

# 2.5Gbps Post Amp

## High bandwidth demand

The increasing demand for high-bandwidth in different application related to the Internet, telecommunications, data communications, fiber channel, etc. has created a tremendous need for fiber rich networks and the components that support them. To meet these high bandwidth requirements, the fast

product turn-around time dominates the decision-making process for the customer in vendor selection. The exponential growth in optical technology, due to these high bandwidth requirements, along with competition in optical components, makes the customer more demanding and specific about the product requirement.

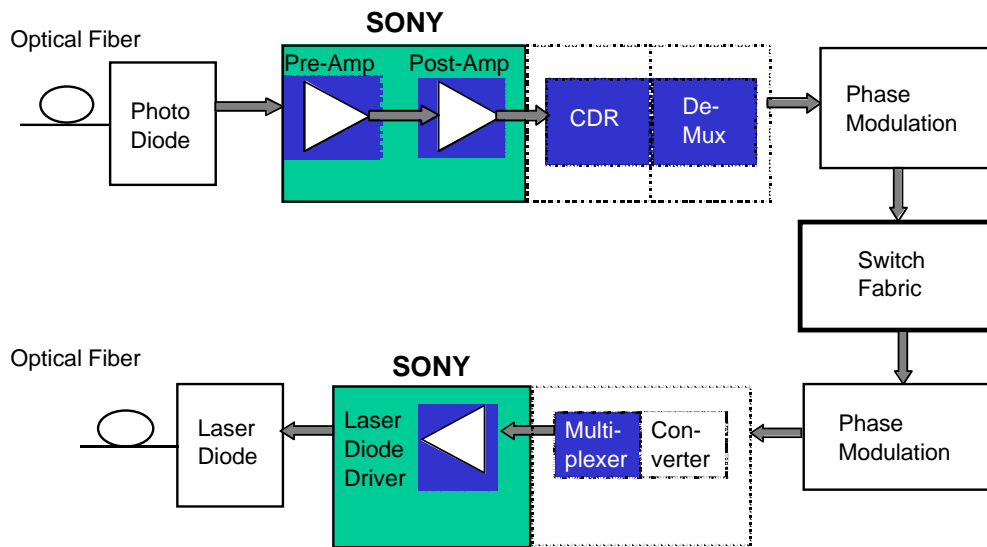


Figure 1. Optical Networking Block Diagram

## Industry's Requirements

After studying the market, the customer has to decide which component is appropriate for their application. Then, they must develop an optical module based on the project's fundamental requirements such as:

- Time to market
- Better, faster, most cost efficient, and scalable
- The development cycle
- Meet all the Standard's specifications
- Marketing and the technical support provided by the vendor

- Evaluation board availability and above all, the brand name, which is important from service point of view.
- Compact package size, if needed available even in wafer form
- Complete specification and application notes for the product
- The vendor's roadmaps on products in the pipeline.
- A back up solution in case the vendor discontinues the product

### **Qualifying Tests**

Qualification of these devices is time consuming. The customer needs to perform multiple tests, including:

- Electro-optical test, which requires several weeks
- Life time tests, which takes a few months
- Fulfill all standards (ITU / Bellcore) specifications
- Check AC / DC characteristics & Power consumption
- The vendor provides temperature characteristics and package qualification.

### **Why Sony's Post Amp**

Sony has a line of optical communication products and a promising road map including 10Gbps follow-on products. Based on the criteria and concerns, one of the high-performance optical networking products is our Post-Amp.

This is an ideal product for fiber optics applications. This high-speed Post Amplifier with Signal Detector, CXB1820, is part of Sony's family of 2.5Gbps optical networking ICs for use in high-performance optical transmitter and receiver functions. It can also be used in Fiber Channel (2.1Gb/s) applications.

The Sony's CXB1820 has design flexibility and meets the needs for performance, reliability, and cost. It comes in a compact 24-pin VQFN plastic package with a fine lead pitch of 0.4mm and has been used in the fiber optics applications. A typical SONET application in which this product can fully utilize its features is an OC-48 module, giving a data rate 2.488 Gbps.

### **About Sony's Post-Amp**

This bipolar post amplifier has an edge over existing parts in the market and fulfills the industry requirements. The key receiver function provides reshaping and regenerating on a single chip with one power supply of +3.3V.

A typical optical communication system needs an alarm function, which asserts the alarm signal at a very low bit error rate ( $>1E-3$ ). The signal detector in the CXB1820 will assert an alarm signal at input voltage 2-4mVpp. The hysteresis width for this chip is designed to maintain a constant gain of 6db whereas the typical values are 3db.

This post-amp has the power and chip-count savings that can translate into better utilization of the real estate on an optical module

or printed circuit board. This leads to cost savings to the designer on both fiber-based data communication and telecom solutions. The typical signal which is received from a pre amplifier is weak, so the post amplifier should have high sensitivity; this high sensitivity is provided in the CXB1820.

The evaluation board is equipped with a dual supply capability in order to connect ECL outputs to measuring instruments.

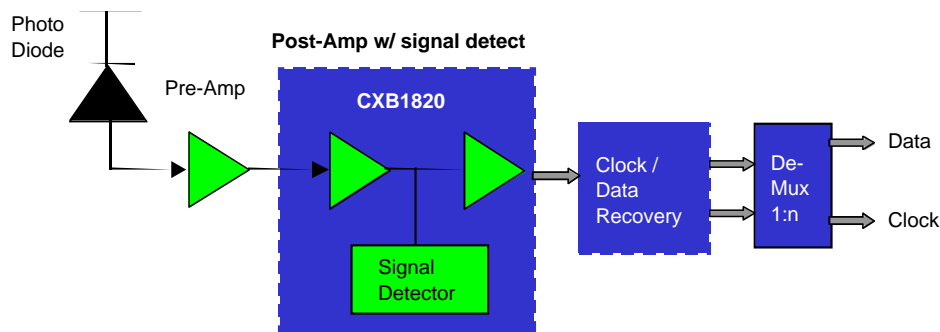
Other features for the post-amp include:

- Auto offset cancel circuit
- Signal interruption alarm output
- Stabilized Signal Detect output function
- TTL/ECL/PECL support
- Squelch circuit

## Application

Typical applications for the post amp are:

- SONET /SDH transmission systems and modules.
- OC-48 fiber optic modules
- Gigabit Ethernet
- Fiber Channel up to 2.1Gbps



**Figure 2. Typical Receiver Unit for SONET / SDH Fiber System**

This gives the customer an additional option to choose clock data recovery (CDR) integrated with post-amp or independent CDR. The interface between the post-amp and

the CDR is an industry standard. The basic approach to accomplish the CDR adopted is through Phase Lock Loop (PLL).

## Integrated Post Amp & Clock/ Data Recovery

After analyzing the market trends, for high-speed and integration, Sony has integrated the post amp with clock and data recovery (CDR) into a single chip, the CXB1826. It comes in a 48-pin VQFN package. With one

power supply of 3.3V, the key receiver function inclusive of reshaping and regenerating provides retiming as well. No reference clock is required and current mode logic (CML) mode is added.

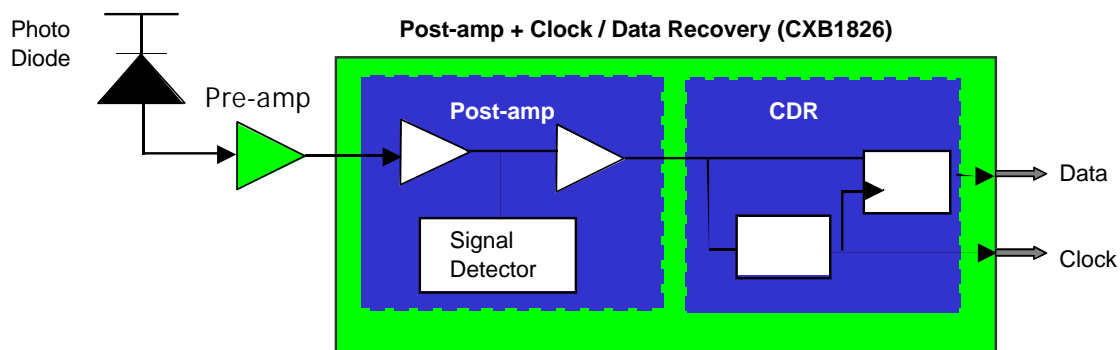


Figure 3. Typical Receiver Unit with Integrated Post-amp and CDR for SONET / SDH Fiber System

## Conclusions

### Benefits

- Available both as post amp and post amp integrated with CDR @ 2.5Gbps
- Good sensitivity
- Stable signal detect function
- Signal detect hysteresis width of 6dB max
- Supports both TTL/PECL output for signal detect

As fiber optics data communication products, are growing at a rapid pace, higher speeds, compact sizes and increased functionality is imminent. Even though more integra-

tion is possible though not desirable in all cases, this provides the customer more room for flexibility.

Embracing this growing market trend, Sony will provide more integrated devices and high-speed optical components that reach up to 10 Gbps. These devices will be available in wafer form as well. Sony's product roadmap includes products such as Post-Amp, Laser Diode Driver (LDD), Clock & Data Recovery (CDR) and Pre-Amp.