

Planar Waveguide Circuit Modules Global Market Forecast and Analysis (2011-2016)

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ElectroniCast Consultants provides a detailed market and technology analysis of planar waveguide circuit modules used in optical communication applications. Below, are three levels (or “food chain”) pertaining to planar waveguide circuits. For the purposes of this ElectroniCast study, we quantify and provide a market forecast for “Level 3”

- Level 1 - The PWC chip
- Level 2 – PWC packaged chip with fiber attached (compact component)

• Level 3 – Module: typically 1 or more PWC chips and compact component(s) inside an module enclosure, with fiber(s) attached

PWC module average selling price (ASPs), which are quantified in this report by ElectroniCast, include attached optical fiber(s) (0.5-2 meters in length), along with splice sleeves, module enclosure and associated packaging components; however, connectors are *not* included. The prices are the estimated or forecasted average prices paid during the indicated calendar year.

The module prices are the manufacturer’s (“factory”) prices, invoiced to the first (original) customer, or transfer prices for internal (captive) production. They take into account the typical purchase quantities and related quantity discounts, as well as the variation in performance specifications between one user and another. The costs of supplier testing, qualification, documentation and other ancillary costs are included in the price calculation.

The average module footprint (enclosure dimension size) will trend to decrease in size; however, the number of channels and functions per module are trending to increase. All of this is made possible by technology allowing for more functional integration and/or capacity on a (single) PWC chip (in this study, we are quantifying the 2011-2016 timeframe).

Based on primary research (interviews and evaluations) with engineers and product planners from both the supplier-side and the user (customer-base), ElectroniCast can see ideas and then (eventually) concepts about 3-7 (or more) years before innovation solutions (products) are announced in the public domain. Once we feel confident that these ideas and concepts will become innovative solutions (new products), we set anticipated usage (consumption) into the market forecast.

It is also important to note that we, in effect, forecast signal transmission demand growth, which will drive demand for increased capability/capacity components. In addition to serving as an improved solution for advanced applications, this solution also is a better economical solution for earlier (existing) applications. ElectroniCast analysts have extensive experience at searching for and finding-out about these ideas-concepts-innovations and evaluating them with an excellent success factor rate.

Networks combine voice, audio, data at various speeds for video, television, including interactive 3-dimensional high definition television (3D/HDTV), wireless/mobile, Internet and other specialized transmission into a single integrated infrastructure. Included within the infrastructure is business Enterprise resource planning (ERP) software, unified messaging, Internet-based social networking, web-assisted call centers, and a variety of communication infrastructures.

Residential use includes video on demand, e-commerce, small office/home office telecommuting, advertising, medical monitoring, elder care monitoring, childcare monitoring, home and office security. Communication networks are utilizing built an Internet backbone, rooted in demand. The customers are demanding greater speed, more functionality and reliability, and naturally, they expect "perfect" quality of service.

A planar lightwave circuit (PLC) is a generic term used to refer to an optical circuit consisting of a light waveguide. In the same way as an electronic integrated circuit (IC), it is formed on the surface of a substrate using technologies such as thin-film formation, photolithography, and dry etching. Silicon is used as the substrate and silica glass as the waveguide. The merit of the PLC is that it provides a low-loss connection with optical fiber because the PLC and the optical fiber are both made of silica, and they both have a core size of the micrometer order.

Planar technology allows a much tighter density of components given that all functions are can be performed on a single PWC chip. The end result is a much smaller device and smaller footprint for the OEM manufacturer's equipment. This is a key metric for new systems as Central Office Space is in short supply. This report provides the findings of ElectroniCast Consultants' study of PWC modules consumed in optical communication applications.

The worldwide review of 2011 plus the market forecast (2012-2016) is presented for PWC-based modules is segmented by the following functions:

- Consumption Value (US\$, Million)
- Quantity (number/units: Thousand)
- Average Selling Prices (ASP \$, each)

The ElectroniCast market data are segmented into the following geographic regions, plus a Global summary:

- America (North America, Central and South America)
- EMEA (Europe, Middle Eastern countries, plus Africa)
- APAC (Asia Pacific)

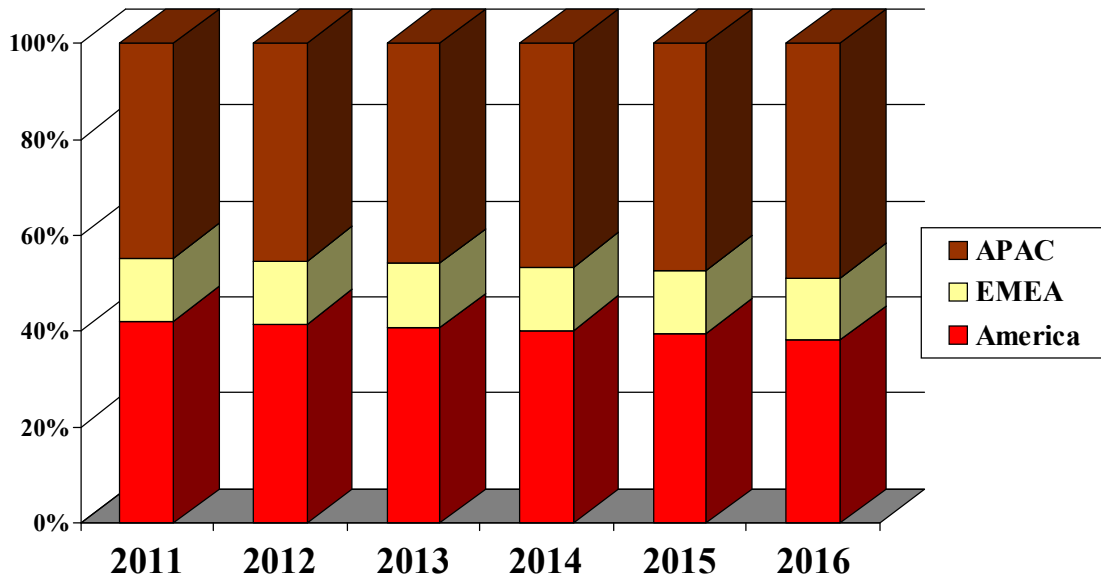
The following is a list the PWC-based modules that we quantify in this market forecast study report.

- Discrete PWC Module
 - AWG Module
 - Switch Module
 - VOA Module
 - PLC Splitter Module
 - Other/Miscellaneous PWC Module
- Integrated Multifunction PWC Module

According to ElectroniCast Consultants, the global consumption value of planar waveguide circuit (PWC) modules will increase with strongly rising quantity growth partially offset by declining average prices.

The APAC region, with 45% in 2011, is forecast to increase at as faster pace versus the other two regions to maintain the lead in relative market share (see Figure). The America region is set to hold onto the 2nd-place position. Europe, Middle East and Africa (EMEA) will remain in a distant third place in relative market share, increasing at 20.3% per year (2011-2016). The consumption value of a particular module is determined by the region and final application (“end-use”) of the module. PWC discrete (single function) modules are forecast for relatively slower growth versus the integrated multifunction module category.

**Planar Waveguide Circuit Modules
Global Consumption Value Market Share (%), By Region**



Note: Market forecast data in this study report refers to consumption (use) for a particular calendar year; therefore, this data is not cumulative data.

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