

Agenda

- **Overview**
- **Single Mode Fiber**
- **Performance**
- **Supported Configurations**
- **Cable Plant**
- **Cable Plant Testing**
- **Mission Critical Sales Process**
- **Web Site**

Long Wave GBIC

- **PACS Limited Ship March 99**
 - 6 customers only
- **FCS Q4FY99**
- **A5000, A5100, A5200 Support**
- **A5K Software/Firmware Release 6 only (2/20/99)**
- **Firmware Release 1.09 Required (Patch)**
- **Hubs will be supported**
- **STORtools 3.0 will work the same.**

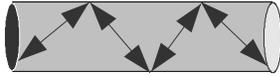
Long Wave GBIC

- **LW–GBIC can be identified by blue plastic parts, stainless steel jacket and wire bale**
- **All LW–GBICs are sourced from IBM**
- **<http://www.chips.ibm.com/products/fiberoptic/products/documents/ocs036001.html>**

Part Numbers

- **X-Option contains LW-GBIC, 15M SM cable and user's manual:**
 - **X6737A** FCAL LW GBIC MODULE 100MB/S
- **FRUs:**
 - **#370-3722** FCAL LW GBIC MODULE 100MB/S
 - **#537-1014** ASSY,CBL,FIBR OPTIC,15M S-MODE

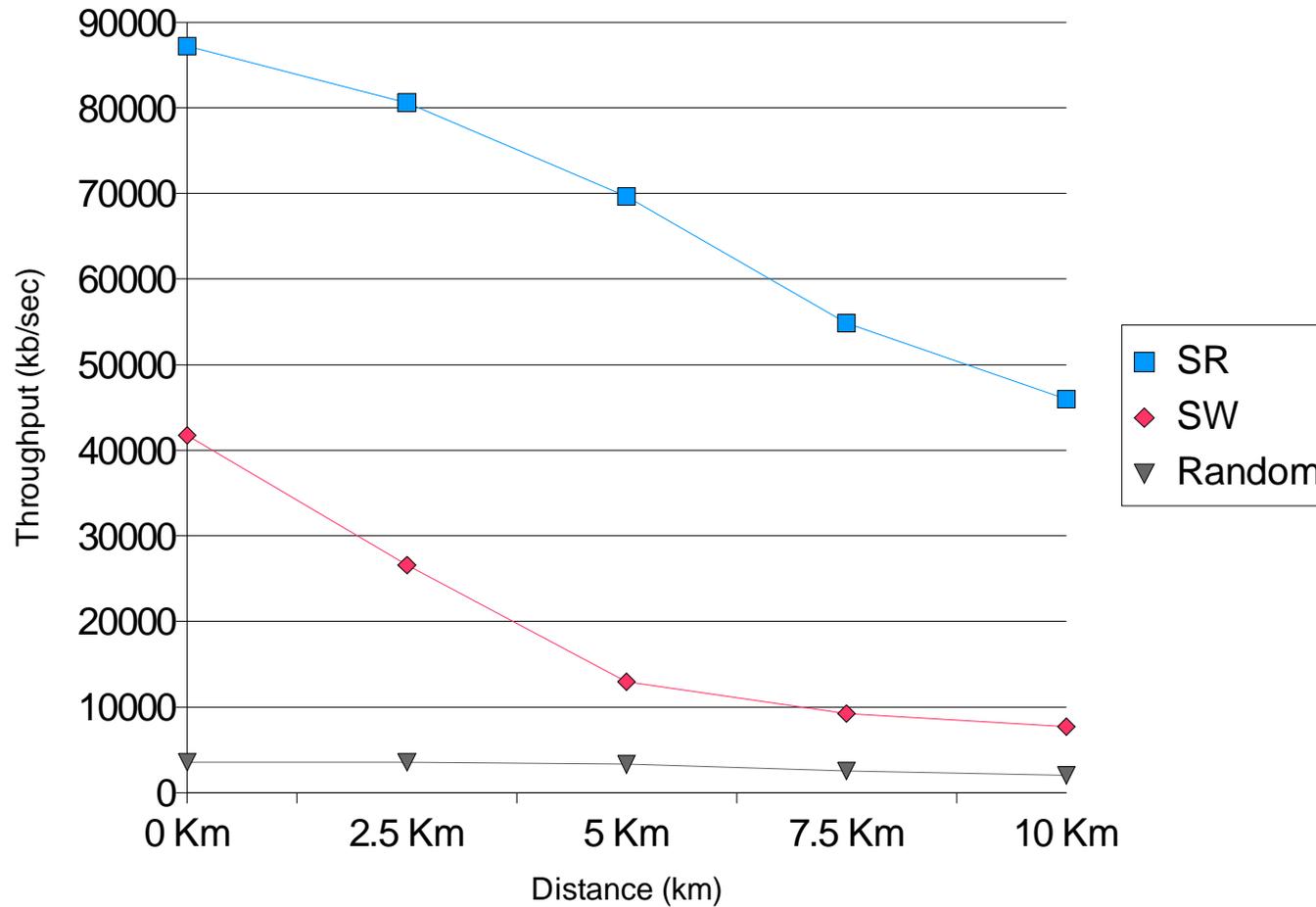
Multi-Mode / Single-Mode Fiber

- **Multi-Mode** – Short Wave GBIC use only 
 - Fiber has Gray outer jacket
 - 770 – 860 nm wavelength, 50/125 micron fiber
 - Up to 500 meter distance
 - Dispersion of light in the fiber limits distance

- **Single-Mode** – Long Wave GBIC use only 
 - Fiber has yellow outer jacket per FC-PH spec
 - 1270–1350 nm wavelength, 9/125 micron fiber
 - Up to 10 km distance between LW-GBICs
 - Power of Laser and receiver limits distance

LW-GBIC Performance

Long Wave GBIC Performance



Supported Configurations

Cable Plant

- **Cable plant must meet or exceed EIA/TIA 492CAAA approved single mode optical fiber specification.**
 - EIA – Electronic Industries Alliance
 - TIA – Telecommunication's Industry Association
 - <http://www.tiaonline.org/>
 - Corning SMF-28 or Lucent Equivalent

EIA/TIA 492CAAA Specification

- **Customers will need to specify to their cable plant supplier to install fiber that meets the EIA/TIA Specification**
- **Detail Specification for Class IVa Dispersion–Unshifted Single–Mode Optical Fibers (ANSI/TIA/EIA–492CAAA–98)**
- **Specification enables end users and manufacturers of fiber–optic cable to specify the choice of single–mode optical fiber contained in the cable.**

Cable Plant/GBIC info

- **Sun specifies single mode cable plant but does not recommend installers or installs cable plant.**
- **LW-GBIC is not intended to be customer installable**
- **Installation cost included in the price of GBIC**
- **No safety concerns with LW-GBICs**
- **Sun includes 15 meter single-mode fiber with (2) SC connectors only**
- **Cluster 2.1 support with 2 nodes at FCS**
- **Network Storage qualifying mirroring configurations using VM only**



Fiber Testing

➤ **Loss Budget**

- End to End for each fiber in the cable plant
- 8.2 dB per fiber
 - 2 meter to 10 km distance

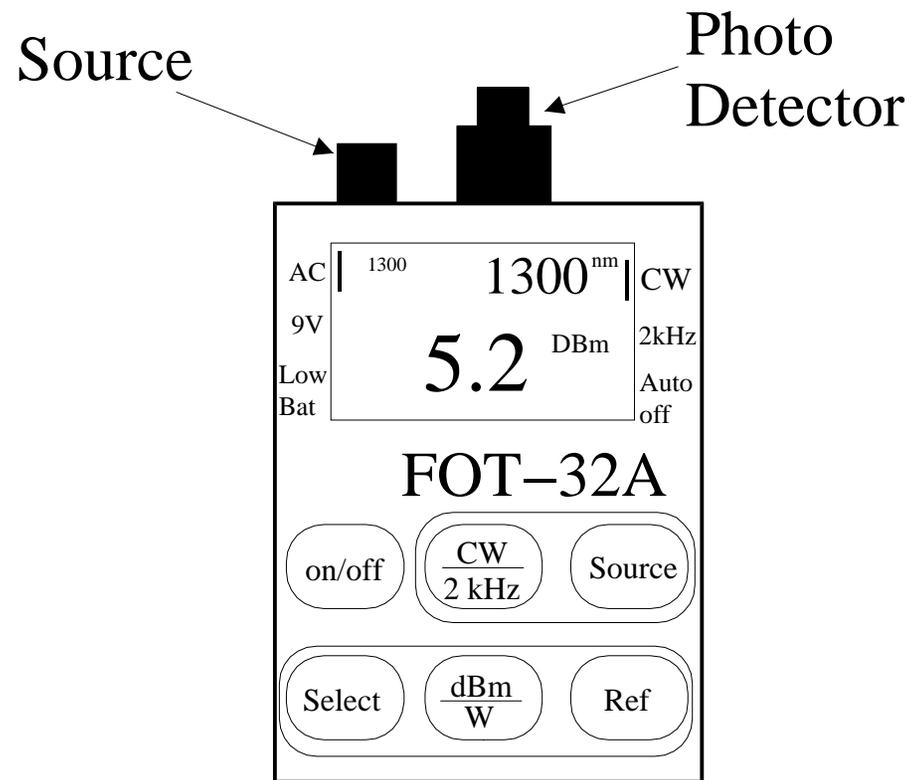
EXFO FOT-32A



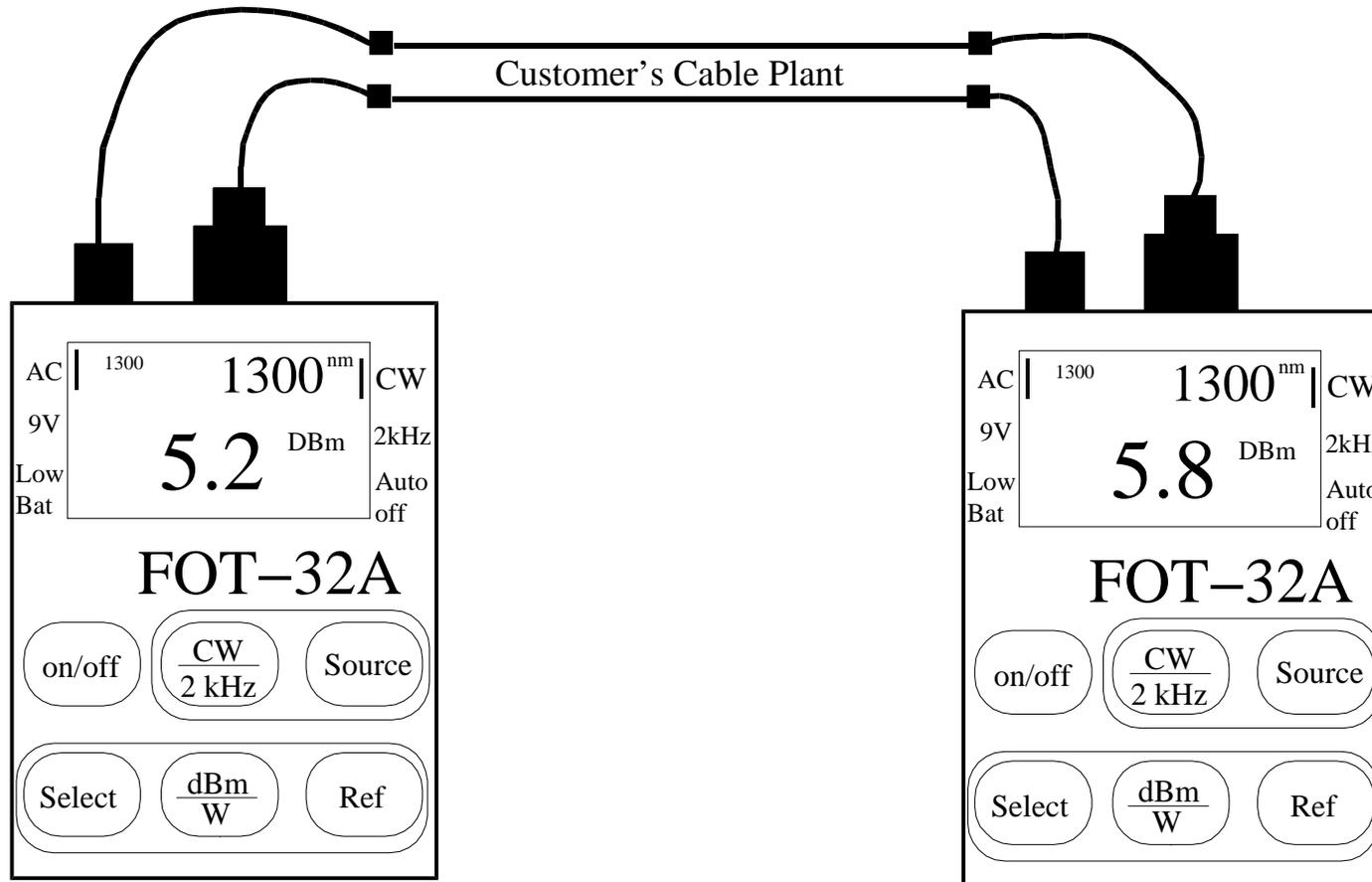
Reading in db, dBm and Watts

Direct Loss Measurements

Power Measurement



Cable Loss Test: Two FOTs



Measuring Optical Cable Loss

- **4 step process Requires 2 FOTs**
 - At a one location
 - Calibrate both FOTs
 - Set reference from source on alternate FOT
 - Move FOT to local and remote sites
 - Locate correct cable with 2 kHz signal
 - Measure loss in fiber

Installation Procedure

- **Will require 2 SSEs**
 - Local and remote site
- **24 hours Burn In time for A5x00**
 - Use STORtools 3.0 Installation Verification Load Test

3 FOT Tests can be performed

- **LW-GBIC Launch Power > -9.0 dBm**
 - GBIC connected directly to FOT
- **Passive Cable Plant Loss 8.2 dB**
 - Measure single Fiber in the cable plant for loss using laser source on FOT
- **Minimum Receive Power -17.7 dBm**
 - Measure absolute power from GBIC laser source through cable plant to meter

- dB and dBm Measurements

Optical power is measured in linear units of milliwatts (mW), microwatts (uW "mu" W), nanowatts (nW) and decibels (dB).

dB is a ratio of two powers

$$\text{power (dB)} = 10 \log (\text{power1}/\text{power2})$$

If we are measuring absolute power levels, the measurement is referenced to 1 milliwatt (mW), is expressed as "dBm" and the calculation becomes:

$$\text{power (dBm)} = 10 \log (\text{power}/1 \text{ mW})$$

Measuring GBIC Launch Power

- **Calibrate FOT**
- **Place fiber between laser output on GBIC and photo detector on the FOT**
- **Reading should be between -9.0 dBm and -3 dBm for a good LW-GBIC**

Mission Critical Approval Process

- **Sales desk process "like" E10K ordering process**
- **Most customers will be mission critical so Sun needs to insure Enterprise Services can support customer**

storaqeweb.eng/photon/main/index.html

Long Wave GBIC (Gigabit Interface Converter) Support Page

General Information

Tested and supported A5x00/host configurations in [Postscript](#) and [PDF](#)

[Part Numbers and Descriptions](#)

[Pre Announce Customer Ship \(PACS\) Ordering Guide](#)

[Differences Between Single Mode and Multimode Cable](#)

[Ordering Process](#)

[Installation Checklist](#)

[Cable Test Equipment Training Material](#)

[Installation Recommendations](#)

[Trouble Shooting](#)

[FAQs](#)

Industry Specifications

100-SM-LC-L in [Postscript](#) and [PDF](#)

EIA/TIA492CAA 10 km cable plant specification in [Postscript](#) and [PDF](#)

Other Links

[External Fiber Optic Training Information](#)

[External Fiber Optic Cable Testing Information](#)

[EXFO - Maker of the hand help fiber test set FT-30A](#)

[Sun Enterprise Cluster Support Links](#)

[IBM Long Wave GBIC Specifications](#)

