

PCB SolderSim

EDA TechnoFair 2000

2000年1月27~28日

アンソフト ジャパン株式会社



PCB SolderSim

は下記の機能を含みます:

- ハンダリフロー工程のためのプリプロセッサ
- 熱の過渡解析
- PCBと部品の温度を予測
- PCBストレスを予測

PCB SolderSim

ハンダリフロー機構成定義画面

Job Name: SS_DEMO
15:16:42 09/09/1999

Conditions Applied above the PCBoard

Temp. :

Flux :

Conv. :

Rad. :

Board Travel →

Temp. :

Flux :

Conv. :

Rad. :

Conditions

Machine Type:
Wave

Step
Locations

S1 = 11.8 in
S2 = 17.7 in
S3 = 29.6 in
S4 = 41.3 in
S5 = 53.1 in
S6 = 59.1 in

Applied Belt
Speed :
5.906 in/min

Main Menu

Option: 1

Known Parameters

Define Analysis

Parameters

Set up a Soldering

Simulation

Job Name: SS_DEMO
15:36:49 09/09/1999

>>> SELECT A NUMBERED ITEM OR AN OPTION FROM THE MENU.

Search String F-Search B-Search Save Exit

***** Process Control Parameters *****

- Conveyor Belt Data:
 - 11. Minimum belt speed = 4.7244 in/min
 - 12. Maximum belt speed = 47.2441 in/min
 - 13. Applied belt speed = 5.9055 in/min
 - 14. Moving direction of board = +X
 - 15. Board side facing top = FRONT
- Heating zone temperature
 - 21. Minimum zone temperature = 100,0000 C
 - 22. Maximum zone temperature = 300,0000 C
 - 23. Maximum adj. zone temp. diff. = 50,0000 C
 - 24. Zone pairs with identical temperatures:
 - 2401. (1, 7)
 - 2402. (1, 9)
 - 2403. (UNDEFINED)
 - 25. Applied zone temperature:
 - 2501. Temperature of zone 1 = 150,0000 C
 - 2502. Temperature of zone 2 = 200,0000 C
 - 2503. Temperature of zone 3 = 175,0000 C
 - 2504. Temperature of zone 4 = 200,0000 C
 - 2505. Temperature of zone 5 = 230,0000 C
 - 2506. Temperature of zone 6 = 210,0000 C
 - 2507. Temperature of zone 7 = 240,0000 C
 - 2508. Temperature of zone 8 = 210,0000 C
 - 2509. Temperature of zone 9 = 250,0000 C
 - 2510. (UNDEFINED)
- Reference board temperature:
 - 31. Reference board location = Board Center
 - 32. Desired board temperature range:
 - 3201. (UNDEFINED)

Machine Type:
Wave

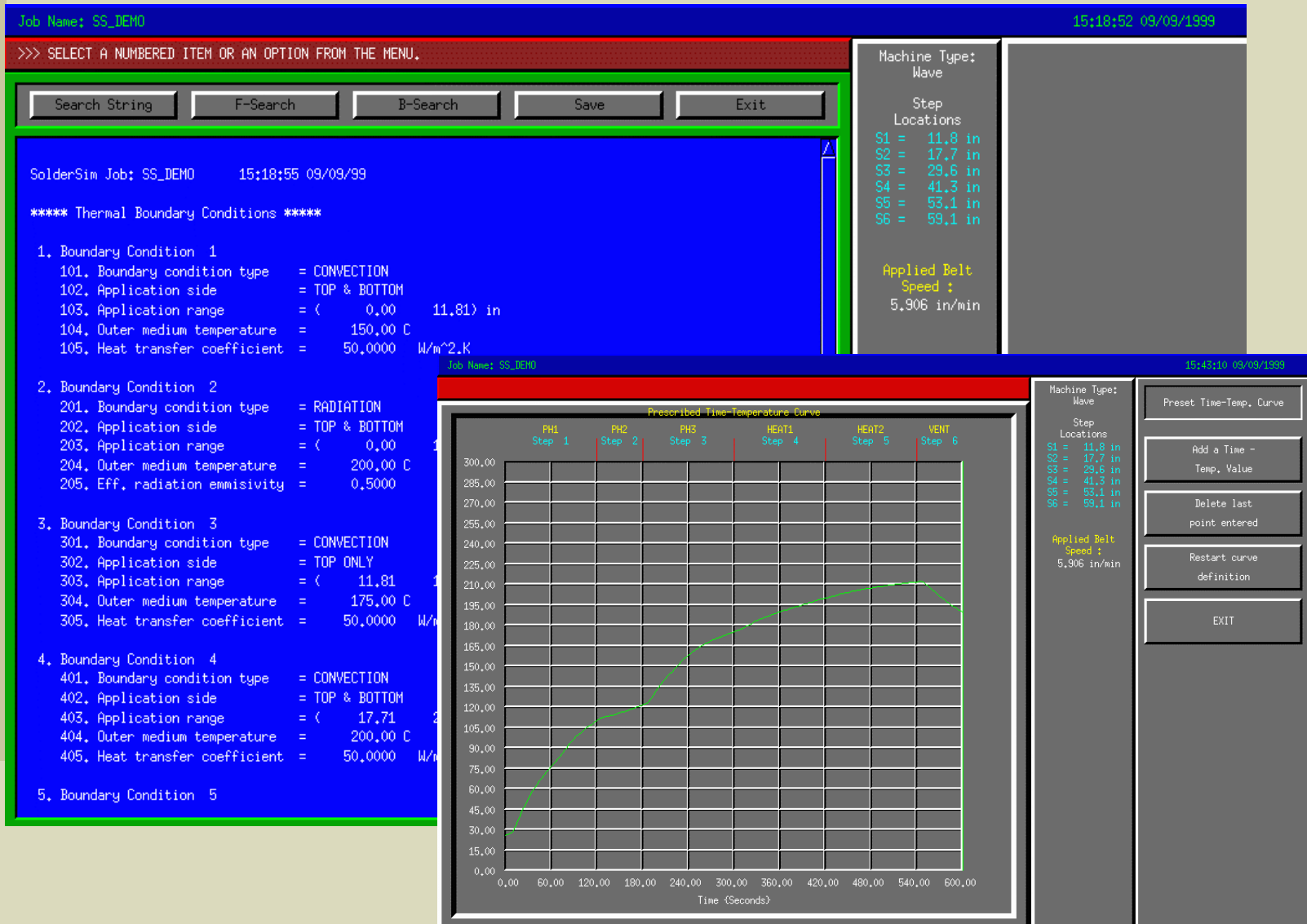
Step
Locations

S1 = 11.8 in
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Applied Belt
Speed :
5.906 in/min

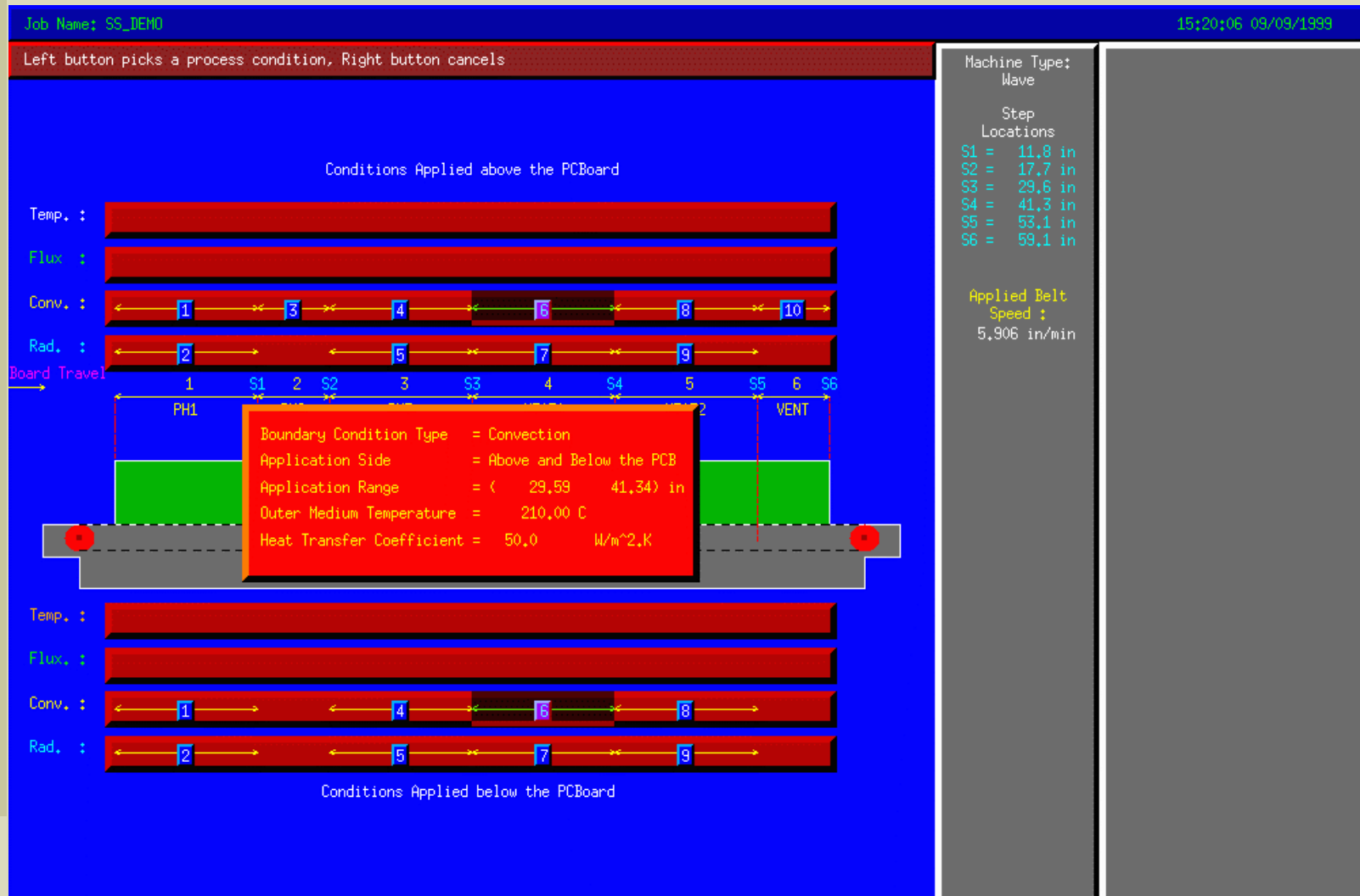
PCB SolderSim

境界条件: 対流, 放射, 熱伝導



PCB SolderSim

設定の詳細



PCB SolderSim

解析パラメータ

Job Name: SS_DEMO

>>> SELECT A NUMBERED ITEM OR AN OPTION FROM THE MENU.

Search String F-Search B-Search Save Exit

SolderSim Job: SS_DEMO 15:14:33 09/09/99

***** Analysis Control Parameters *****

1. Unit Systems:

11. Geometry	=	OLD BRITISH
12. Temperature	=	SI
13. Others	=	SI

2. Geometric Precision = 0.5000 in

3. Finite Element Parameters:

31. Number of Time Steps	=	215
32. Time Increment Size	=	3.0000 sec
33. Number of Nodal Points	=	1008

4. Ambient Condition:

41. Ambient Temperature	=	25.0000 C
42. Convection Heat Transfer Coef.	=	15.0000 W/m^2.K

5. Default Non-thermal Component Data:

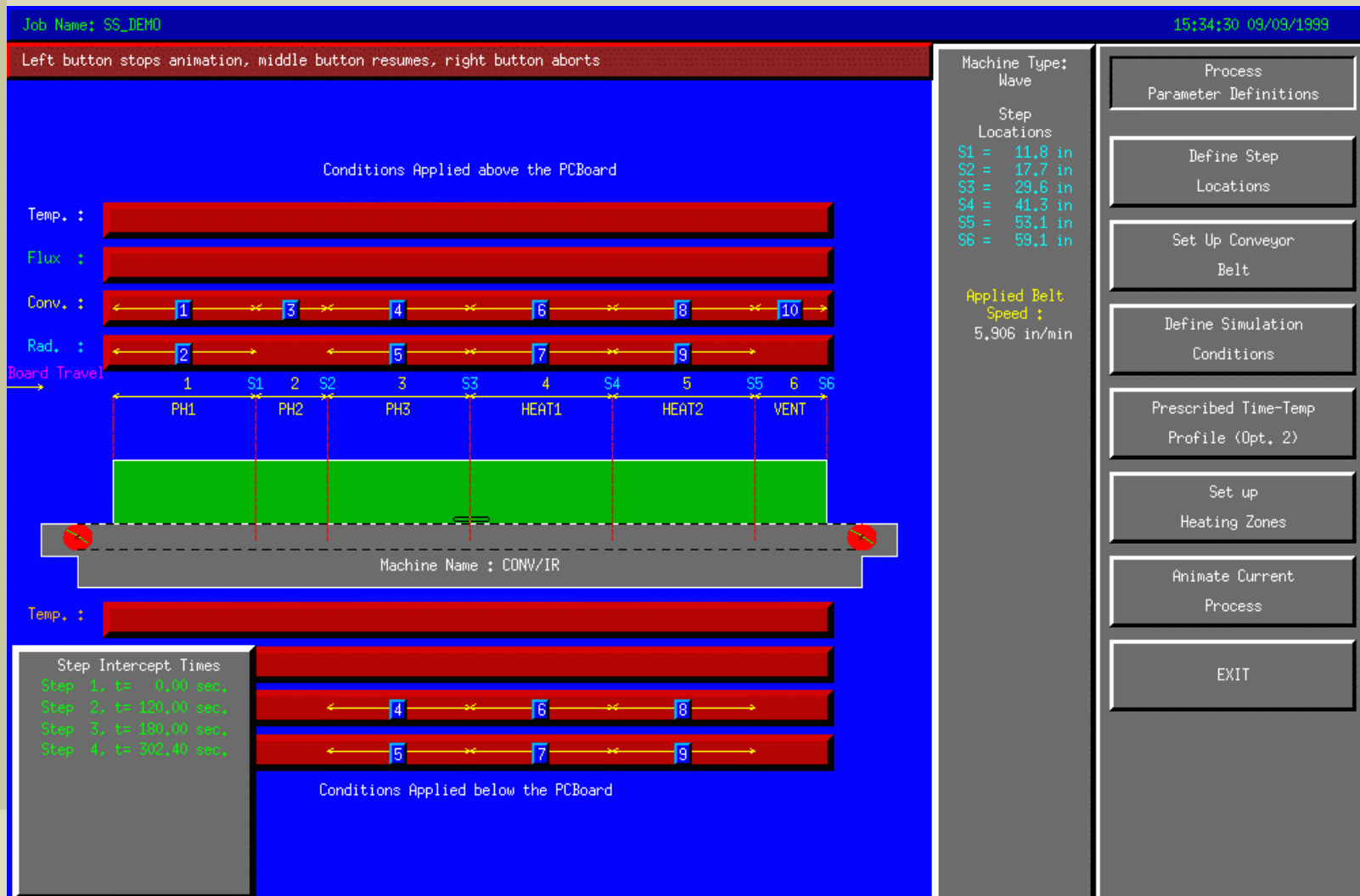
51. Mass Density	=	1700.0000 Kg/m^3
52. Specific Heat	=	2093.0000 J/Kg.K
53. Thermal Conductivity	=	6.0000 W/m.K

6. Thermal Stress Analysis Parameters:

61. Time for Stress Analysis	=	500.0000 sec
62. Stress Free Temperature	=	25.0000 C

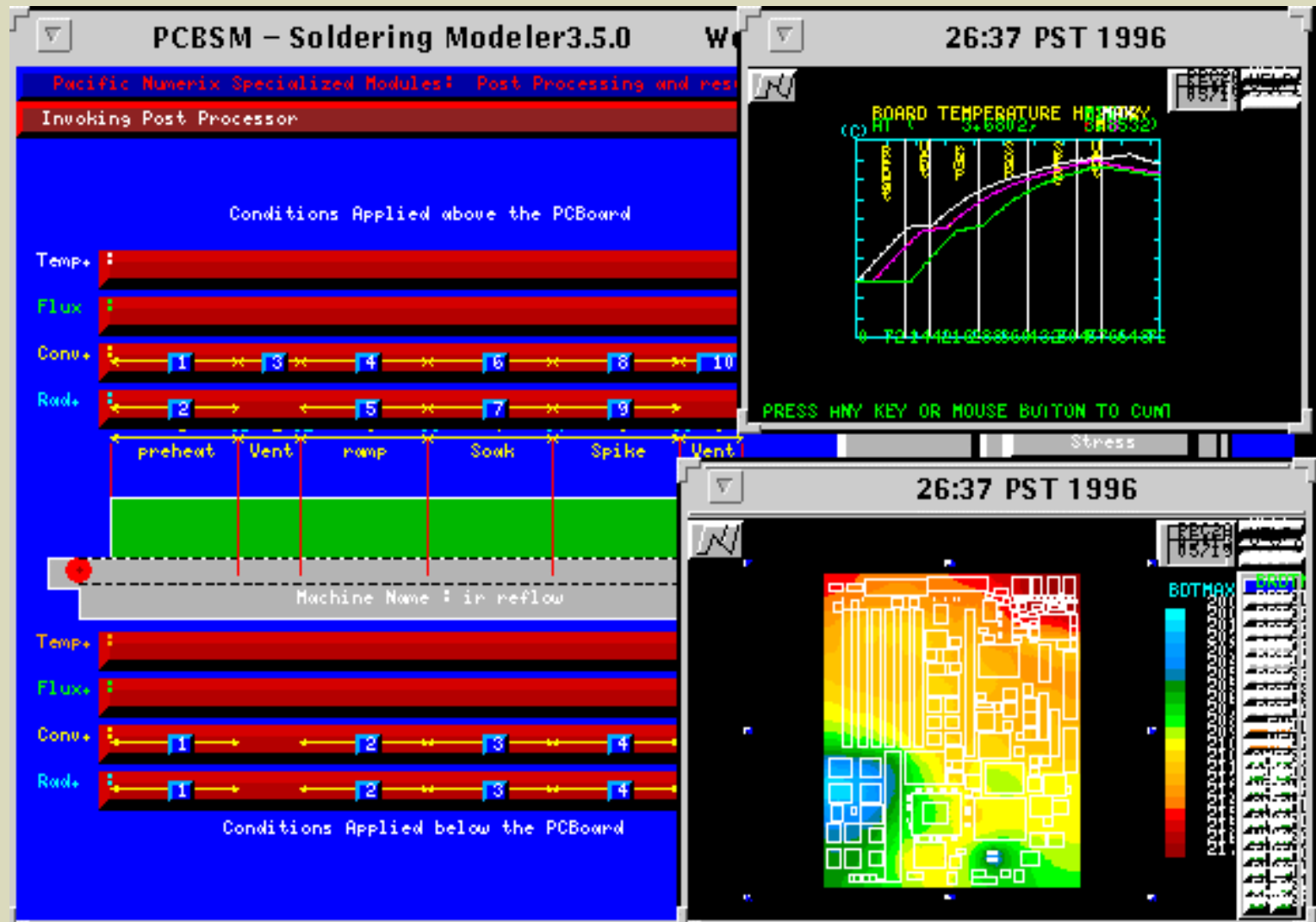
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熱解析実行画面



PCB SolderSim

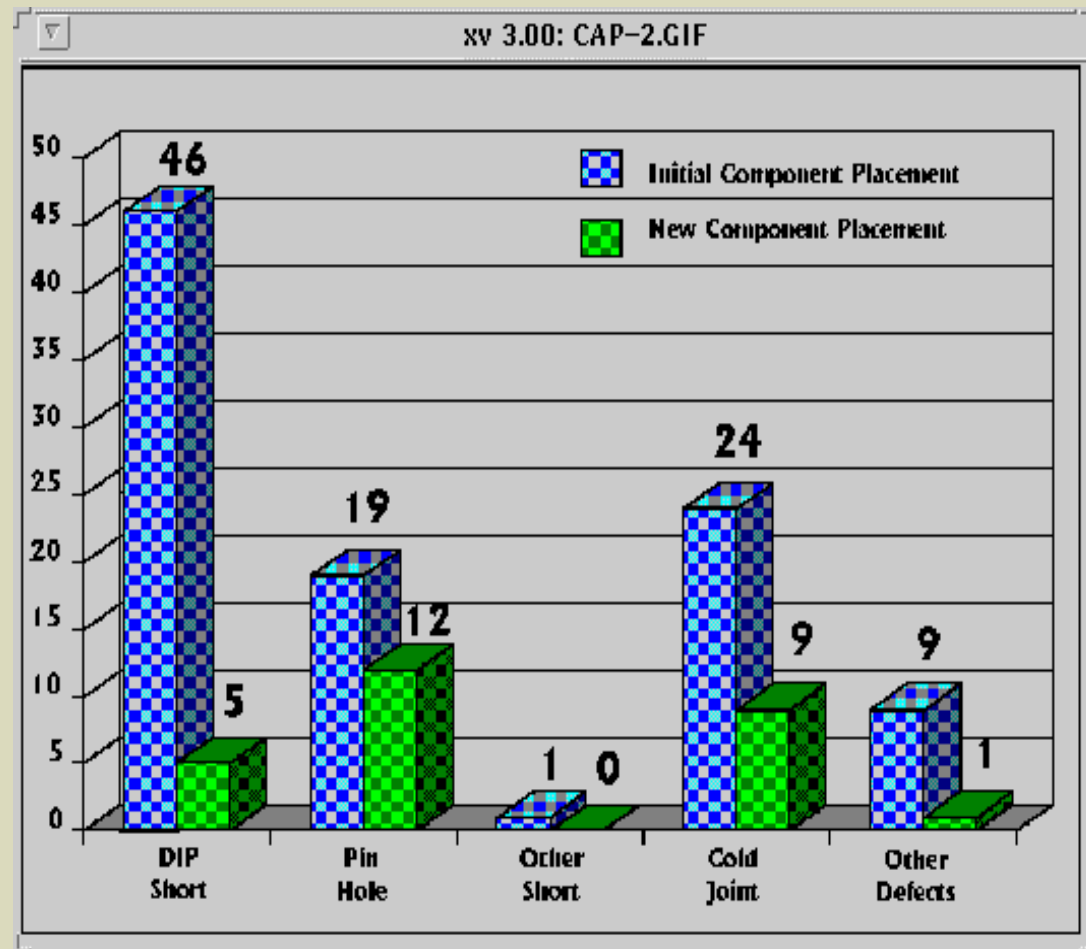
結果: PCB /部品温度 と熱コンタ図



SOLDERSIM 成功事例

• Solder Simは再設計を99回から27回に削減

• 再設計コストを\$300,000.-以上節約



PCB SolderSimの優位点

- ハンダリフロー工程におけるPCBと部品温度を予測
- リフロー機のベルトスピードと熱境界条件に基づいた部品の配置と設計指針の決定
- リフロー機の熱環境下におけるPCBの変位を予測
- リフロー機の熱環境下におけるPCBストレスを予測