



## About Menara Networks

Menara Networks, an optical networking specialist, develops innovative products and solutions that greatly simplify today's layered optical transport networks. The Company's products provide optical networks with superior performance and fewer network elements. Menara's value proposition translates into improved service velocity, and a significant reduction in the overall network cost. Its MSA-compliant products enable its OEM customers to seamlessly and rapidly unlock the potential of their platforms by offering unique opportunities for expanded addressable markets and faster revenues.

Menara's technical team draws on extensive expertise in digital communication and signal processing, high speed mixed-signal IC design, optical devices and components, WDM system designs, product management and marketing, and network operations. The team has a proven track record of developing and delivering market-first solutions that were commercially successful. Management team members have held key management and executive positions at leading companies such as Nortel, Qtera, Siemens, Multilink, and Worldcom.

The Company is funded by Sigma Partners, Spark Capital, Applied Ventures (Applied Materials venture capital arm) and Concept Ventures, and is revenue generating as of 2007.

<b>Year Founded</b>	2004
<b>Founder, President &amp; Chief Executive Officer</b>	Siraj Nour El-Ahmadi
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## Company Products and Solutions

Leveraging its extensive expertise in mixed-signal high-speed IC design, WDM System design and optical networking operations and management, the company is announcing its flagship portfolio of innovative, impairments-tolerant DWDM optical transceivers. Menara's products achieve innovative design breakthroughs and constitute an industry's first by integrating G.709 OTN, Forward Error Correction, and electronic dispersion compensation functionalities in a MSA-compliant transceiver. They are 100% MSA-compliant, operate over rates ranging from 9.96 Gbps to 11.1 Gbps, and transparently support a multitude of protocols such as SONET/SDH, Ethernet and Fiber Channel. Menara's products also integrate other networking functions such as OTN overhead processing and management information base (MIB) support for ease of integration into the host system and seamless support for the network NMS.

Menara's current product portfolio is comprised of:

- Industry's only DWDM, XFP pluggable transceiver with integrated ITU-T G.709 OTN and Forward Error Correction



- Industry's only DWDM, XENPAK/X2 pluggable transceiver with integrated ITU-T G.709 OTN and Forward Error Correction



- Industry's only full C/L band tunable 300-pin transponder with integrated ITU-T G.709 OTN, Forward Error Correction, and Electronic Dispersion Compensation



For more information, please refer to the product briefs.



## **Menara Networks' Innovative Solutions**

Menara's solutions provide a significant and quantifiable capital and operational cost savings for a number of key network applications. Menara's products offer unique and differentiated value propositions for:

- **Protocol-agnostic ITU-T G.709 OTN/DWDM Transport,**
- **Transparent Ethernet transport, and**
- **Ethernet services demarcation.**

### ***ITU-T G.709 OTN/DWDM Transport***

With the continued growth of bandwidth hungry applications such as IPTV and peer-to-peer networking, there is a greater need for cost-effective optical transport. This need is particularly true for the fast growing and cost-sensitive metro and regional parts of the network. Through a number of innovations at the IC integration, system architecture and embedded software levels, Menara Networks has packaged all the necessary high-performance transport attributes such as ITU-T G.709 OTN processing, Forward Error Correction, Electronic D and embedded network management support, which traditionally have only been found in DWDM transponder systems, into a suite of MSA-compliant optical transceivers. Menara's optical transceivers offer advanced features such as adaptive receiver threshold optimization, network alarms and performance monitoring indicators, pre-processing for superior optical performance and simpler end-to-end network management and control. Menara's transceivers' 100 percent MSA compliance ensures rapid adoption and integration into transport systems and multi-service provisioning platforms.

Menara's unique MSA transceivers with integrated OTN successfully interoperate with five leading vendors' ROADM and DWDM platforms, achieving error-free transmission reach of more than 1,200 km over SMF-28 fiber. The company's transceivers provide:

### ***Transparent Ethernet Transport***

In addition to being the interface of choice at the enterprise, Ethernet is fast becoming the preferred protocol to transport all new services such as IPTV and VPLS, as well as for backhauling traffic from DSLAMs and wireless base stations. Secure and reliable transport of Gigabit Ethernet and 10 Gbps Ethernet (10GE) is becoming a high priority for service providers and large enterprises. Compared to the traditional TDM based approach, Menara's products



offer a more cost-effective and transparent solution for Ethernet traffic, providing superior performance and enhanced OAM. Menara leverages the power of ITU-T OTN digital wrapping capability and superior payload capacity over SONET/SDH to transparently and efficiently transport Ethernet traffic with superior performance and OAM&P. The Company's unique and proprietary suite of high-speed ICs and optical system design expertise, offers the industry's only pluggable optical transceivers with integrated DWDM, OTN framing, and Forward-error-correction capability.

### ***Ethernet Service Demarcation***

As consumers and business customers appetite for high-speed Ethernet services continues to grow unabated, network operators are struggling to provide efficient Ethernet transport with reliable and secure service demarcation in the last mile. Ethernet, a layer 2 protocol, is unable to provide the bit-by-bit OAM features demanded by the high availability of transport networks and the various IEEE initiatives such as 802.3 ah that have come short of achieving this goal. Menara's solution extends ITU-T G.709 OTN transport performance and OAM support. Menara's MSA-compliant multi-rate optical pluggable transceivers offer all the necessary Ethernet Demarcation functions with the added benefit of superior OTN transport OAM features, including true bit-error-rate measurement for SLA guarantees, 100 percent transparency to customer traffic for guaranteed security and privacy, and forward error correction for superior link performance.

Menara's products provide network operators with full OTN Demarcation functions without the need to purchase and deploy a specific Ethernet Demarcation node or a DWDM transponder at the customer premise as well as incurring maintenance costs and providing it with an external DCN over its life-time. Network operators can communicate remotely with Menara's pluggable transceivers for all OAM&P communications and messaging via the OTN far-end monitoring capability. This functionality is achieved through the OTN out of band overhead, which does not interfere with the payload Ethernet traffic.



## Management Team

### **Siraj Nour El-Ahmadi**

#### **Founder, President & Chief Executive Officer**

Siraj, a co-founder of Menara, brings over 14 years of experience in optical transmission in particular and the telecom industry in general. Prior to founding Menara, Siraj served as Vice President - Marketing & Product Management at Nortel, responsible for the OPTera LH 4000 ULR product (acquired from Qtera); achieved over \$200M in revenues in its first two years. Prior to that, Siraj was the Product Architect & Vice President of Product Management at Qtera Corporation, a successful technology Start-up acquired by Nortel in 2000 for \$3.25B. Siraj also held a Senior Manager position at Bell Northern Research and worked as a Transmission Engineer at WilTel (WorldCom) where he evaluated and deployed the world first bidirectional EDFA and bi-directional WDM transmission. Siraj holds a BS and MS in Electrical Engineering from the University of Oklahoma, is a member of Eta Kappa Nu and is the inventor of 11 patents, issued or pending, in the area of optical communications. He authored a number of publications and is a frequent speaker at telecom and optical networking events and conferences.

### **Salam El-Ahmadi**

#### **Founder, CTO and VP – Advanced Technologies**

Salam has over 12 years experience in system design, test, and deployment of various communications systems including wireless, wireline, and optical networks. His background combines in-depth knowledge of signal processing techniques, digital communication theory, and nonlinear optics propagation, allowing him to bridge gaps between the seemingly unrelated fields of communication theory and the physics of fiber optics. Through a hands-on management style, he leads diverse teams of highly skilled engineers and scientists with the clear objective of taking disruptive technologies from conception stages to viable commercial products. Prior to founding Menara, he held senior positions, ranging from research to field deployment, with Nortel networks' wireless division and Qtera's WDM system design group. He co-authored several patents and holds a BS, MS in Electrical Engineering from the University of Oklahoma and is finalizing his requirements for the Ph.D. degree from SMU.

### **Dr. Harry Tan**

#### **Founder, Chief Scientist**

Harry, a co-founder of Menara, brings over 30 years of experience in communications systems and network research and development. Prior to founding Menara, he was the co-founder and CTO of Qplus Networks, engaged in the development of phase modulation based 40G fiber optic WDM transport systems. Harry was an Electrical Engineering faculty member at Princeton University and at the University of California, Irvine for over 25 years. His research in information theory and coding, digital modulation, data compression, optical communications, routing protocols and random access protocols has appeared in over 70 peer reviewed publications. Harry was also a consultant to the Jet Propulsion Laboratories and to The Aerospace Corporation. He received the BS degree in EE from the MIT and the MS and PhD degrees in Engineering from the UCLA and is a member of Sigma Xi, Tau Beta Pi and Eta Kappa Nu.



**Dr. Matthias Bussmann,  
Vice President – High Speed IC Design**

Dr. Bussmann is leading the company's custom high-speed ASIC design efforts. He contributes his expertise in high-speed fiber-optic IC and module design paired with his design experience in a broad range of advanced integrated circuit technologies. Prior to Menara, Dr. Bussmann was with Eltech Precision, Multilink Technology, and Micram Microelectronics, all companies specializing in design, development, and marketing of high bit-rate electronic products for advanced fiber optic communication systems. In the roles of co-founder, CTO, and Senior Scientist of Multilink Technology, Dr. Bussmann helped Multilink grow into a 350+-employee NASDAQ-traded company. Dr. Bussmann holds a Dipl.-Ing. and a Dr.-Ing. degree (summa cum laude), both in Electrical Engineering, from Ruhr-University Bochum, Germany.

**Sultan McDoom  
Vice President – Engineering**

Sultan McDoom brings over 27 years of experience in Engineering and Operations, mostly in taking carrier grade telecommunications equipment from concept to market deployments. His experience spans product development from chip level to system and network level products and solutions at GE, Honeywell, Nortel, Siemens, and two other privately funded companies, Qtera, acquired by Nortel and Optovia, acquired by JDSU. Most recently he led Engineering and Operations at Optovia Corporation. Mr. McDoom has managed engineering teams comprised of electronic, microwave, optics, mechanical, software and product integrity engineering, and manufacturing engineering. He holds a BSc. in Electrical Engineering.

**Sri Nathan  
Vice President – Business Development**

Previously, Dr. Sri Nathan was an independent consultant, to small and medium size companies to create new market opportunities, evaluating efficiency of various large networks with detailed architecture analysis, and, guiding teams to build strategic planning and modeling tools. Prior to this he was the CEO and President of Jasmine Networks, a Metro Optics Sub-System company. Sri later joined Qtera Corporation as the Vice President of Sales, Marketing and Business Development. Sri earned his Ph.D. in Management and Administrative Science and an advanced degree in Computer Science from the University of Texas. He has a B.S. in Engineering from Madras University (India). He holds twelve patents in optical technology applications, has many publications and is an avid speaker in various conferences.

**Adam Hotchkiss  
Vice President – Product Line Management**

Adam Hotchkiss brings more than a decade of experience in the definition, launch and support of telecommunications and data transmission systems to interchange and local exchange carriers. Prior to Menara Networks, Adam served as Product Line Manager for WDM Systems at Qtera Corporation, which was acquired by Nortel Networks in 2000. In his role with Qtera and Nortel Adam served in a senior position responsible for the definition, requirements and architecture of WDM transport products, which led to the successful launch of two generations of WDM platforms including the industry's first ultra-long haul 10G WDM system. Prior to Qtera and Nortel Networks, Adam served at Fujitsu Network Communications where he was responsible for the launch of Fujitsu's first WDM system and the support for SONET access and core infrastructure products and networks.