



TS-DEM **Development of Electronic Modules**

Electronics Design Office

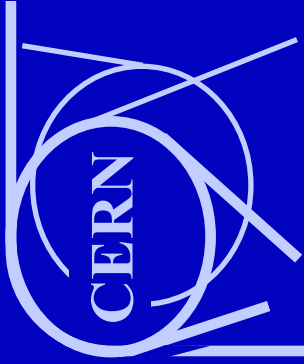
Betty Magnin / Erik van der Bij
CERN



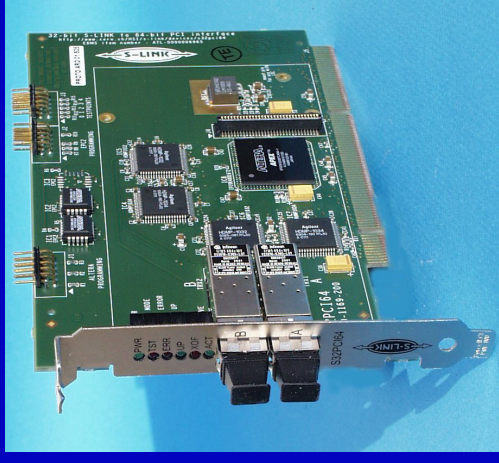
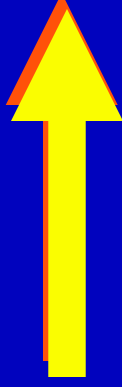
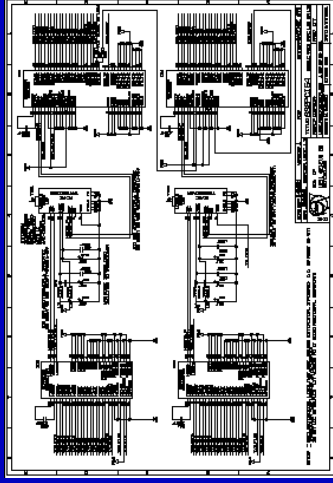
Contents

Mission and means
Tools
Cost aspects
Future Evolution





Mission



- From schematics to mounted PCBs**
- 1 to 200 pieces / project**
- Project cost: CHF 150.- to CHF 20'000.-**
- Around 800 projects / year**
 - (500 new designs, 150 modifications, 150 production only)



Turn-around time

Prototype electronics production
multi-layer PCB, standard priority

Layout (and queue) 4 weeks	PCB fabrication 3 weeks	Assembly 2 weeks	Margin 1 week
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Tight planning and follow-up needed
Need companies that you can rely on

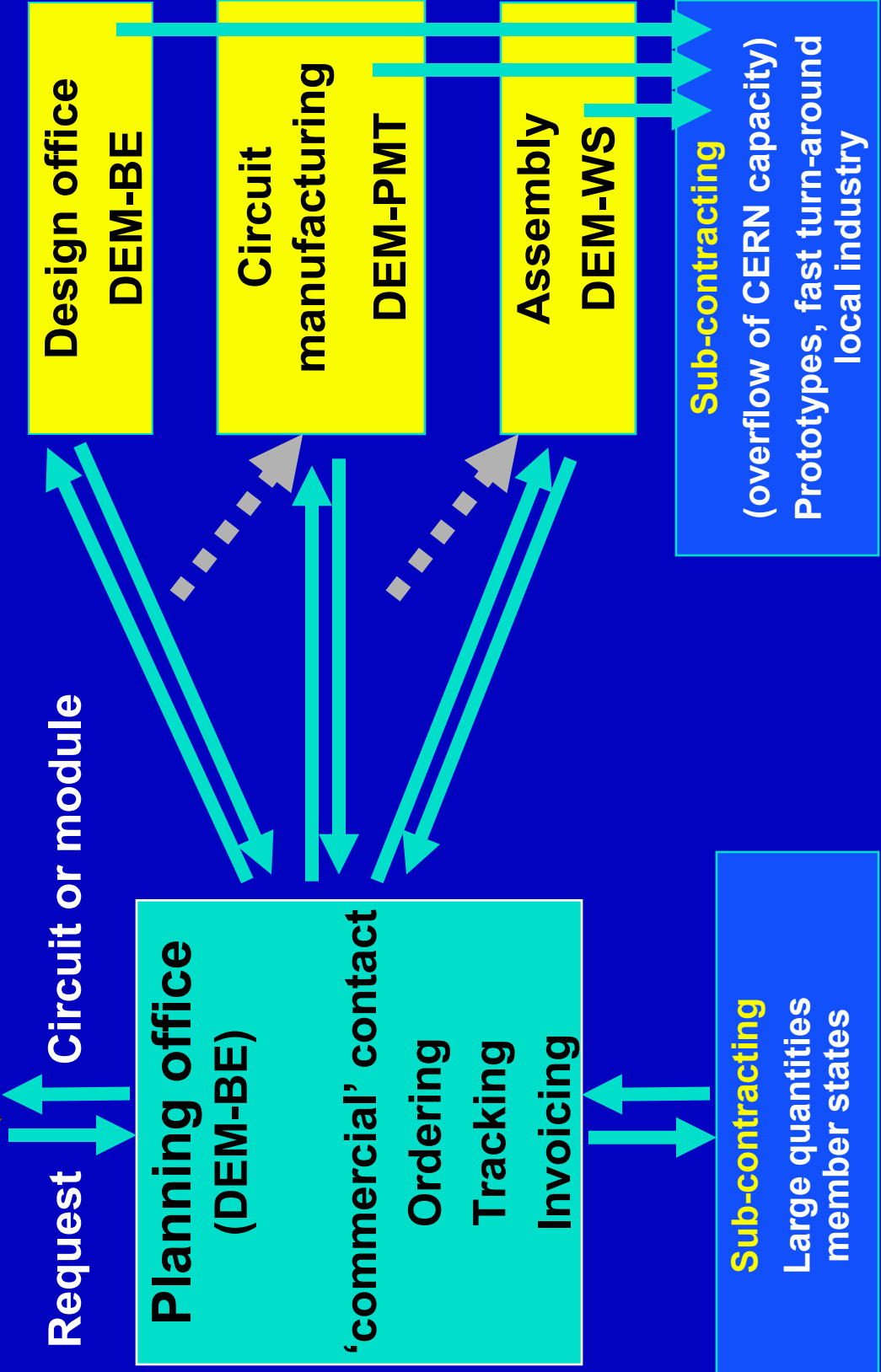


Tasks

- Plan the project**
- Advice on finding manufacturable solutions**
- Create components in libraries**
- Design layout and specific mechanical parts**
- Order PCB's**
- Order mechanical parts**
- Order standard components from CERN Stores**
- Order PCB assembly**
- Invoice**



TS-DEM



staff: includes section leaders staff prod: staff dedicated to production IS: industrial support



Means of DEM-BE

Planning office

- Planning and technical support (SL) : 0.5 Staff
- Ordering, administration and follow-up : **2 IS**
- Invoicing : 0.5 Staff

Design office

- Management (SL) : 0.5 Staff
- Librairies : **2 Staff + 0.5 IS**
- Layout and mechanical design : **8.5 IS**



Production means

In-house

PCB Manufacturing
PCB Assembly

: TS-DEM-PMT
: TS-DEM-WS

Outside (we can subcontract all phases)

PCB Layout and mechanical design: 1 company
PCB Manufacturing : 4 companies
PCB Assembly : 4 companies

(Manufacturing and assembly for productions of over 10 pieces)



Tools

CAE

Cadence
PCAD
CAM350
Autocad
Fabmaster
EDMS

Planning and billing

Specific application on FileMaker
Several EXCEL worksheets
MS Project
EDH
JMT
JMT2 should unify (with TS-CSE)



Document management via EDMS

- Schematics
- Specification
- PCB Layout
- Manufacturing
- Assembly
- Mechanics
- Pictures
- Supplier info

We send only the EDA number to subcontractors!

Betty Magnin / Erik van der Bij

The screenshot shows a web browser window with the URL <http://edms.cern.ch/edms/trees/cookie=2687797&top=1250427580&open=1250427580>. The page title is "EDMS IREF2 Power Supply". The user is identified as "User: GUEST". The page content includes a description "Description: IREF2 Power Supply", an equipment code "Eq. Code:", an EDMS ID "EDMS Id: EDA-00596 v.0", and a responsible person field. On the right side, there are options to "Displayed" (Compact listing, Extended listing, Hide obsolete, Show obsolete) and "Sorted by" (Default, Number, Creation Date, Status). A "Documents in this node: 8" indicator is visible at the bottom of the left sidebar.

Item ID	Description	File Name	Size	Status
448863 v.1	IREF2 Power Supply schematics	Doc_Page		In Work
		EDA-00596-V1_sch SCH	(64 kb) pdf (30 kb)	
448864 v.1	IREF2 Power Supply specification	Doc_Page		In Work
448865 v.1	IREF2 Power Supply PCB-layout	Doc_Page		In Work
		EDA-00596-V1_pcb pcb	(96 kb) pdf (35 kb)	
448866 v.1	IREF2 Power Supply Board manufacturing data	Doc_Page		Released
		EDA-00596-V1_specif xls	(54 kb) pdf (75 kb)	
		EDA-00596-V1_pcb-mfg zip	(51 kb) zip (6)	
448867 v.1	IREF2 Power Supply Assembly	Doc_Page		In Work
		EDA-00596-V1_pcb-mat XLS	(60 kb) xls (51 kb)	
		EDA-00596-V1_fabric ZIP	(1 kb) zip (1)	
		EDA-00596-V1_top-top pdf	(58 kb) pdf (25 kb)	
		EDA-00596-V1_bot-bot pdf	(25 kb) pdf (25 kb)	
448868 v.1	IREF2 Power Supply Mechanical parts	Doc_Page		In Work
448869 v.1	IREF2 Power Supply picture	Doc_Page		In Work
448870 v.1	IREF2 Power Supply supplier info	Doc_Page		In Work

Items: EDA-xxxxxxx



Cost aspects

Costs temporarily supported by Design Office

One project = One Invoice (design+production)

Controlled via contracts (suppliers or FSU)



Future evolution

Improve IS polyvalence and competence level

- Training (on-the-job or seminars), HF and Fine-Pitch
- Visits of PCB manufacturing and assembly subcontractors

Improve planning, follow-up and invoicing process

- JMT2 with DEM specific extensions made by TS-CSE

Evaluate subcontractors for PCB Assembly

Extend the service to larger volumes