Mini-MT Connector Interface
Team Mission

- Develop a new interface technology to enable increased panel density and reduced system cost.
- Meet the requirements for an optical transceiver interface rather than just a cabling connector.
- Use active component suppliers’ input to develop an optimum solution. No cost shift to active devices.
Team Mission (continued)

- Single Mode and Multimode solution.
- Enable multiple sources of transceivers, connectors, and cable.
- Standardize optical connector through TIA and IEC
Current Supporters

- Connectors, Cable, Cable Assemblies
  - Siecor
  - AMP
  - Fujikura
  - Furukawa
  - Sumitomo
Current Supporters

- Transceivers
  - AMP - Lytel Division
  - Hewlett Packard
  - Vixel
  - Fujikura America
Current Supporters

- Molded Ferrule Technology
  - US Conec
  - Fujikura
  - Furukawa/ Europtics
  - Sumitomo
Application Evolution

- High reliability cost sensitive applications
- NTT interoffice network - 1988

Current
- Telecoms - FTTH - SM
- Datacom - backbone, mainframe links - SM&MM

Future
- Datacom - Fiber to the desk
MT History and Future in NTT Network

1983  MT Ferrule Developed
1988  4,8 fiber SM MT Deployed in Network
1991  MPO style Connector Deployed
1996  IEC Standard completed for MPO style
1997  New Optical Access System Deployed
      ( Pi System)
2000  FTTH Cost Equals Copper
Statement of Direction

• NTT Has:
  - Developed MT ferrule and MPO applications for many years
  - Developed the Mini-MT connector around the small MT ferrule
  - Planned future major application for two fiber connections

• NTT will provide technical data to support U.S. standards activity through US Conec, an NTT affiliate

• NTT has submitted the Mini-MT to IEC 86B for approval to start standardization

• NTT is establishing multiple sources today and encourages world-wide supply
License Policy

- NTT complies with IEC and ANSI licensing requirements
- NTT offers to license its patents which include features of the Mini-MT for reasonable terms to any company
MT Production Volume
(000)
FTTH AND MT TECHNOLOGIES

**MT connectors**: Easy to joint cables with lower loss

- **Fusion splicing**: Giving lowest loss joints but with longer time
- **Mechanical splice**: Easy to joint a drop cord but with higher loss

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**AURORA**: Automatic Optical Fiber Operation Support System

**FTM**: Fiber Termination Module

**SLT**: Subscriber Line Terminal

**ONU**: Optical Network Unit

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*Pre-connectorized optical fiber cable*
The New Optical Access System is a system for installing Optical Network Units (ONUs) near customers. Each ONU accommodates a maximum of 10 lines, which will share one SLT at a cost comparable to that of metallic networks.

AURORA: Automatic Optical Fiber Operation Support System
SLT: Subscriber Line Terminal
FTM: Fiber Termination Module
ONU: Optical Network Unit
OPTICAL FIBER WIRING SYSTEM IN THE PREMISES

- Distribution cabinet in a floor
- Intra-premises cable
- Main distribution cabinet
- MT-4
- MPO-2
- SC connector
- Termination cable
- ONU
- Drop cable
- MPO-2
- Customer premises
Fibre Channel Requirements

- Half the cost
- Small size (board edge, EMI)
- Multi-Source
- Low Technical Risk
- Market Acceptance
Added Customer Requirements

- SM performance = SC
- Telco reliability
- Easy to clean
- Term. technology independent
Variety is the spice of life

- Termination methods
- Lower parts count
- Improved materials - lower cost
AMP LightCrimp XTC Connector

- Resilient Spheres
- Plunger
- Buffer
- Fiber
- Ferrule
- Strength Members
Siecor Unicam Technology

Factory Polish

Fiber Stub

Field Fiber

Mechanical Splice with Index Matching Gel
Parts Comparison (mated pair)

- SC Duplex
  - 48 total parts
  - 6 precision parts
    - (4) ferrules
    - (2) sleeves

- Mini MT Plug & Socket
  - 15 total parts
  - 4 precision parts
    - (2) ferrules
    - (2) guide pins (low cost)
Cost / Installed Systems Approach.

- 39% Electronics
- 27% Cable
- 20% Labor
- 9% Connecting Hardware
- 5% Connectors

Optical Fiber Project Typical

- Electronics 39%
- Connecting Hardware 9%
- Cable 27%
- Connectors 5%
- Labor 20%
Mini-MT
Height Comparison
Width Comparison
Increased Panel Density
Ribbon Cables Offer 20% Cost Reduction

2.9 mm

750 um
Cost Savings Summary

- Electronics - Increased port density reduces number of cards in hubs and enables limited space applications
- Cable - 20% improvement through ribbons
- Termination and Installation Labor - 2x increase in # of fibers per termination operation
- Connecting Hardware - Low precision parts
- Optical Connectors - 1/2 the cost of SC Dup.
SM Insertion Loss

Average = 0.19 dB
Maximum = 0.46 dB
SM Return Loss

Average -41 dB
Maximum -37 dB
SM Temperature Cycle

3 Connector Pairs
-30 to 70 C
10 Cycles
Mini-MT draft interface
Standardization Track Record

- IEC 874-16 MT Sectional 09/94
- IEC 1754-5 MT Interface 11/96
- IEC 1754-7 MPO Interface 11/96
- TIA FOCIS for MT in-progress
- TIA FOCIS for Mini-MT submitted 1/97
- IEC NWIP presented 2/97
- IEC NWIP to be submitted 3/97
Introduction plans

● First products featuring parts from Japan available 2nd quarter.
● Amp/Siecor can/will provide cable assemblies produced with these parts
● Amp and Siecor versions later this year.
Ferrule Availability

● 4 Manufacturers of MT & Mini-MT
  ■ Fujikura
  ■ Furukawa
  ■ Sumitomo
  ■ US Conec

● 5 Channels to market
  ■ Above + Europtics
Mini-MT: The right choice

- Half the size & *cost* of duplex SC
- Telco apps combine to drive volume/cost
- Enables system cost improvement
- SM performance
- Standards momentum for MT style
- Multiple sources today! Globally