On the Production of Submarine Equipments to support the Submarine Cable Business
Company Profile

Founded : 10th March 1998 *100% subsidiary of NEC  
(Otsuki plant operation started in 1986)

President : Ikuo Mito

Employees : 205 (As of September, 2008)

Description of Business :  
Production of the Devices for Fiber Optic Communication Systems, and Submarine Repeaters.

Certifications : ISO 9001 (Certificated in December, 1994)  
ISO 14001 (Certificated in November, 1996)  
TL 9000 (Certificated in August, 2005)
Business Vision

As a member of NEC Group, NEC Yamanashi contributes to achieve wealthy society by the stable supply of Fiber Optic Devices and Optical Submarine Repeaters for Next Generation Network.

NEC Group Corporate Philosophy
NEC strives through "C & C“ to help advance societies worldwide toward deepened mutual understanding and the fulfillment of human potential.

NEC Group Vision 2017
To be a leading global company leveraging the power of innovation to realize an information society friendly to humans and the earth.
Environment Philosophy

<Environmental Philosophy>
NEC Yamanashi contributes to establish sustainable development society by being harmonized with local community, developing human mind to co-habit with natural surroundings, and encouraging the environment friendly activities and production.

- 100% Environment-conscious device products
- Environmental load & cost reduction in all processes
- Reinforcement of environmental load reduction of corporate partners
- Environmental communication across the organization

All employees advance activity with high environmental awareness

Effluent treatment facility: Full closed system
Purified water is 100% recycled. No drainage is allowed outside the facility. Working to create gentle environment for the earth by conserving energy and achieving the goal of cutting waste to “Zero.”
Areas of Business

1. Submarine Systems
   • Optical Submarine Repeater, Multidrop Equipment, Equalizer
   • Seismograph/ Submarine Tsunami Gauge

2. Fiber Optic Devices
   • Optical Transceiver (Hi-Speed INF/ Access INF)
   • MR (Magneto Resistive) Sensor

3. Product Analysis
   • Reliability Evaluation, Failure Analysis Service
   • Component Analysis for RoHS and other directives
The Core Competence of NEC Yamanashi

◆ Highly reliable technology of Submarine Equipments
  Achievement of 25 years quality guarantee
  Highly reliable manufacturing technology
  Highly reliable manufacturing/testing equipments

◆ Ultra small optoelectrical hybrid mounting technology
  Mounting technology to integrate silica waveguide, optical semiconductor element, and LSI

◆ World-Class Fiber Optic Device Manufacturing
  1. Excellent mass productivity- Passive alignment technology
  2. World’s only Waveguide formation technology by Atmospheric Pressure CVD
  3. World’s only IC Wafer/ Magnetic Thin film layering and integration technique

◆ Production Analysis Technology
  Equipped with excellent reliability testing system for consistent product failure analysis technology from process to analysis.
Fiber Optic Devices & MR Sensor

**NEC Devices Family**

- **Optical Network, Mobile Device**
  - WDM, U-NODE, Terminal Devices
  - Base Station
  - GE/PON, Router
  - WiMAX
  - PASOLINK

- **Computer, Broadcast Video Device**
  - Super Computer
  - Server, PC
  - Broadcast Video

- **Mobile Phone, Notebook PC**
  - Mobile Phone
  - Notebook PC

**Optical Devices Family**

- **“Key Devices” to support NGN**
  - Hi-Speed Optical INF (2.5G ~ 10Gb/s)
    - 10G FBT
    - 10G XFP
  - Access Optical INF (156M ~ 2.5Gb/s)
    - GE/G-PON
    - P2P-SFF/SFP
  - Hi-Speed Optical INF for Computers
  - OIP
  - MR Sensor
    - Magneto Resistance Sensor
    - Open/Close Detection, Position Detection

**Customers (NEC Grp)**

- NEC Tohoku
- CJP (Miyagi)
- NEWIN
- NEC Saitama
- NECE
- NEC Magnus
- NECAT

**NECT**

- NEC Saitama
- NECP

**NEC Devices Family**

- Computer, Broadcast Video Device
  - Super Computer
  - Server, PC
  - Broadcast Video

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MR Sensor (No.1 World Share)

• **MR Sensor: Magnetic field sensing device – magneto resistive effect**
  Comprised of MR elements and IC chip forming very compact sensor device

• **No.1 World Share (Approx. 12Mpcs/month)**
  Chosen by world’s major vendors for Mobile phone, Notebook PC, Digital Still Camera, and many other applications.
1. Submarine Cable System

- Fiber-Optic Submarine Repeater Devices
  (Produced by NEC Yamanashi)

- Depth of the sea ~8,000m

2. Submarine Seismic Observation Systems

- Submarine Seismograph

- Submarine Tsunami Gauge

- Terminal apparatus

- Land Communication Lines etc.
1. **Repeater (R160/320DS)**
   - 10-G64 wavelength, 128 wavelength etc.
   - Amplify optical signals, Monitor troubles

2. **Block Equalizer (Q160/320DS)**
   - Characteristics compensation

3. **Branching Unit (B160/320)**
   - Submarine branching
     (Power Switch, Fiber Switch)
Submarine Systems ~the core competence

Consistent, highly reliable production technologies, capabilities, and processes are maintained.

On these basis, we are able to produce Defect-Free, Highly Airtight, Highly Water Proof, and High Withstanding Voltage submarine repeaters.

- **Airtight Sealing Technology**
  (Internal humidity: 20%RH> over 25 years)

- **Production & Testing Technology of the Highly Water Proof structure products**
  Equivalent to 8,000m water depth (78.6 MPa)

- **Technology to achieve High Withstanding Voltage, High Heat Radiation structure**
  15,000V and above

- **Maintenance-Free**
  "Zero" market defect
## Submarine Equipments ~Highly Reliable Technology

### Production Technology

- Airtight Sealing Technology
- Pressure Proof Technology
- WDM Testing Technology
- Environment (ESD protection, Clean Room)

### Production Facility

#### Production Equipments

- **Molding Machine**
  - Connect Molding Machine
  - Hi-frequency brazing machine
  - Unit insertion machine
- **Electronic Beam Welder**
- **Hi-frequency brazing machine**
- **Connect Molding Machine**
- **Vacuum heating & drying**
- **Hi-strength fiber connecting machine**

#### Testing Equipments

- **High pressure He Airtight Test**
  - Hydraulic testing equipments
  - WDM automatic test equipments
  - Constant temperature water tank
  - Large/Mid. Constant temperature oven
  - Vibration tester
Production Line (Submarine Repeater)

Optical Submarine Repeater Production Line (Second building 1F)

- Panel Assy /Unit Assy
- Vibration Test
- Repeater Assy /Airtight Sealing
- Hi-pressure He Airtight Test (Pavilion)
- Final Test
- OFT Assy/ Airtight Devices Assy

[Shipping Area]