

Infiniband and Gigabit Ethernet Cable Stripping

Introduction

InfiniBand and Gigabit Ethernet are computer-networking communications standards used in high-performance computing that features very high throughput and very low latency. It is used for data interconnect both among and within computers. InfiniBand is also utilized as either a direct, or switched interconnect between servers and storage systems, as well as an interconnect between storage systems. Whilst fiber optics seem to be a logical choice for high speed data transfer, copper technology is still the preferred option based on investment costs and power utilization for these short distance interconnects.

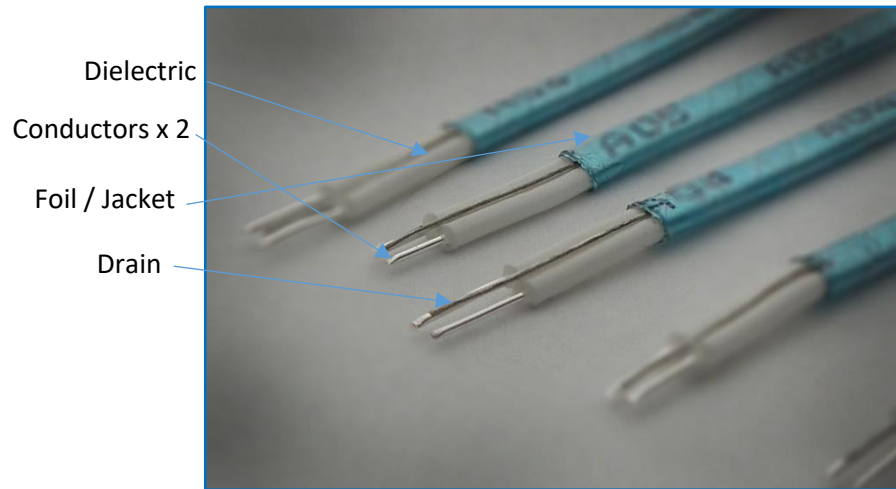
The cable design consists of eight twin-axial (twin-ax) cables connected to a PCB emitter / receiver. Each twin-ax cable consists of two conductors coated with a dielectric, one or more drain wires and a wrapped mylar foil. These twin-ax are then further encapsulated with foil, braid, and jacket.



Figure 1: Melanox InfiniBand Cable

Stripping these cables presents a number of key challenges if the highest data rates are to be achieved.

- No bending of conductor
- Accurate spacing between the cut foil and the cut dielectric
- Precise dielectric cuts
- No residue on the conductor to allow minimum gap from dielectric
- Convenient method for removing the shield



Solution

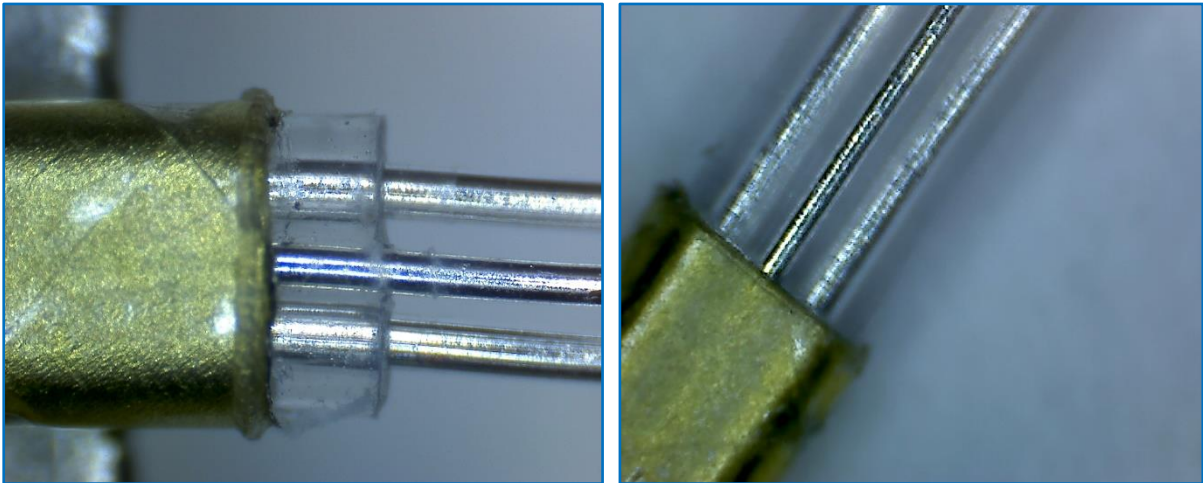
Laser Wire Solutions is the world leader in novel laser solutions for the stripping of InfiniBand and Gigabit Ethernet cables.

The exact solution depends on whether it will be implemented in a fully automated cable manufacturing line, or a manual assembly operation. The exact solution also depends on the cable design regarding placement of the drain wires. Typically, there is a single drain wire underneath the foil – the foil conductive layer contacting the drain. Alternately there can be two drain wires on the outside of the foil, with the conductive foil surface facing out. In both cases the foil is held in place by a clear adhesive wrapped tape.

Single drain:

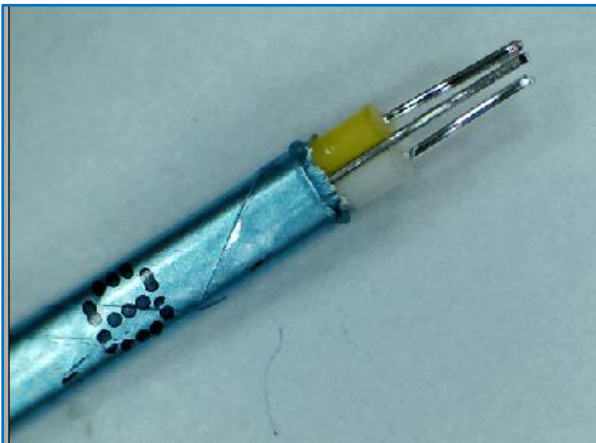
Cables with a single drain can have the foil removed in a single laser process. LWS has a new proprietary process that cuts the foil and clear jacket in a single step. The foil and jacket are also slit to ease peeling of the foil / jacket combination. The laser process reliably cuts the foil without damaging the underlying conductor or drain – no matter the dielectric material. Alternatively, in some applications the foil is vaporized to allow a second laser in to cut the dielectric through the gap. This is convenient for automation but has a less quality finish than peeling the foil. This proprietary technology produces the sharpest and cleanest foil cut on the market, with no foil tags, even when there are multiple layers of foil.





The dielectric is cut with our precision Mercury laser technology. Unlike competing laser solutions, the precise laser spot and process control allows the dielectric to be cleanly cut with a sharp edge leaving minimal residue on the conductor and drain.

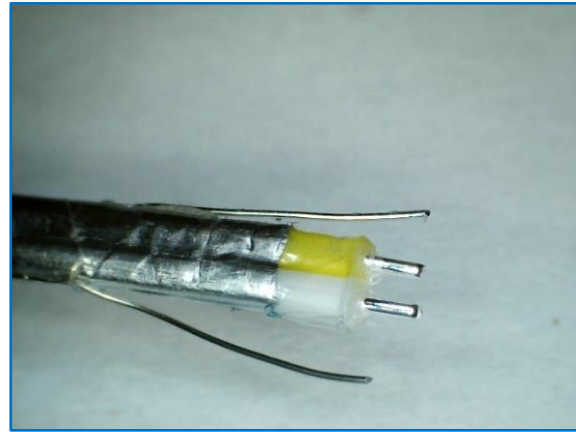
A lower cost alternative to directly cutting the foil is to remove the clear adhesive jacket and then pull or peel off the foil. Where the cable construction calls for the foil to be wrapped with the conductive layer facing into the cable, the Mercury technology is capable of vaporising the mylar backing of the foil. There are then two options. The jacket and backing can be totally vaporised and then the foil manually peeled away. With practice and tweezers a clean cut can be achieved with no tags.



Alternately a single laser cut can be made through the jacket and mylar backing. If the cable end is flexed, the foil will snap at the cut line, allowing the jacket / foil slug to be pulled off. This is a quick and convenient method for removing the foil – but can leave a jagged edge and tags if more than one layer of foil is present.

Dual drain:

In dual drain applications, the foil is wrapped with the conductive layer facing out. The drains are trapped between the foil and adhesive jacket. Mercury carbon dioxide laser technology is used to either totally vaporize the jacket, enabling the drains to be peeled away from the foil, or just two windows made over the drains, leaving a strengthening strip of jacket on the foil. The foil can then be peeled or laser cut, depending on the level of quality required.



We offer laser modules for the jacket / dielectric and foil for use either in manually operated lines, or integrated into semi-automatic or fully automatic production lines. Standard modules can be configured as required and customized if necessary to meet your needs.