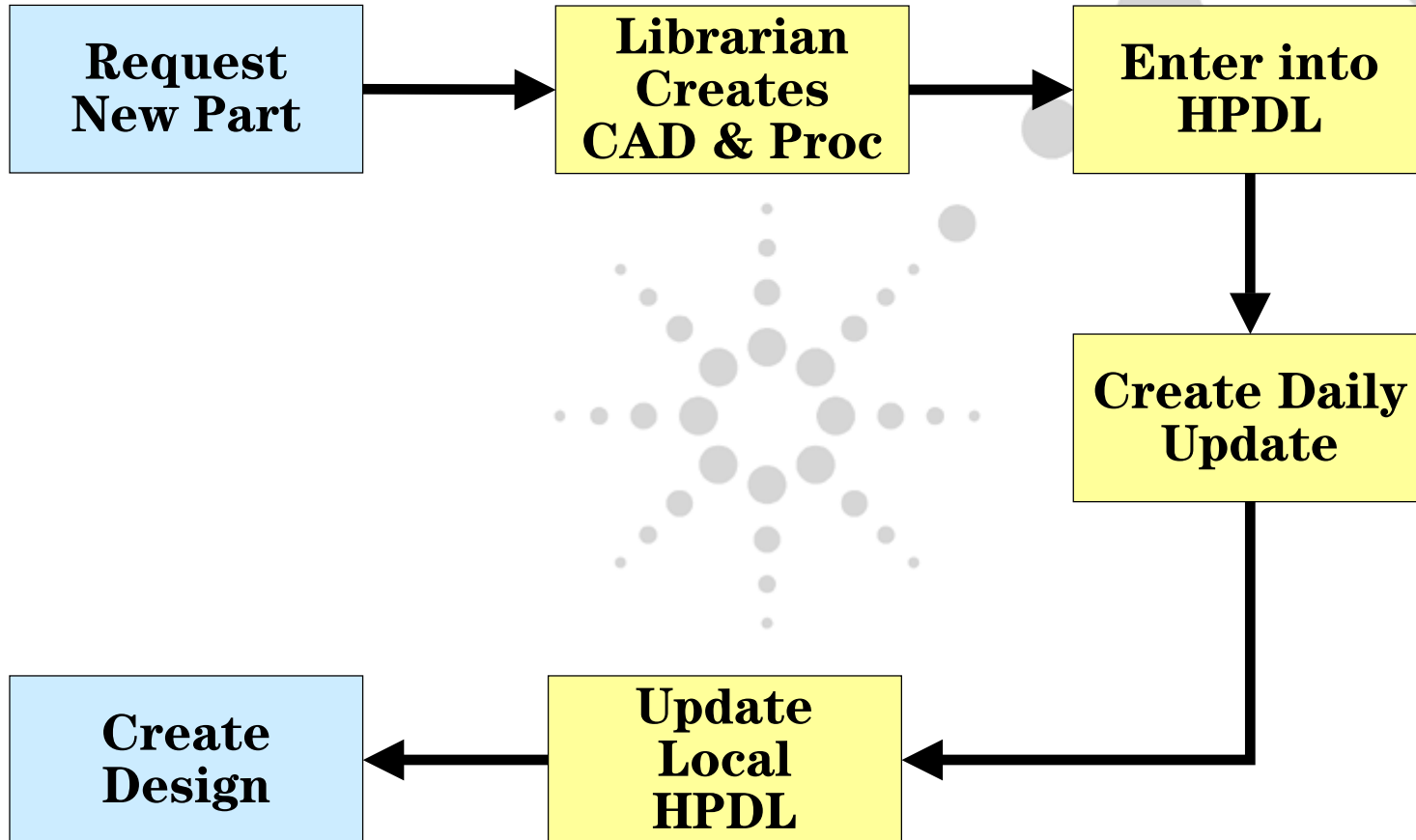
Design Flow Owns the "Process":

- Make a New Part Request
- Create a Local Temp. Symbol and Footprint
- Create Corp. Symbol and Footprint
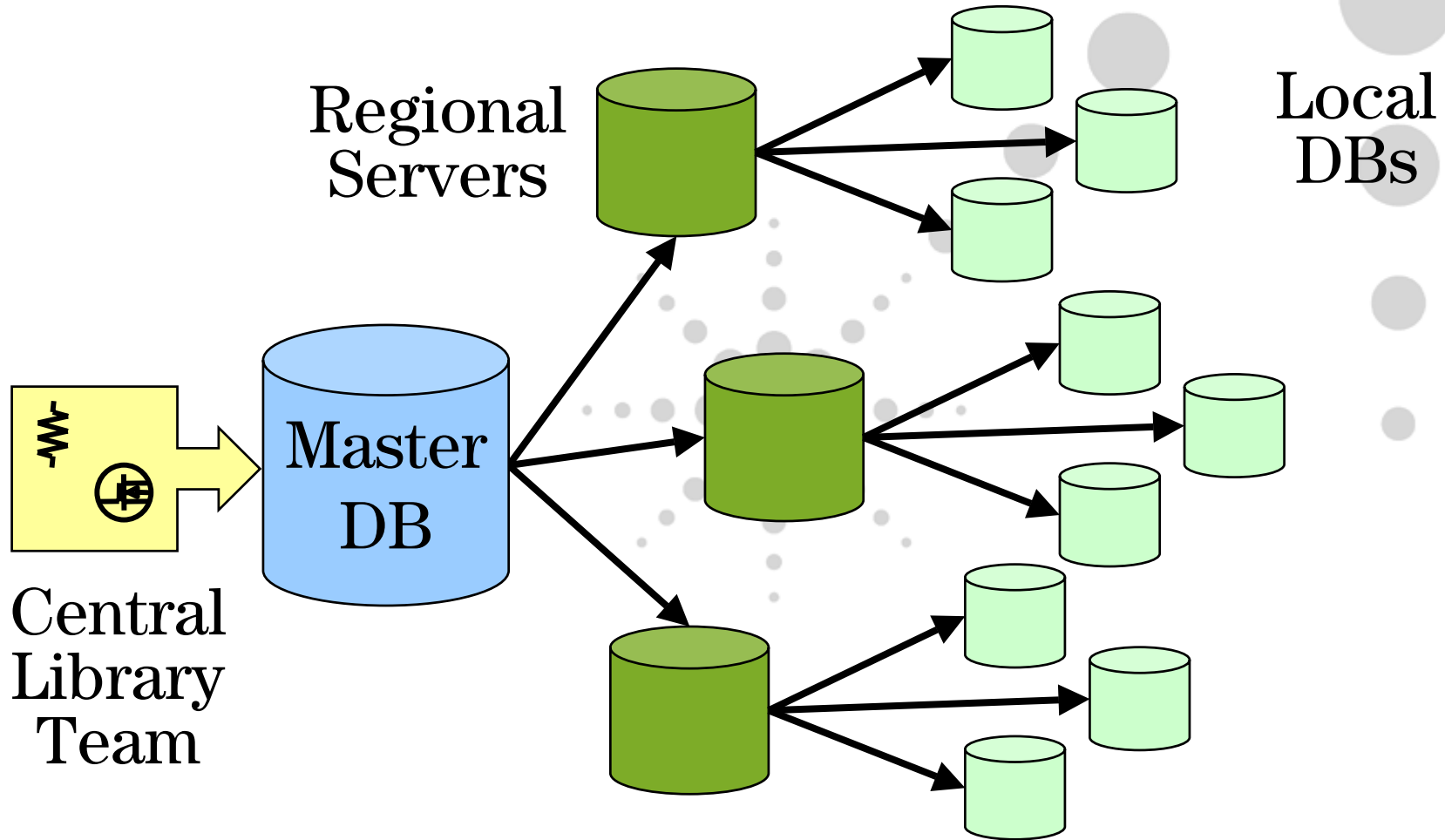- Update Your Design Later with Corp. Info

Corp. Lib.

New Part Req

Local Lib.

Agilent Technologies

Typical Corp. Library Approach

```
┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│   Request    │ ───► │ Local Libr.  │ ───► │  Corp. Libr. │
│   New Part   │      │   Creates    │      │   Creates    │
│              │      │  Temp CAD    │      │  CAD data    │
└──────────────┘      └──────┬───────┘      └──────┬───────┘
                             │                     │
                             ▼                     ▼
                      ┌──────────────┐      ┌──────────────┐
                      │    Add to    │      │  Enter into  │
                      │  Local Lib.  │      │  Corp. Lib.  │
                      └──────┬───────┘      └──────┬───────┘
                             ╲                     │
                              ╲                    ▼
                               ╲            ┌──────────────┐
                                ╲           │ Create Daily │
                                 ╲          │   Update     │
                                  ╲         └──────┬───────┘
┌──────────────┐      ┌──────────────┐             │
│    Create    │ ◄─ ─ │   Download   │ ◄───────────┘
│    Design    │      │   to Local   │
│              │      │   Library    │
└──────────────┘      └──────────────┘
```

Agilent Technologies

HP/Agilent Library Approach

```
┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│   Request    │ ───> │  Librarian   │ ───> │  Enter into  │
│  New Part    │      │   Creates    │      │    HPDL      │
│              │      │ CAD & Proc   │      │              │
└──────────────┘      └──────────────┘      └──────────────┘
                                                    │
                                                    v
                                             ┌──────────────┐
                                             │ Create Daily │
                                             │   Update     │
                                             └──────────────┘
                                                    │
┌──────────────┐      ┌──────────────┐              │
│   Create     │ <─── │   Update     │ <────────────┘
│   Design     │      │   Local      │
│              │      │   HPDL       │
└──────────────┘      └──────────────┘
```

Agilent Technologies

HP/Agilent Library Network

Regional Servers

Local DBs

Master DB

Central Library Team

Agilent Technologies

Support Issues

- Nightly Update Process

- Regional Server Maintenance and Upgrades

- Local Support, Coordination, and QA

- Local Hardware, Maintenance, and Upgrades

- Solution Tied to a Single Vendor

A Complex System to Maintain

Agilent Technologies
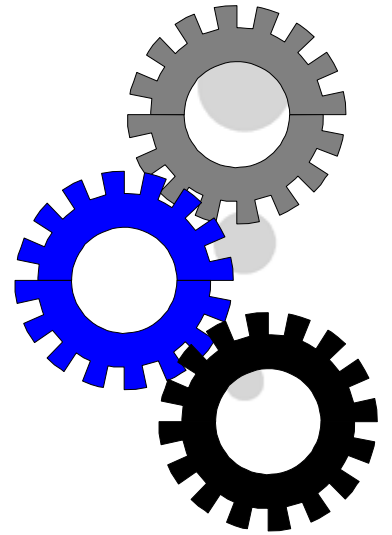
Transferring Designs

- Approaches:
  - Collect the Footprints
  - Share Your Library
  - Secure Access to Corp. Library System
- Concerns:
  - IP Protection
  - They Want to Use Another Part

My Company   Contract Mfg.

Agilent Technologies
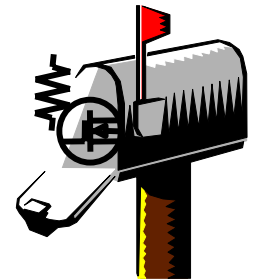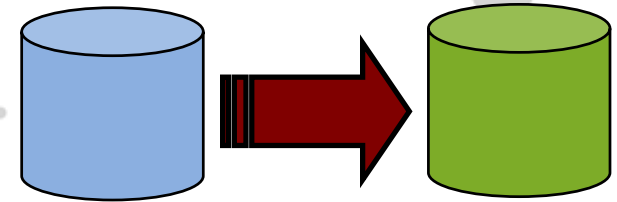
Using The Web

- Common User Interface
- 24 x 7 Access
- Great For Information Sharing

Agilent Technologies

Introducing The CAD Data Store

- Online Database of Commonly Used Parts for PCB Design
- Free to Search, View Specs, Symbols, and Footprints
- Purchase CAD Data (Symbol, Footprint, Map File)
- Support All Major PCB Tools
- New Part Creation Service

http://caddatastore.agilent.com

Agilent Technologies

CAD Data Store Benefits

- Find Parts Quickly
- Access to Quality CAD Data
- 24 x 7 Access Worldwide
- A Virtual Library System or Quality Content Generation
- Create Common Libraries:
  - Multiple PCB Tool Formats
  - With Multiple Vendors

Agilent Technologies

The CAD Data Store Approach

caddatastore.agilent.com

Browser

PCB Tool

EEserve

Local Files

Symbol
Footprint
Map

Agilent Technologies
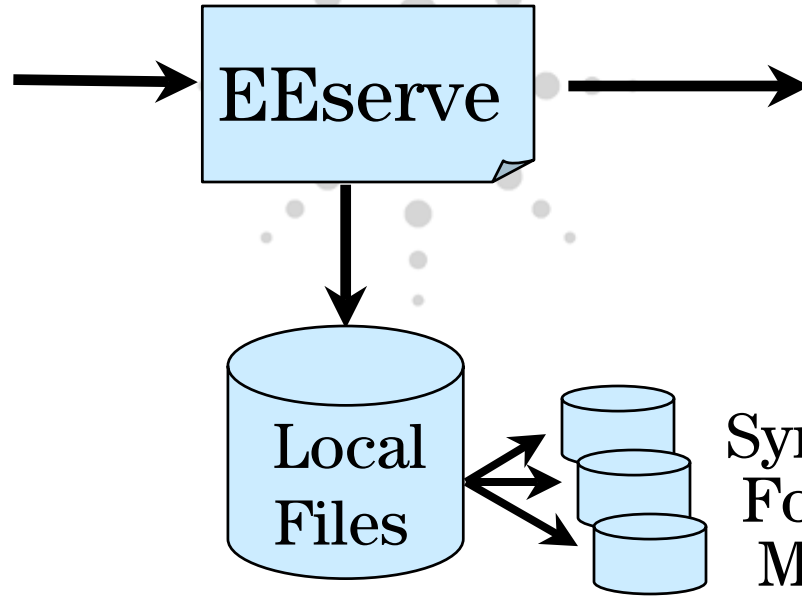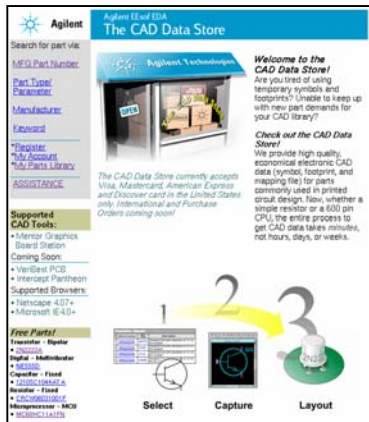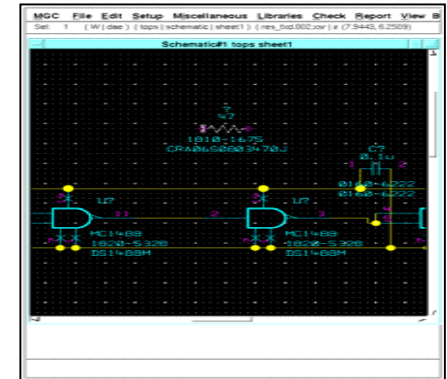
Using The CAD Data Store

Select

Capture

Layout
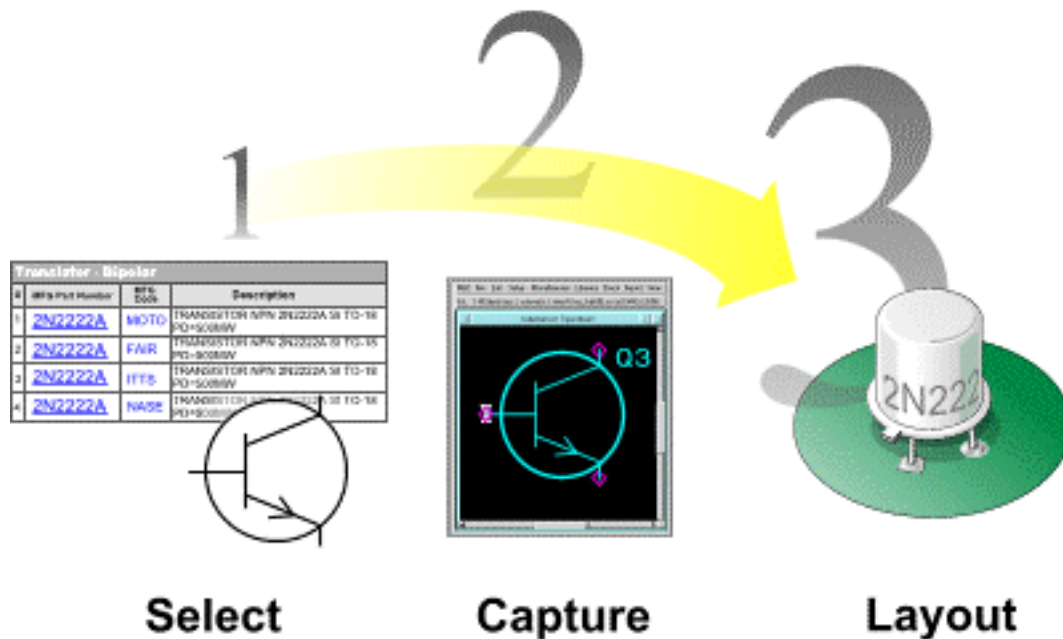
- Search For Parts
- Review Part Specifications
- Preview/Select Symbol & Footprint
- Purchase
- Download & Insert Into Schematic

Agilent Technologies

Search For Parts

- Mfg. Part No.

- Part Type & Specs

- Manufacturer

- Keyword

I Need a 4MB DRAM ...

Agilent Technologies

Search By Part Type

Part Families:

Amplifier
Analog IC
Capacitor
Circuit Protector
Connector
Digital
Diode
Logic
Magnetic
Memory
OptoElectronic
Other
Power Supply
Resistor
Switch
Transformer
Transistors

Logic
ASIC
Gate Array – FPGA
Gate Array – PLD
Microprocessor – MCU
Microprocessor – Special MPU
Microprocessor – Standard MPU
Microprocessor – Support

Magnetic
Inductor – Fixed
Inductor – Variable
Magnetic Shielding Bead

Memory
Memory – DRAM
Memory – PROM
Memory – SRAM

- 110+ Part Categories

- RLCs, Connectors, Transistors, ICs, ...

Agilent Technologies

Find By Performance Specs

Electrical Characteristics

Manufacturer's Part Number		
Supplier Name		
supplier generic part number		
application type	DRAM	
number of words	262144	
bits per word	16	
t(RAC) – max	<85n	SEC
t(CAC) – max		SEC
t(RC) – min		SEC
t(REF) – max		SEC
page mode	e.g.: NO , YES	
static column mode	e.g.: NO , YES	
nibble mode	e.g.: NO , YES	
data line configuration	e.g.: COMMON, SEPARATE I/O	

Application Type (DRAM)

No. of Words (256K) Bits/Word (16)

Access Time (<85 ns)

Refine Your Search

Agilent Technologies

Review & Compare Specs

Agilent Technologies

Preview Symbol & Footprint

Part Family:	Memory – DRAM
Mfg Part Number:	D424170LE–80
Description:	DRAM 256KX16 80 NS SOJ FST–PG–M 5V
Manufacturer:	NEC ELECTRONICS INC
Location:	SANTA CLARA

Choose a specific symbol to display in your CAD Tool. Note that all symbol variations listed are also downloaded into your CAD Tool's library.

If you have not yet created the appropriate CAD Data Store library, you may do so from the MY Account program. If you have not yet set up a CAD Data Store Account, you must first register with the CAD Data Store.

1. Select & View Symbol Variations

Choose Symbol	Symbol Name	Power Pin	Level Code	Bus Flag	Rotation	Mirror Flag	Demorgans Flag	Preview
●	mem_dram.052	n	full	regular	0	no	no	Symbol
○	mem_dram.052	p	full	regular	0	no	no	Symbol

2. Select Footprint

Select Footprint (If multiple footprints are present)	Preview all Footprints
● so00039	Footprint

Multiple Symbols for Insertion

Symbol Variations

Agilent Technologies

Preview Symbol & Footprint

so00039

Agilent Technologies
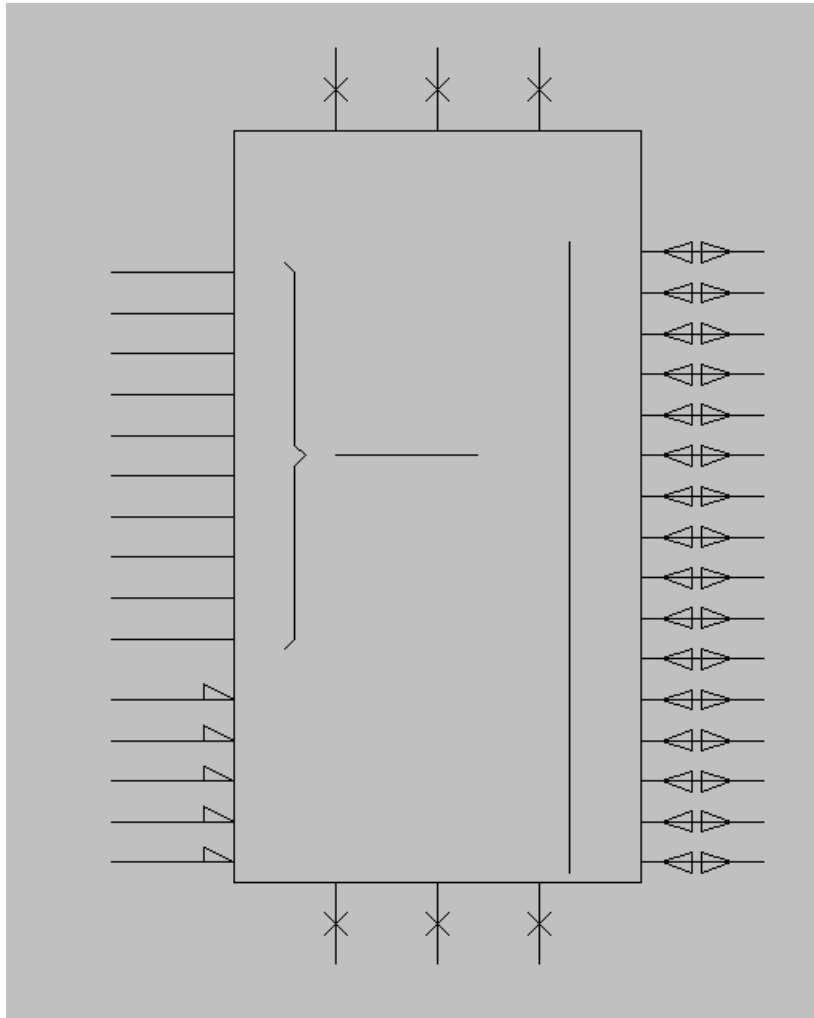
Purchase & Download

Agilent

Agilent EEsof EDA
The CAD Data

Part Selection: Download Part

Part Family:	Memory – DRA
Mfg Part Number:	D424170LE
Description:	DRAM 256KX1
Manufacturer:	NEC ELECTRO
Location:	SANTA CLARA

Symbol Name	Power Pin	Level Code	
mem_dram.052.nfr	n	full	re

Important! Before purchasing this data, yo
and configured the EEserve software. The
charge to handle the download and automa

If the EEserve software has been installed
now before continuing.

Page 31

Agilent Technologies
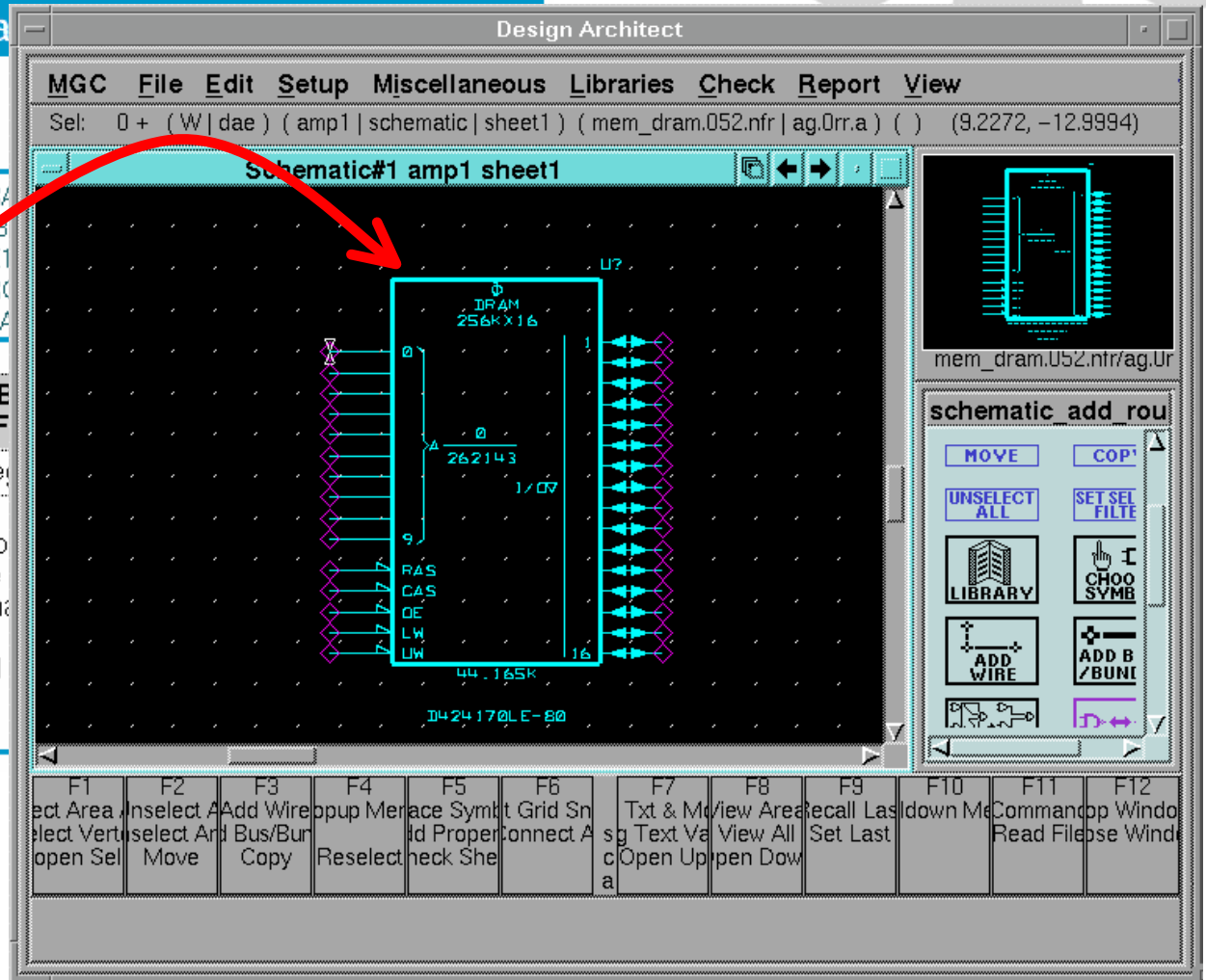
My Parts Library

Select the desired part type from the list:

Part Type	Account	
	100000011	100000012
Analog – Phase Locked Loop	1	
Capacitor – Fixed	3	1
Connector – RF	1	
Digital – Multivibrator	1	
Diode – PIN	1	1
Memory – DRAM	1	
Microprocessor – MCU	1	
Microprocessor – Standard MPU	2	
Resistor – Fixed	3	1
Transistor – Bipolar	3	1
Total number of parts:	**17**	**4**

Manage Parts By Libraries Defined By PCB Tool, Process, and Users

- Buy Once, Download Often
- Single, Site, and Global User Licenses

Agilent Technologies

My Account

User	Access Level		
	Admin	Browser	Buyer
Ammondson, Pam			
Fache, Niels			*
Kachigan, Karl	*		*
Nathan, Kent		*	
Smith, Fred		*	
Pierce, Shelly			*
Biggs, Bob		*	
Berthaux, Frank			*

Library Account #: 100000011
Description: Mentor Site Dev Lib
CAD Tool: Mentor Graphics Board Station
Board Technology: PC5
Component Spacing: Standard Spacing
License Type: Site User

Control Buying, Downloading, and Administrative Privileges

Agilent Technologies

A Personal Invitation

- Fill Out Feedback Form, Then ...
- Send an E-mail to
  info_caddatastore@agilent.com
  Requesting Information on the
  CAD Data Store Test Drive
  Promotion
  - Get $100 in "CAD Bucks"
  - *Limited Time Offer To Viewers by May 15th*

Free Parts!

Transistor – Bipolar
- 2N2222A

Digital – Multivibrator
- NE555D

Capacitor – Fixed
- 12105C104KATA

Resistor – Fixed
- CRCW06031001F

Microprocessor – MCU
- MC68HC11A1FN

100   100

Agilent Technologies

CAD Data Store Benefits

- Find Parts Quickly
- Access to Quality CAD Data
- 24 x 7 Access Worldwide
- A Virtual Library System or Quality Content Generation
- Create Common Libraries:
  - Multiple PCB Tool Formats
  - With Multiple Vendors

http://caddatastore.agilent.com

Agilent Technologies