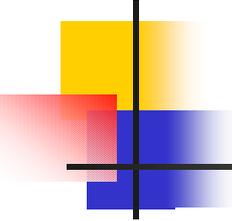


GBIC Interface Directions & Standard Support

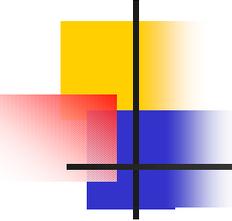
Dave.Wodelet@sjrb.ca

Shaw Communications



Overview of Talk

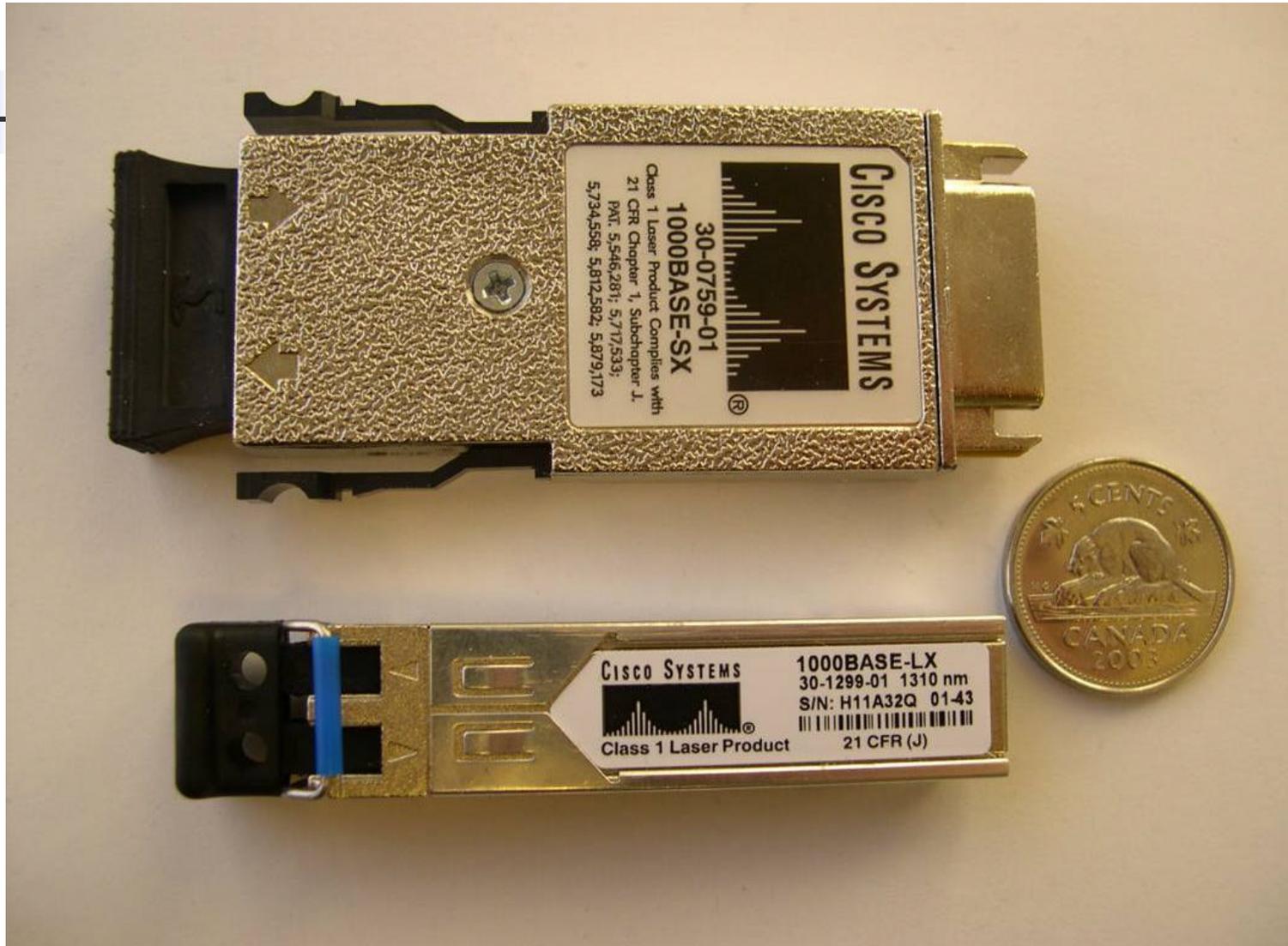
- Whirlwind GBIC Tour/Overview
- What's good about GBICs
- Vendor Directions
- What's the problem
- What's the solution

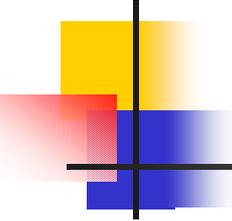


GBIC Overview

- GBIC
 - GigaBit Interface Converter
- First introduced in 1999
- Originally specified for Fiber Channel
- Become the standard for Gigabit Ethernet

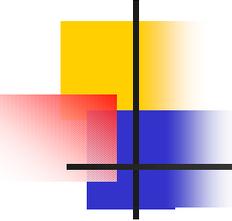
GBIC Overview





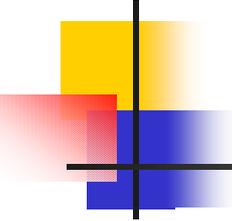
GBIC Overview

- SFP GBIC
 - **Small Form-factor Plugable**
 - Required for higher density cards
 - Also called...
 - **Mini-GBICs**
 - **SFF GBICs** (**Small Form Factor**)
 - **GLCs**
 - **New GBICs**
 - “Next Generation” GBIC



GBIC Overview

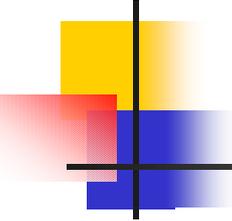
- XFP GBIC
 - “Next Generation” GBIC
 - Up to 10 Gbps (SFP up to 2.5 Gbps)
 - Similar size to SFP but longer
 - <http://www.xfpmsa.org/>



Terminology

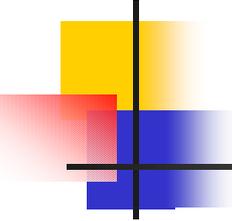
- “SFP” or “SFP GBIC”
 - Smaller form factor GBIC

- “GBIC”
 - Original / Larger GBICs
 - ...or all GBICs (generically)...
 - ... where **size doesn't matter**



GBIC Interface Types

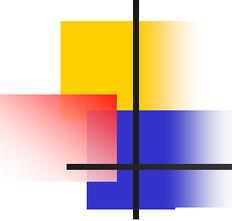
- SX
- LX
- LX70 (ZX)
- Copper
- CWDM
- DWDM
- SONET



GBIC Interface Types

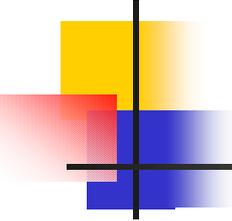
- SX
 - MM fiber (850nm) – 1/2 Km.
- LX
 - SM fiber (1310nm) – 10 Km.
- LX70 (ZX)
 - SM fiber (1550nm) – 80 Km.

Newer
“Smart”
GBICs can
do MM or
SM up to
10 Km



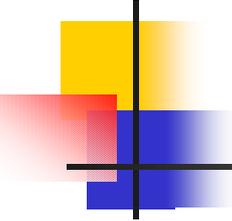
GBIC Interface Types

- Copper
 - 100 meters
- CWDM
 - 140 Km.
 - 8 wavelength common (18 possible)
- DWDM
 - 140 Km.
 - 45 wavelength common (176 possible)



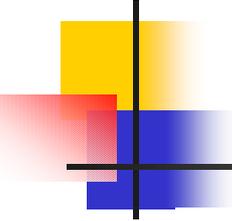
GBIC Interface Types

- SONET
 - OC48 (quite new)
 - OC192 (near future)



GBIC Standards

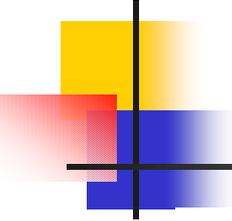
- IEEE
 - For SX and LX GBICs (large form factor)
 - http://www.schelto.com/802_3/1Gig/index.htm
- MSA
 - **Multi-Source Agreement**
 - Cover all other GBICs (including the SFP)
 - <http://schelto.com/SFP/>
- IEEE 802.X Standards
 - <http://standards.ieee.org/getieee802/new.html>



GBIC Manufacturers (OEMs)

- GBIC Standardization created a niche manufacturing market

- A few major GBIC manufactures (OEMs)
 - Finisar
 - Agilent
 - IBM / JDS Uniphase
 - ...



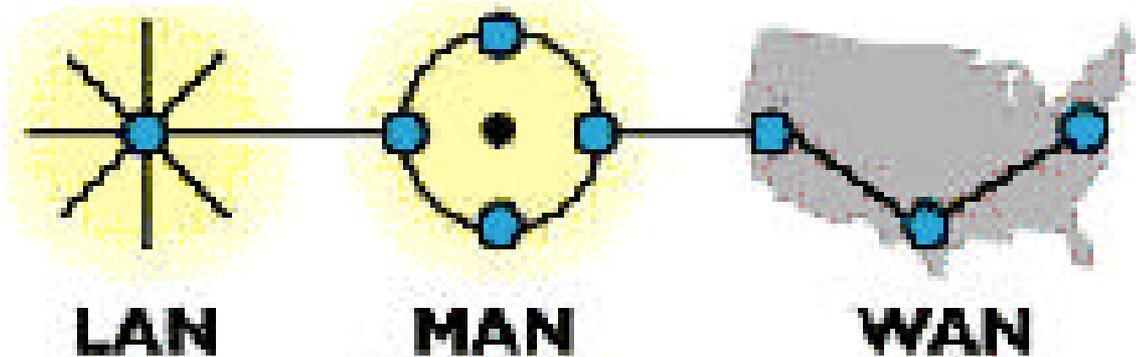
Equipment Vendor's GBICs

- None of the large network equipment vendors actually make their own GBICs
 - Cisco
 - Extreme
 - Juniper
 - Etc...
- They just remarket those from one of the major GBIC OEMs

The Good News...

(The GBIC Advantage)

- Versatility
 - Change GBIC to change distance
 - Change GBIC to change technologies...
 - Optical
 - Copper
 - CWDM
 - DWDM
 - SONET



The Good News...

(The GBIC Advantage)

- Investment Protection
 - Keep card – Replace GBIC
 - Keep GBIC – Replace card
- Minimized downtime during changes
 - Hot swappable
 - Plug and Play
- Faster time to market for new technologies

The Good News...

(The GBIC Advantage)

- "Pay-as-You-Populate" cost structure
- Increased reliability
 - Larger "field tests" trials
 - Recall GBIC not entire line card
- Better availability
 - More places to buy from
 - Assured supply to meet market demand

The Good News...

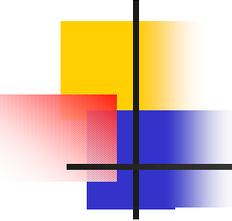
(The GBIC Advantage)

- Sparing & Support Advantages
 - Reduced inventory costs
 - Only one of each type
 - ...Not one of each type for each vendor
 - Multiple sources = quicker replacements

The Good News...

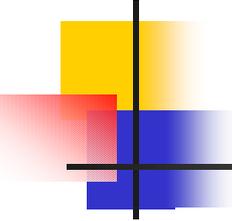
(The GBIC Advantage)

- Reduced costs
 - Standardization allows for mass production
- Mass production = lower costs
 - Lower costs for vendors
 - = Lower costs for you (??)
- More competition = lower costs
 - Equipment vendor not the only source



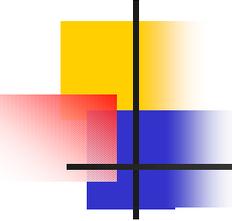
Relative Cost Comparison

GBIC Type	Vendor Avg.Price	3 rd Party Avg.Price	\$ Savings	% Saving
SX	\$4	\$1	\$3	74%
LX	\$9	\$3	\$6	67%
ZX	\$46	\$18	\$28	60%
CWDM	NA	\$18	NA	NA
DWDM	NA	\$28	NA	NA



The Bad News...

- GBICs have readable EPROM
 - Manufacturer(OEM) name
 - Manufacturer(OEM) part number
 - Vendor/Reseller part number
 - Vendor/Reseller Specific fields
 - etc...

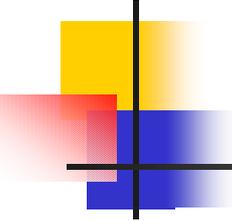


The Bad News...

- Vendors starting to use EPROM info to disable ports
 - Must use **"their(?)"** GBICs in **their** equipment



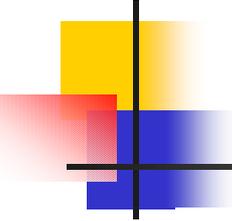
Remember...
None of these
equipment vendors
actually make their
own GBICs



The Bad News...

- Port disabling
 - Only a few vendors (currently)
 - All SFP GBICs (now)
 - New XFP GBICs (likely)

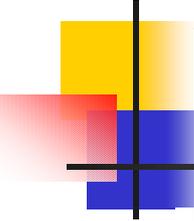
- Older/larger GBICs... (ok for now)
 - ...but all may not be grandfathered



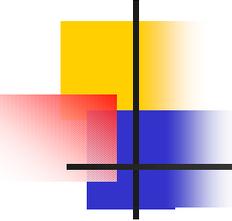
Equipment Vendors

Vendor	Disable Port	Don't Care (Today)
Harmonics		X
Motorola		X
SkyStream		X
BigBand		X
Terayon		X

Equipment Vendors



Vendor	Disable Port	Don't Care (Today)
Cisco	X	
Juniper		X
Extreme	X	
Enterasys		X(?)
Nortel		X(?)
Foundry		X(?)
Alcatel	X(?)	



Top 10 reasons...

- "Some GBICs don't fit"
 - Won't fit = Won't use
 - Address via IEEE/MSA standards
 - Publish list of approved/problem manufacturers
 - Use Manufacturer ID in EPROM to restrict/allow certain manufacturers

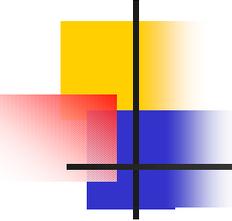
Top 10 reasons...

- "Some GBICs don't fit"

- Tell customers to push harder...

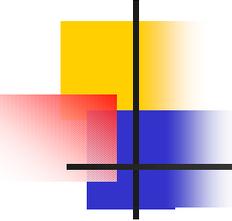


- ...then charge extra for this "Automatic Locking" feature!



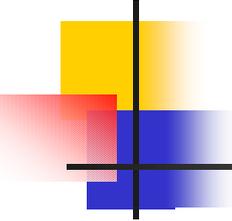
Top 10 reasons...

- *“Some GBICs draw too much power”*
 - Doesn't work = Won't use
 - Address via IEEE/MSA standards
 - Publish list of approved/problem manufacturers
 - Use Manufacturer ID in EPROM to restrict/allow certain manufacturers



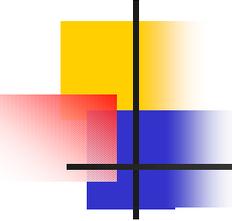
Top 10 reasons...

- *“Some GBICs draw too much power”*
- Fuses & Breakers
 - Your own GBICs can go bad too
 - You should be protecting your cards anyway



Top 10 reasons...

- *“Losing Revenue to 3rd Parties”*
 - Yes, it’s tough all over
 - Competition
 - Yes, it still exists
 - It’s the “Name of the Game”
 - If 3rd parties can make money through resale why can’t you?

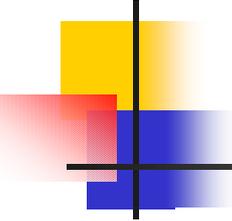


Top 10 reasons...

- *“Quality Control – our OEM makes them to our exacting standard”*

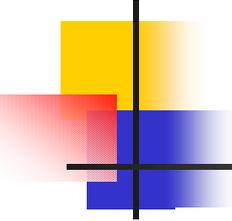
Their OEMs say...

- it still adheres to IEEE/MSA standards
- the identical GBICs are supplied to **all** their customers
- any quality changes are incorporated into their regular production runs



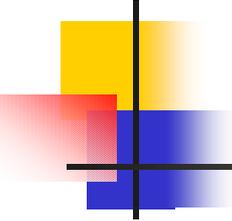
Top 10 reasons...

- *“Our customers wanted this”*
 - Who?
 - Customers want vendors to support IEEE/MSA standards too
 - Customers want options too...
 - Make “Port Disable” the default but give customers option to override



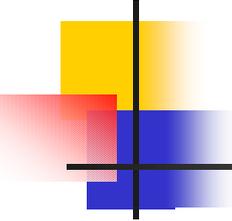
Top 10 reasons...

- *“We can’t support or warrantee the use of 3rd party GBICs”*
 - Even if GBIC is identical – from the same OEM you use – why not?
 - Customer can swap in Vendor’s approved GBIC during troubleshooting
 - If both GBIC and your card adheres to the IEEE/MSA standards what’s the problem?



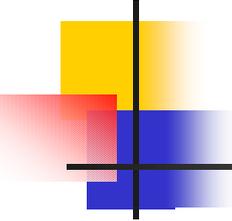
Top 10 reasons...

- *“Protecting the Industry – Keeping problem GBICs out of the market”*
 - EPROM is re-writeable
 - Less expensive to re-write a EPROM than to put a “Vendor X” label on the outside of the GBIC
 - Will **actually** cause more problems
 - “Bad” GBICs won’t be distinguishable from the vendor’s “Good” ones



Shaw's GBIC Experience

- We have interchangeably used multi-vendor GBICs for last 5 years.
- No problems
- Just lucky??
 - All our GBICs come from one of the 3 major GBIC manufacturers (OEMs)



What's next?

- It's up to you...
- Push vendors to
 - Make "disable port" an option
 - Expand GBICs use to other cards
 - One line card that did Ethernet, OC48, DS3, etc
 - Just add the GBIC for the interface you want

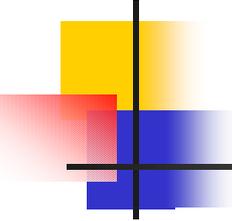
Contacting Equipment Vendors...

Their first approach will be to try and
make this problem go away...



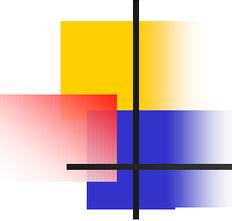
**It's not
just a cost
issue**

...by reducing your GBIC cost



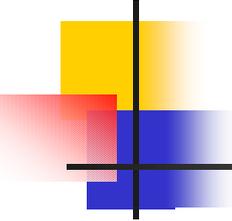
Contacting Equipment Vendors...

- Still early in the game
 - Many still sitting on the sidelines
- Find out what their GBIC direction is
- Put multi-vendor GBIC support in purchase and support agreements
- Encourage vendor to become actively involved & support current IEEE/MSA standards



More Information

- Dave.Wodelet@sjrb.ca
- General site:
 - <http://www.schelto.com/>
- IEEE Spec for SX, LX GBICs
 - http://www.schelto.com/802_3/1Gig/index.htm
- MSA for SFP GBICs
 - <http://schelto.com/SFP/index.html>
- IEEE 802.X Standards
 - <http://standards.ieee.org/getieee802/new.html>



Questions / Comments

