



Nordic Test Forum

*invites to*

# TestForum 2003

A Nordic forum for exchange of experience and know-how  
within the field of production test of electronics.

Meet colleges and experts, gain knowledge about trends  
and best practices in the area of test of electronics.

Tuesday and Wednesday, December 2 and 3, 2003

**Comwell Borupgaard, Snekkersten, Denmark**

TestForum 2003 Program, November 22, 2003



## The Program for TestForum 2003

This year we have combined a program for TestForum aiming at covering some quite essential challenges confronting people in the area of production test of electronics. The topics include boundary scan test (JTAG), functional test and fixtures, as well as optical inspection, AOI, and X-ray inspection, including AXI. For this year's TestForum, the focus of boundary scan test is on systems applications. Functional test covers the range from audio to RF, but with main emphasis on RF related issues such as bluetooth.

Among others, we have invited four trend setting experts to present overviews of the topic areas. One is Stig Öresjö from Agilent in the USA. He was one of the fathers of BSDL, the boundary scan description language, and now he is quite active concerning X-ray inspection. Another is Gunnar Carlsson from Ericsson. Gunnar has a reputed, in-depth knowledge concerning test and inspection, not least in the area of boundary scan. Michael J. Smith from Teradyne has a broad and detailed knowledge about inspection and test, and in recent years he has also served as chairman for the Roadmapping Committee under the North American initiative, National Electronics Manufacturing, NEMI. Last, but not least is Göran Wetter from IVF Industrieforskning & Utveckling AB, and he will share with us his deep knowledge of X-ray inspection.

The many contributions from knowledgeable users and suppliers of solutions for test and inspection should not be forgotten – they will ensure a good contribution in each of their fields.

We dare to state that TestForum 2003 will offer a most interesting opportunity to acquire new and important know-how for those who participate. It will inevitably prove an event where each participant will obtain new and important knowledge about test and inspection, the opportunities and shortcomings. In the years to come we trust that most of you that participate will think back of the seminar for its positive inspirations and experiences.

Yours sincerely



Knut Båtsstøløkken  
Chairman of *Nordic Test Forum*

## Local Organizer

The local organizer is:

Birger Schneider  
Tel.: +45-45 76 21 00  
Email: [bsc@microlex.dk](mailto:bsc@microlex.dk)

## In Association with

The TestForum 2003 event is in association with the following Nordic organizations:



**Invited Speakers**

**Gunnar Carlsson** is a Test and DFT Strategist with Ericsson, Radio Systems Development (although also consulting for other parts of Ericsson). He has 25 years of experience in the test and DFT area, gained in different positions, e.g. board test engineering, development of test related SW tools, managing development of ASIC DFT tools, and consulting in general in the area. Gunnar has been involved in test and DFT spanning from ASIC over boards to entire network nodes, and over the product life cycle from design verification over production test to testing in the field. Further, he is an active participant in several national and international organizations in the test field, such as the steering committees of ETTTC, ETS and the Swedish Network for DFT Research.



**Michael J Smith** is currently a technologist for Teradyne's Assemble Test Division based in North Reading, Massachusetts, USA. He has over twenty years of experience with Automatic Test Equipment starting with simulator based functional test systems in the early 80's, through to traditional electrical inspection systems, image based inspection systems and process monitoring and control. He has written numerous papers and articles as well as being the National Electronics Manufacturing Initiative (NEMI) Roadmapping Chair for Test and Inspection in 2000 and 2002 and IPC Technical Committee Member for APEX 2002, 2003 and 2004. With a European background in technical support and sales he has been actively involved in product development based on his relationships with major customers worldwide.



**Stig Oresjo** is a Senior Test Strategy Consultant with Agilent Technologies, Manufacturing Test Business Unit (MTBU). He joined Hewlett-Packard Sweden in 1977 as a Board Test Systems Engineer. Mr. Oresjo moved to the USA in 1984 to work with Printed Circuit Board Assembly Test as an Applications Specialist for HP. He represented HP (Agilent) on the Boundary-Scan standards committee (IEEE 1149.1) from 1987 to 1995 and was the co-editor for the Boundary-Scan Description Language (BSDL) effort (IEEE 1149.1b). Mr. Oresjo has extensive experience of in-circuit, functional, boundary-scan, x-ray and AOI testing of PCBA's. He has also done extensive research on industry defect levels, defect spectrum and test / inspection systems test effectiveness. He has authored many papers and articles regarding PCBA test issues and holds several patents related to board test.



**Göran Wetter** is a Senior Materials and Failure Analysis Specialist at the research institute IVF Industrial Research and Development Corporation in Sweden, where he is a member of the Division of Electronics Packaging and Production, and is responsible for the Failure Analysis Laboratory. He has an M.Sc. in Mechanical Engineering, and has worked in the field of electronic materials analysis for over ten years. He has a thorough knowledge of a variety of analysis techniques, such as X-ray microscopy, Scanning Electron Microscopy, Energy Dispersive Spectroscopy and Scanning Acoustic Microscopy.



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## Program

*Tuesday, December 2, 2003*

Time	Titles	Speakers or additional info
8:30-10:00	NTF Annual General Assembly	For members and other interested.
10:00-10:30	Registration	
10:30-10:40	<b>Welcome/Introduction</b>	Knut Båtstøløkken Birger Schneider
10:40-12:15	<b>Key Note Session</b>	<i>Chairman: Knut Båtstøløkken</i>
10:40-11:30	"Test strategies yesterday, today, and tomorrow"	Stig Öresjö, Agilent, USA
11:30-12:15	"System Test and Boundary Scan"	Gunnar Carlsson, Ericsson, S
12:15-13:45	Lunch	
13:45-17:15	<b>Boundary Scan - System test</b>	<i>Chairman: Bengt Magnhagen</i>
13:45-14:15	"Design Considerations in Using 1149.1 as a Backplane Test Bus"	Pete Collins, JTAG Technologies
14:15-14:45	"Module Test, System Test and Functional Test using Boundary Scan"	Mikael Hauschultz, Tellabs Denmark
14:45-15:15	"System Test through Boundary Scan"	Mikael Löfbom, Saab Test Systems
15:15-15:45	Coffee Break	
15:45-16:15	"Analog Mixed Signal Boundary-scan (1149.4)"	Olivier Wilms, National Semiconductor
16:15-16:45		
16:45-17:15	"Safety Risks Concerning Sabotage/Espionage in Using Boundary Scan for System Test?"	Birger Schneider, et. al.
17:15-17:45	Fruit & refreshments	
17:45-18:15	"News from Conferences"	Gunnar Carlsson, et. Al.
18:15-19:30	"Does AOI/AXI remove the need for ICT and functional test ?"	<i>Panel moderator: Birger Schneider</i> Pete Collins, JTAG Technologies Gunnar Carlsson, Ericsson Bengt Nilsson, Partnertech Michael J. Smith, Teradyne Stig Öresjö, Agilent Bengt Magnhagen, Elektronikindustri-föreningen
20:00	Dinner	
21:30	Social get-together	

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### Nordic Test Forum (NTF) Annual Assembly, December 2 2003

NTF was established at TestForum 2001. We hold our annual assembly for NTF at 09:30 December 2, 2003. The agenda and motions will be dispatched to the members in a separate mailing.

If you do not intend to participate in the Annual Assembly, the TestForum 2003 starts with Registration from 10:00 to 10:30.

**Program, cont'd**  
**Wednesday December 3, 2003**

Time	Titles	Speakers or additional info
07:00-08:30	Breakfast	
08:30-12:00	<b>Functional Test &amp; Fixtures</b>	<i>Chairman: Ole Flesaker</i>
08:30-09:00	"Fixtures for HF Applications"	Stig-Gunnar Jensen & Gunnar Vik, Flextronics, N
09:00-09:30	Testing Bluetooth	Jens Marquardsen & Tomas Rønberg, Rhode & Schwarz
09:30-10:00	"Test fixtures for Bluetooth and other RF applications"	Henning Essén, Columbia Elektronik, S
10:00-10:30	Coffe Break	
10:30-11:00	A 100 MHz General Purpose Suite of Instrumention	Nick Storton, National Instruments, UK
11:00-11:30	"Video & AudioTesting Using a Suite of Modular Block Solutions"	Birger Schneider, microLEX Systems, DK
11:30-12:00	"RF Testing Using PXI Solutions"	David Owen, Pickering Switch, UK
12:00-13:30	Lunch	
13:30-16:00	<b>AOI-machine inspection/X-Ray</b>	<i>Chairman: Birger Schneider</i>
13:30-14:00	"Real-time microfocus X-ray - a tool for quality control and failure analysis of electronics"	Göran Wetter, IVF, S
14:00-14:30	"The Effects of Business and Technology on Image Inspection"	Michael J. Smith, Teradyne
14:30-15:00	Coffe Break	
15:00-15:30	"3D X-ray computed tomography of automotive and electronic devices"	Dr. Stefan Becker, Phoenix, D
15:30-16:00		
16:00-16:15	Test Forum close	Knut Båtstøløkken

### Practical information

The *Seminar Fee* adds to DKK 3,200 (about Euro 431) for NTF members and DKK 3,600 (about Euro 485) for others. The fee includes participation, hotel room for the night December 2 and 3, food and refreshments from Tuesday morning to Wednesday afternoon, and documentation. Exhibitors pay DKK 5,000, i.e. Euro 673, which also includes the participation of a single person.

The seminar fee will be invoiced directly to the organisation, from which the participant comes. In the event of cancellation after the final registration date, or in the event of failure to appear, the entire fee is still due. On request, another person from the same organisation can participate instead.

The cost for extra lodging at the hotel, e.g. between December 1 and 2, is DKK 995 per night (Euro 134). NTF is unable to guarantee rooms after the date of the final registration.

The *Final Registration* is Wednesday, November 26, 2003, in order to guarantee hotel room at the conference center. Participation after this date is possible, but requires special arrangements.

### Exhibition

As in previous year, there will be a mini show related to the tools and methodologies relevant to the NTF Forum event. Suppliers can make arrangements with NTF about exhibition space. If nothing special has been agreed, a table of about 70x140 cm<sup>2</sup>, as well as space for posters or similar material will be made available.

## Registration

Please send your advance registration to the TestForum 2003 secretariat at:

microLEX Systems A/S  
Dr. Neergaards Vej 5C  
DK-2970 Hoersholm  
Danmark

Att.: Suzanne Holte

Tel.: +45-45 76 21 00

Fax: +45-45 76 22 00

Email: [sho@microlexsys.com](mailto:sho@microlexsys.com)

Web: [www.microlexsys.com](http://www.microlexsys.com)

Registration: microLEX Systems **no later that Wednesday November 12, 2003.**

Please indicate, whether you register as:

- |  |           |
|--|-----------|
| • NTF member   | DKK 3,200 |
| • A non-member   | DKK 3,600 |
| • An exhibitor, i.e. wants to participate in the small exhibition: | DKK 5,000 |

## Become Member of Nordic Test Forum

If you are involved in production test, validation test, and inspection of electronics, and your professional work is related to activities in the Nordic countries as a test professional, design engineer, manufacturer, supplier of solutions, consultant, or similar, you may register as member of Nordic Test Forum, NTF e.g. of the following reasons:

- Exchange of know-how in testing.
- Increased contact network in the Nordic countries.
- Surveillance and information of International activities in the area of test and inspection.
- Discounts at NTF seminars and TestForum events.
- Membership list

You can register for NTF membership on the WEB page:

[http://www.ittf.no/faggrupper/produksjonstest/innmelding\\_html](http://www.ittf.no/faggrupper/produksjonstest/innmelding_html)



## Nordic Test Forum in Short

*TestForum* is an annual event that *Nordic Test Forum (NTF)* runs every fall/early winter. NTF also runs 2-3 thematic events during a year, but these are focused events addressing basically only one topic area, each in the area of test and inspection of electronics, whereas TestForum typically has 3-thematic areas and cover the broader balance of test and inspection as well.

*TestForum* has its roots back the late eighties, where it originated as an event for the Norwegian electronics industry. However, from the late part of 2001 a group of people from Sweden, Norway and Denmark established the network, *Nordic Test Forum*. Later on, this activity (including the *TestForum* event) was extended to include all the Nordic countries. The language of the official presentations is English. Content and focus of the TestForum varies over time, but always within topic areas in focus at a given point in time.

*TestForum* has its main emphasis on issues relevant to production managers, engineers and technicians working in the fields of production, test, inspection and validation of electronics. At TestForum events we offer technically relevant presentations on methodology, tools, modules/instruments and available technology. The interaction between users and suppliers within the focus areas is an important asset of TestForum, and this balance and interaction is pursued in presentations, panel discussions, and in the planning of the events.

### TestForum Aims at:

- Creating and sustaining a relevant, balanced and coherent interaction between users as well as between users and suppliers of solutions for test, inspection, validation and production of electronics.
- Providing an up-to-date view on new methodologies and tools for relevant test, inspection, validation and production of electronics.
- Establishing a relevant and balanced view on equipment, systems, tools and software from tool vendors in the domain.

### Target Group of TestForum

Engineers and technicians, managers and planners within the fields of electronics production and test, inspection and validation. Includes also decision makers in organizations that procure equipment, tools and systems for production and test, inspection and validation of electronics.

### Executive Committee of TestForum and NTF

Anna Carlqvist,	Kitron Development AB
Bengt Magnhagen,	Högskolan i Jönköping
Birger Schneider,	microLEX Systems AS
Bjørn B Larsen,	NTNU Institutt for fysikalsk elektronikk
Knut Båttstøløyen,	Kitron Development AS
Knut Johansen,	Kongsberg Defence Communication AS
Ole H Flesaker,	Høgskolen i Buskerud
Stig-Gunnar Jensen,	Flextronics International Norway AS
Martin Viktil,	SINTEF Elektronikk og kybernetikk

## Comwell Borupgaard, Snekkersten, Danmark

Located in beautiful North Zealand (Nordsjælland), you find one of the most attractive hotel and conference centers in Denmark. An old manor house with the addition of a new, modern-style wing creates a unique atmosphere combining old fashioned charm with completely modern facilities.

Comwell Borupgaard offers 158 bright, comfortable rooms including 4 suites, two fine restaurants and a banqueting hall (seating capacity 450), indoor pool, fitness center and beautiful surroundings. The charming city of Elsinore (Helsingør) with Hamlets castle Kronborg, Sweden and Louisiana Museum of Modern Art are all close by.



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### Transport to Comwell Borupgaard

Comwell Borupgaard is located 400 m from Oeresund (Øresund), about 40 km North of Copenhagen (København) and 3½ km South of the city center of Elsinore (Helsingør).

**Copenhagen (København).** If you arrive from Copenhagen, it is quite easy to come by public transportation. Take the train on the coastal route (Kystbanen), direction Elsinore (Helgingør). You may leave from the Central Station, from stations at Nørreport or Østerport or other stations on the costal line. Trains are leaving every 20 minutes. The trip to Snekkersten is about 45 minutes. Snekkersten is the second but last station before Elsinore. Upon arrival at Snekkersten, leave the station towards North, step across the street and here you see the small lane leading up to Comwell Borupgaard. You will have to walk about 250 m.

**Kastrup, Copenhagen Airport.** You may take public transportation. Take the train, one level down from the arrival hall, direction Elsinore (Helgingør) via Copenhagen Central Station. The trip takes 1:02 hours. Normally you need not change at Copenhagen Central Station but can remain in the same train. Follow the same procedure as above (Copenhagen).

**Elsinore (Helsingør).** Take the train Southbound for Copenhagen one station and get off at Snekkersten, or get a taxi for the 3½ km ride. (Ferries to and from Sweden leave every 20 minutes from Elsinore to Hälsingborg in Sweden. The ferry to Oslo may be boarded at Hälsingborg).

**By Car via Motorway E47/E55.** Drive North, direction Elsinore (Helsingør). When the motorway ends, continue straight on towards Elsinore on the Kings Road (Kongevejen). At the second roundabout turn right to-



wards Snekkersten following O3, "Klostermosevej". Drive about 1½ km until you reach a railway viaduct. Do not go under this but turn left on "Nørrevej". After about 800 m you reach the entrance for Comwell Borupgaard on your left.

**By Car on the Coastal Road (Strandvejen).** Halfway between the 38 km milestone, at Skotterup, og the 39 km milestone, at Snekkersten, you see a road, "Klostermosevej" leaving in the direction of Northwest (opposite th coastal side). Follow this about 650 m until you have passed under two railway viaducts. Now turn right on "Nørrevej". After about 800 m you see on your left the entrance to Comwell Borupgaard.

Comwell Borupgaard, Snekkersten



Copenhagen Airport, Kastrup



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