

*Production Flow, Test,  
Traceability & Labeling*

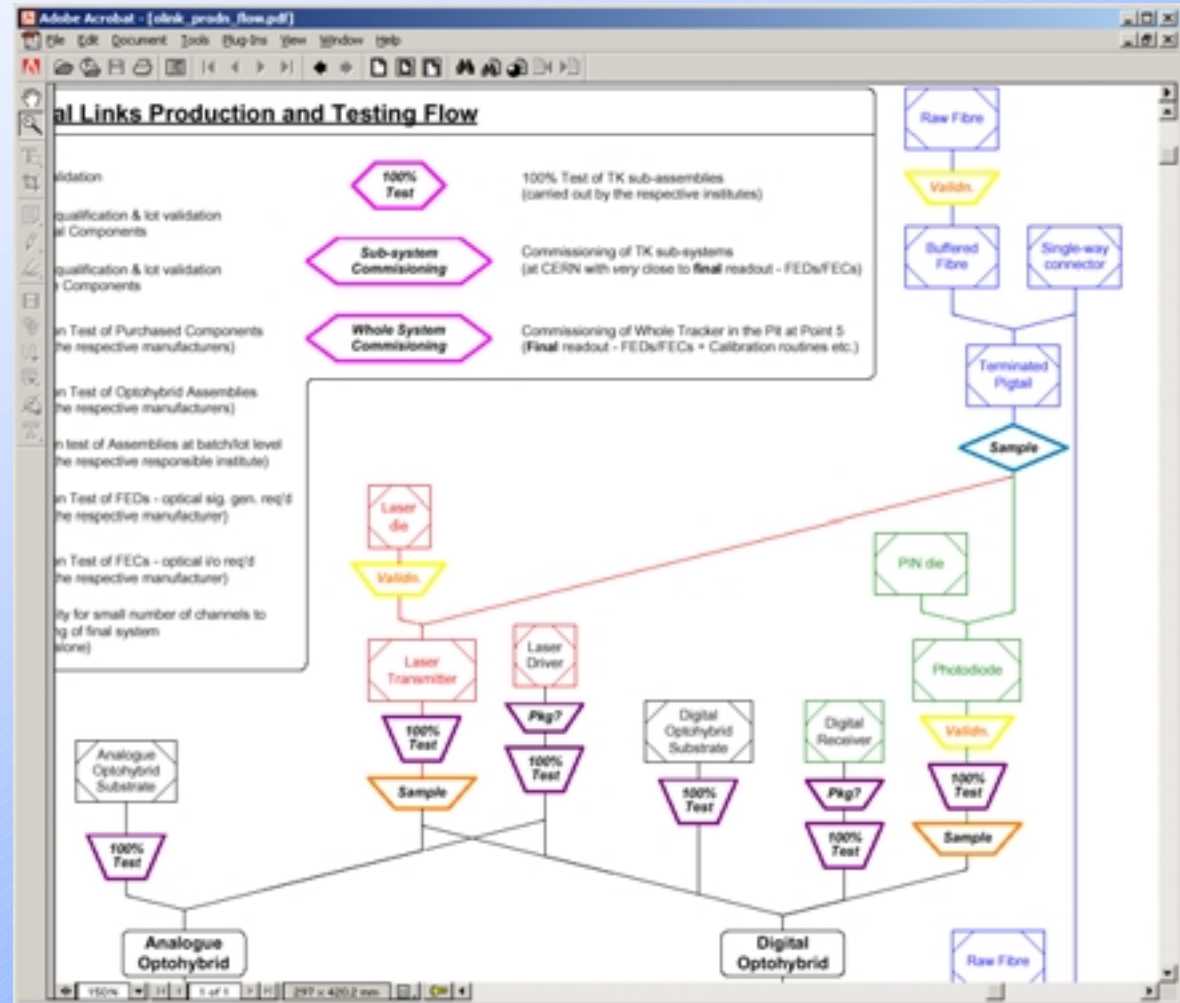
# *Overview*

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- Production & Testing Flow
  - How Assemblies are built and tested from their component parts
- Testing Samples and Time
- Traceability and Labeling
  - Storage of production data

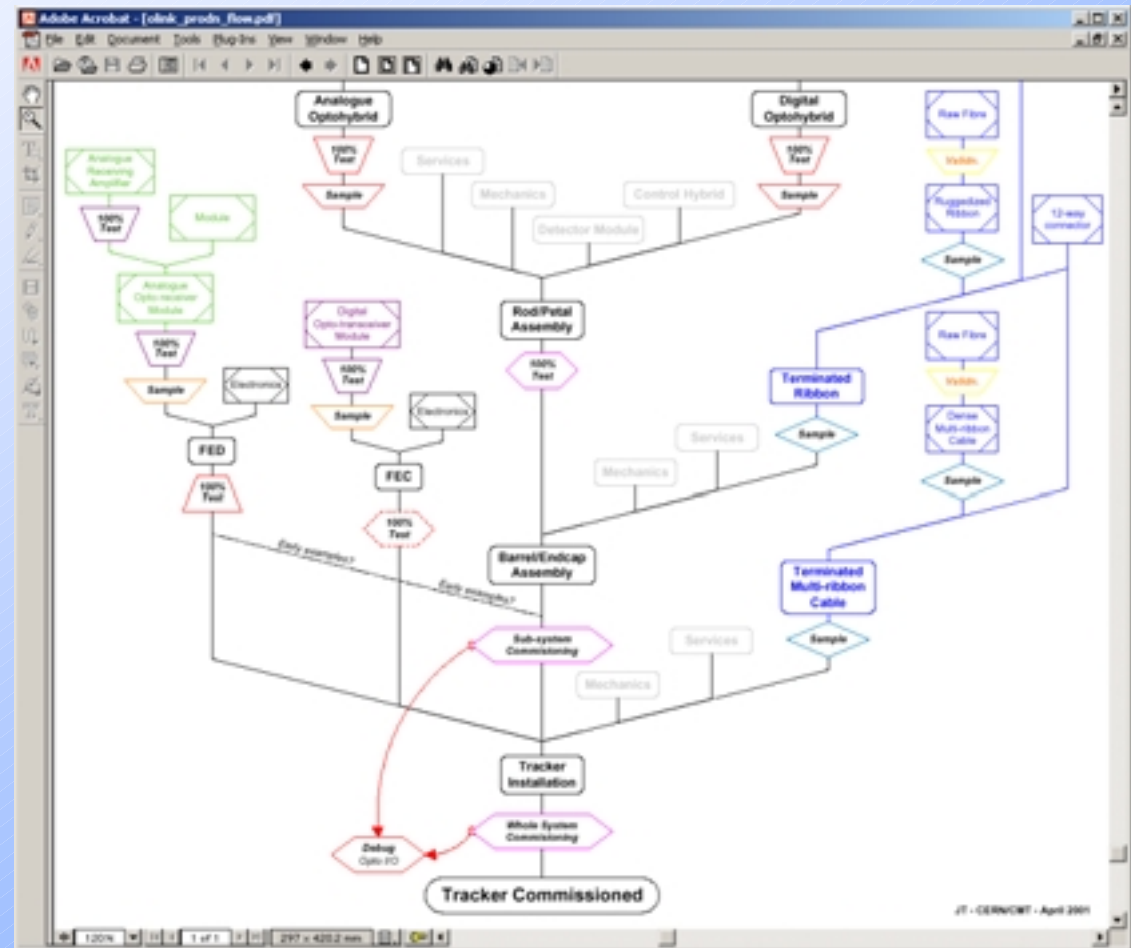
# Production & Testing Flow 1

- From Components to Optohybrid
- Validation by CERN
- 100% manufacturing testing carried out by respective manufacturers
- Lot Testing (sample) done by CERN



# Production & Testing Flow 2

- **Optohybrid Manufacture**
  - 100% test by manufacturer
  - Qualification & Lot validation by Institute in Charge
- **Fibre & Connectors**
  - 100% test by manufacturer
  - Qualification & Lot validation by CERN
- **Back-end Items**
  - 100% test by manufacturer
  - Qualification & Lot validation by CERN



# Test Samples

- Proposed numbers per lot, devices used for lot validation
  - Subject to placement of contracts with manufacturers
    - Implies agreements on scheduling

Adobe Acrobat - [QA\_manual\_v1.0.pdf]

Table 5: Preliminary pre-production and production quantities and timescales for optical link components

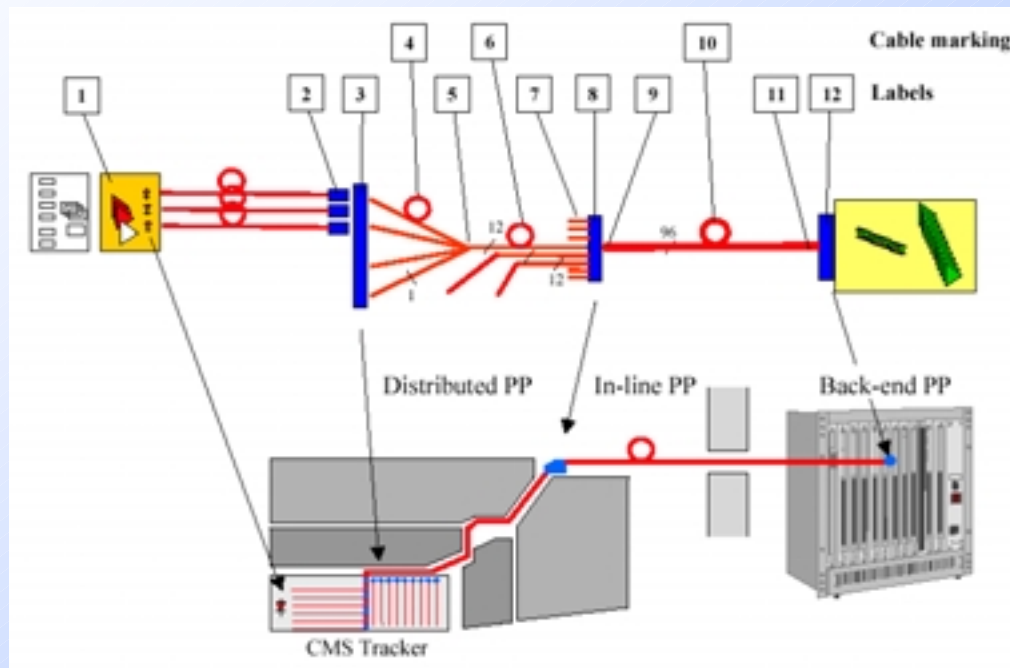
Item	CMS Institute in charge	Total Production	Pre-Production		Production			Total production time	
			Total	Qualification Samples	Number per lot	Number per lot validation	Number of lots		
Analogue Optohybrid (TIB) <sup>1</sup>	INFN	3100	2%	25%	TBD	TBD	TBD	TBD	
Analogue Optohybrid (TEC) <sup>1</sup>	INFN	900	80	20	TBD	TBD	TBD	TBD	
Analogue Optohybrid (TOB) <sup>2</sup>	HEPHY	5800	1.5%	30%	TBD	TBD	TBD	TBD	
Analogue Optohybrid (TEC) <sup>3</sup>	HEPHY	7100	105	30	TBD	TBD	TBD	TBD	
Laser Driver	MBC	19000	n/a	n/a	19000	TBD	1	n/a	
Laser Transmitter	CME	50000	2%	10%	max. 15%	1%	7	7 Quarters 21 months	
Terminated Pigtail	CME	50000	1000	200	7500	max. 75	7	7 Quarters 21 months	
Buffered Fibre	CME	50km	n/a	n/a	50km	500m	1	n/a	
Terminated Fibre Ribbon	CME	4400	2%	22%	max. 20%	1%	5	5 Quarters 15 months	
Ruggedized Ribbon	CME	30km	n/a	n/a	30km	200m	1	n/a	
Terminated Multi-Ribbon Cable	CME	570	2%	50%	max. 15%	2%	7	7 Quarters 21 months	
Dense Multi-Ribbon Cable	CME	45km	n/a	n/a	45km	100m	1	n/a	
Analogue Opto-receiver Module	CME	4500	2.5%	20%	4500	45	1	n/a	
Analogue Receiving Amplifier	CME	5000	100	↑↑	5000	n/a	1	n/a	
Distributed Patch Panel	CME	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
MU-SR Adaptor	CME	4400	n/a	n/a	4400	1%	44	1	n/a
In-line Patch Panel	CME	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Back-end Patch Panel	CME	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

## Testing Time

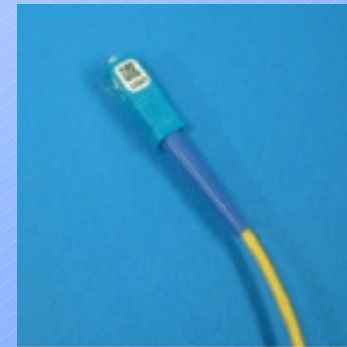
- 100% Test must take less than the production time
- Lot validation must be carried out in time for batch requests to be made

# Traceability of Production Parts

- Traceability implies labeling of parts that can be separated in the optical link system:



- Proposal is to use a 2D barcode system
  - High enough character density from 3mm x 3mm label



- Requires ratification by Tracker community

- Traceability also implies storage of test data

# *Storage of Production Test Data*

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- **Manufacturer Supplied Data**
  - Data to be supplied in electronic form
  - Transferred into Tracker Production Database
  
- **Data collected by test labs**
  - Qualification
    - Qualification Reports – EDMS
    - Data stored locally
  - Lot Validation
    - Validation Reports – EDMS
    - Data stored locally and mirrored to Tracker Production Database
  - *100% Manufacturing Test (optohybrids)*
    - *Data stored locally and mirrored to Tracker Production Database*

# Summary

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- Flow of parts reviewed
  - Sequences defined
  - Clear that the flow is complex and will require careful management
    - This is unavoidable in a complex system with many components
- Have an outline proposal for the lot delivery & testing strategy
  - Available for Tendering process to make requirements clear not only on quantities but also on timescales
  - Can be discussed with manufacturers during contract negotiations
- Will make use of Tracker Production database for traceability of parts and storage of manufacturing data