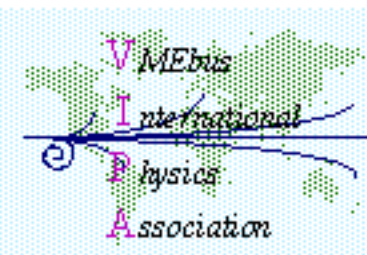


VITA 23

Mechanical Issues

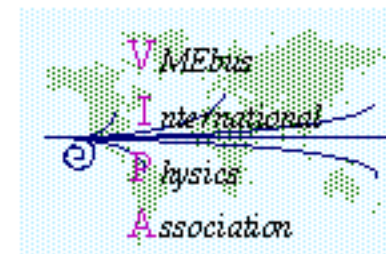
Robert Downing

Why is it Fragile?



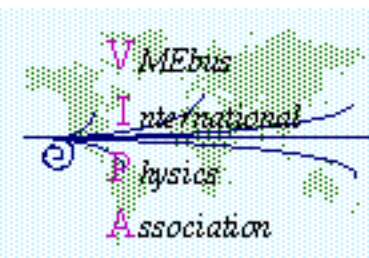
- **Need for more I/O**
 - **Higher Speed**
 - **Smaller pins**
 - **More I/O**
 - **Higher Speed**
 - **Smaller Pins**

History



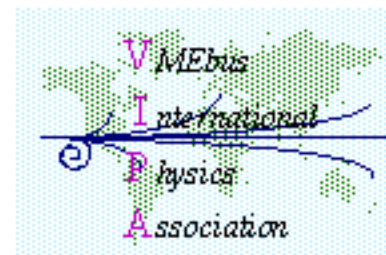
Standard	Module Size	Connector - Main	Connector - Auxiliary	Pins/cm ²
NIM	33 x 190	42 pins - M Module 36 - 2.4 pins & 6 - coax	50 pins - M Module	1.5
CAMAC	17 x 200	86 fingers 2.54 finger pitch - edge card	52 pins 1.6 dia. on 2.54 grid	3.9
Fastbus	366 x 16.5	130 pins 0.64 sq. on 2.54 grid	195 pins 0.64 sq. on 2.54 grid	5.4
VME64 xP	366 x 20.3	415 pins 320 = 0.64 sq. on 2.54 grid 95 = 0.4 x 0.5 on 2.0 grid	330 pin 0.4 x 0.5 on 2.0 grid (up to 170 gnd's)	10.0 (12.5)

Bottom Line



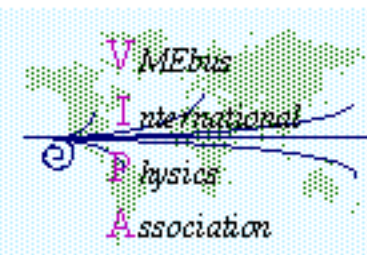
- VME64x 6U and 9U mechanics offer many desirable new features
- Higher density pins have to be handled properly
- Backplanes can be damaged if not careful
- Users need to be trained!!!

CERN Module “Starter Kit”



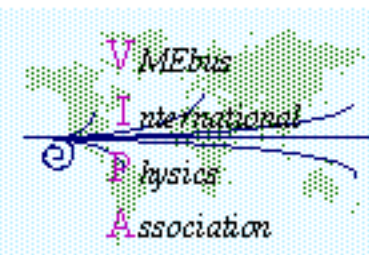
- Web Site Address:
 - www.cern.ch/ECP-ESS/VMEbus_dev/starter.html
- Module Parts provided:
 - 6U & 9U Front Panels
 - Keys
 - P1 & P2 Connectors
 - P0, P5, P6 Connectors
 - Hard Metric Shields
- Also T.M. and backplane connectors

Bottom Line



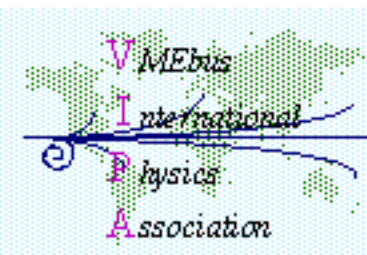
- Careful Handling
- Better Construction Techniques
- Mechanical Testing
- *Training*

Problems Encountered - Short List



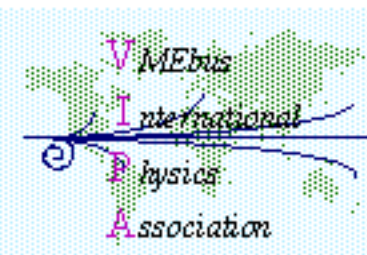
- Smashed Hard Metric on board
- Broken shrouds from bowed boards
- Improper seating of board connectors
- Lack of support for heavy cables
- No front panels
- No stiffeners

Smashed Hard Metric



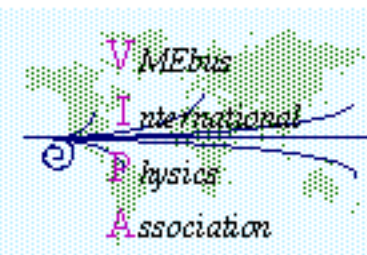
- Inserted with vise
 - Improper support
 - Plastic pushed into top and bottom rows
- Closed entry hole caused bent pins
- Fix?
 - Only use proper insertion tools

Broken Shrouds



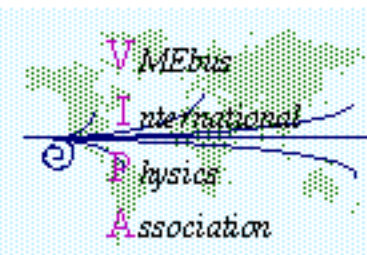
- Shroud has no horizontal tie
- Pressure to straighten board causes side wall to break
- Boards need stiffener for connectors
- Fix?
 - Check board flatness after construction

Connector Seating



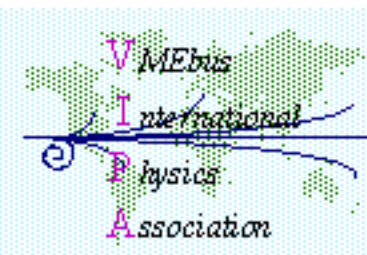
- 2° maximum angular error
- Press fit connectors must be installed with proper tool
- Solder connectors should be held with screws while soldering
- If hand soldered
 - Tack solder
 - Finnish solder with “bolt tightening” pattern

Subrack Support



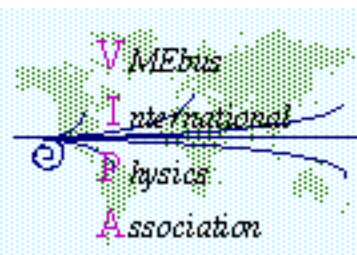
- Subrack is not made to support large downward forces from boards.
- Front panel alignment pins tie top to bottom
 - Beware of pull out of guides from rails
- Heavy cables must be externally supported
- Boards with extensions should have additional support bar

Front Panels



- Align injector/ejector for module
- Provide anti-rotation for levers
- Stiffens and unwarps front part of board
- Provides hardware for keys
- Warning!
 - Never insert boards without front panels

Cost



- Backplane cost: ~\$1000 or more
- Time to change: ? hours @ \$30/hr
- Down Time: ? hours @ \$25K+ /hr