CIR
ENLIGHTENED ANALYSIS

Active Optical Cabling Markets: 2013 and Beyond

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Active Optical Cabling Markets: 2013 and Beyond

Report Summary

We are publishing this report CIRs third on the AOC space because we see signs that AOCs are reaching their take off point:

This year sales AOCs will exceed $150 million for the first time ever. And by the beginning of the next decade, CIR expects the AOC market to be valued in the billions of dollars.

Large firms have entered the AOC market in surprising numbers in the last couple of years. These include 3M, Corning, Molex and Sumitomo. Avago a long-time dabbler in the AOC space has recently decided to become an active participant in it.

For the present, the bulk of AOCs are sold into the data center (and especially the InfiniBand) market. And, as has been the case for a couple of decades now, copper continues to do a good job competing with fiber, which tends to hold down the AOC market. Nonetheless, CIR believes that copper will have a harder and harder job competing with fiber and AOCs in particular -- going forward. On the one hand, today copper solutions for high-speed networks and data links tend to mean expensive twin-ax solutions, not economical twisted pair. On the other hand, the price of AOCs has dropped dramatically.

We think, therefore, that AOCs have an opportunity that they have never had before: With 40 Gbps, 100 Gbps and high-speed InfiniBand moving into the data center, AOCs are looking like the way to go for network managers who want fiber, but dont really want to become fiber technicians.

A similar trend is becoming apparent in the personal computing space optical extenders for the USB 3.0 and Thunderbolt interfaces are now commercial products. CIR projects a particularly strong market for AOCs in the digital signage market where the trend towards the use multiple streams of video will soon overwhelm conventional structured cabling.

Because the addressable markets for AOCs in digital signage and the personal computing market is so much larger than the data centers, CIR believes that by 2017, the digital signage market will overtake the data center market in AOC consumption, with personal computer use of AOCs catching up with data center AOCs in about a decade.

Goal of Report

The goal of this report is to show how the AOC market will be able to achieve such successes and the economic and technological trends that are making it possible. The report is primarily focused on business strategy, analyzing each of the sectors in which AOCs are likely to find a market and identifying the main addressable markets. This report also takes a look at important marketing issues faced by AOC, such as the importance of branding.

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The extensive supplier profiles in this report discuss the products that these firms are (or will soon) offer and include in-depth analysis of the strategies being deployed by major AOC firms including some of newer firms that have entered the market.

The eight-year forecasts in this report are based on an analysis of the growing need for AOCs in the data center/HPC, digital signage, PC interconnect and home theater markets. These forecasts take into consideration todays major drivers for fiber optic deployment such as 3-D television, cloud computing, big dataand the inevitable rise in processor speeds.

The forecasts are presented in both dollar terms and in terms of the number of cables and length of cable shipped. We also discuss which protocols will become dominant in the AOC space over the next few years, determining especially how AOCs will fit in with the rise of 40/100 GigE, HDMI, DisplayPort and the latest generation of USB.

Who is this Report For?

This report will be essential reading for all marketing and business development executives in the networking business as well as those that are specifically concerned with AOCs. It shows where and when the money will be made in the AOC market and which firms are most likely to capitalize on this opportunity.

The report will also be of high value to corporate planners concerned with the future of the data center, consumer electronics and personal computing spaces, and to investors operating in these industries.

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Chapter One: Introduction

1.1 Background to this Report

1.1.1 Why the Prospects for AOCs Keep Growing

Active optical cabling (AOC) is a black-box solution to creating a fiber-optic connection and consists of a complete fiber-optic data link (transceivers plus cable) that can be plugged into existing ports, enabling a very rapid introduction of optical connections. AOCs provide customers with access to all the undisputed advantages of fiber (high bandwidth, relatively thin, lightweight cable, etc.) in a plug-in format.

Unlike most other supposed opportunities in the optical networking space, AOCs generally are not an opportunity because they embody the latest technology capable of providing the highest data rates. Instead, they are a clever design idea that enables the end user to (literally) plug into the power and security of a fiber-optics link, without any special knowledge of fiber optics and—in particular—with a largely electrical data communications infrastructure.

This all sounds rather dull compared with the latest innovation in "quantum networking," or the data link operating at 100 Gbps. However, as the profiles later show, there is considerable and apparently growing interest in AOCs with new firms entering the market over the past 18 months and other firms sprucing up their AOC lines. Also, this is a market where we are dealing not just with small specialist firms, but with some large firms such as Avago, Finisar and Molex.

1.1.2 Evolution of the Addressable Markets for AOCs

CIR believes this ongoing—perhaps even accelerating—interest in AOCs is due to the fact that the addressable market for AOCs is *potentially* huge. That is, there are numerous applications environments where network managers would love to be able to install fiber optics without trying, as it were. And this is exactly the capability that AOCs are designed to provide.

For the time being such markets are focused especially on high-performance computing (HPC) facilities and (to a much lesser extent) large data centers. However, both the firms that have recently entered the AOC space, or have been serious players in it for some time are essentially betting that AOCs will be able to be sold into other markets based on its claim to make fiber optics easy to install. The markets that AOCs have in mind for such a market expansion are primarily personal computing, digital signage and consumer electronics businesses.

Data center applications: This is clearly the market sector where most of the revenues for AOCs are coming from at present, and most of the revenues within the sector are coming from copper replacement within a 15- to 30-meter reach. This is precisely what CIR has been reporting in its AOC studies for several years now.

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The only issue that is left to debate is how quickly AOCs will penetrate data centers. In particular, it seems important to explore where the next wave of opportunities for AOCs is going to come from within the data center, since these will be relatively easy for AOC firms to tap into without recourse to radical new designs or distribution chains with whic they are not familiar.

In practice we think an assessment of the market prospects for AOCs in the data center boil down to answering two questions. First, to what degree will AOCs be deployed in smaller data centers? That is, how far can the addressable market for AOCs in the data center be extended downwards? The second question is how will AOCs compete with more standard 10-, 40- and 100-Gbps fiber solutions? And perhaps there is even a third question here and that is how—and to what degree—can AOCs compete with active copper cabling; a relatively new product category.

AOCs beyond the data center: Reasonable people might disagree about the commercial potential for AOCs in the data center, but we suspect that they would not do so by much. This is because there is a long history of fiber being used in data centers, so the parameters defining the possibilities for AOCs are quite well understood.

One cannot say the same thing about AOCs outside the data center, since this is unknown territory. Fiber optic interfaces for PCs have been talked about for decades and while fiber connections to large-screen TVs is actually a real phenomenon, we are mainly talking about niche markets here; videophiles and bars mostly. AOCs in the digital signage space seems to make sense, but is not yet fully established.

1.1.3 Rethink Necessary

To CIR all of the above suggests that it is time for a careful examination of the prospects for AOCs over the next few years. And the big question here is whether the firms that are now investing heavily in the AOC space are actually making a wise investment or are they simply chasing after pie in the sky; a now traditional sport in the optical networking space.

After all, the prize here would be taking the AOC into huge consumer electronics and personal computing markets and this could prove more than a little daunting given that no PC vendor seems to be especially interested in parallel optical solutions and that there are so many other high-speed solutions in the consumer electronics world. These include mostly copper based solutions. And it remains quite likely that AOCs may have to compete some day with an optical USB solution. Finally, it has been several years since AOCs were supposed to enter retail stores and this has yet to be a significant trend.

We also note that the marketing issues surrounding AOCs are challenging. One steadfast factor in most of the optical networking business is that new products can compete to some extent on the basis of containing the latest advanced optical technology. However, AOCs could never make such a claim. Indeed, in some ways AOCs are really not all that

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differentiated in the marketplace, except in terms of which standard interfaces/transceivers they support. This means that AOCs have the potential of becoming commoditized and their suppliers will have to become increasingly skilled at dealing with this by skillfully building brands and sales channels.

Still, CIR believes that we shouldn't dismiss the role of technology in the future of the AOC entirely. For one thing, technology improvements—and we are thinking particularly of silicon photonics in this regard—may address one of the big problems that AOCs currently face and that is cost. There is not that big a market for $300-$400 HDMI cables.

1.2 Objectives of this Report

One of CIR's motivations for publishing this report is that we believe that AOCs remain an important opportunity within the optical networking space. But it is one that needs to be assessed carefully because of the limitations expressed above. As we have noted in other CIR publications, some analysts have been a little too eager to proclaim the "Day of the AOC" in which every HD television is purchased along with an AOC! This kind of thinking has, in the past, led to some grossly exaggerated forecasts for AOC markets.

CIR believes that AOC firms need clarity with regard to business characteristics, size and growth of the many market segments in which AOCs can (apparently) compete. And CIR has been providing this guidance in AOC reports since 2009. This report represents our analysis of AOC market concerns and expectations at the beginning of 2013. This report also discusses and analyzes the current activities of AOC firms and we have also provided an assessment of how well such firms are positioned to take advantage of opportunities as they emerge.

As usual with CIR reports, this report includes a granular forecast of AOCs by application sector, with breakouts by cable length, units shipped and market value. We also discuss the interfaces that these cables are likely to support.

1.3 Scope of this Report

This report primarily focuses on the opportunities for components, fiber and module manufacturers that we believe will result from the emergence of pre-configured AOC assemblies. We do not discuss in detail the new kinds of equipment that could be built to take advantage of AOC links, nor do we dwell on networking issues, per se.

As such, this report contains information and analysis that will be important to equipment firms, service providers, network managers and investors, as well as component and module firms.

1.4 Plan of this Report

Chapter Two of this report reviews the ongoing opportunities for AOCs in the data center. In Chapter Three we look at the potential of AOC as the basis for a universal parallel optical port on the PC.

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In Chapter Four we address AOCs in consumer electronics markets, while in Chapter Five we provide an analysis of the leading suppliers of AOCs and the product/marke strategies they have been adopting since our last report. Finally, in Chapter Six, w present detailed forecasts of AOC opportunities in these various market sectors.

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