



**California
Amplifier**

**Ecco™
Consumer Electronic Repeater**



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CONFIDENTIAL INFORMATION

Introduction

California Amplifier's Consumer Electronic Repeater, called "Ecco", is a compact, cost-effective, consumer repeater product designed to complement PCS wireless infrastructure. This product enhances in-building PCS coverage on a trouble-spot basis, to multiple simultaneous users. Ecco™ is transparent to the network because it enhances coverage without the use of additional frequencies, alleviating complex frequency planning. By employing various patent pending technologies, California Amplifier has integrated this functionality into a single, self-contained device. Since Ecco requires no mounting hardware or difficult installation for use, it is perfectly suited for consumer deployment in a residence, SOHO or other in-building application.

Ecco is targeted for use by PCS carriers and may either be provided or sold to PCS customers, the end user. Ecco provides an affordable solution to decrease customer voluntary churn caused by spotty coverage and also increase revenue potential by providing cost-effective and reliable in-building coverage. Additionally, Ecco provides an opportunity to attack the landline replacement market using wireless, by enhancing availability and reliability of the wireless link in residences.

Product Operation

Ecco incorporates a high gain antenna that is intended to be directed toward signal paths to / from the base station (called "Donor Antenna"), and a second high gain antenna that is intended to be directed towards the interior of the service location (called "Server Antenna"). Ecco contains electronics that amplify signals between these antennas, in the specific channel block of interest. The design and packaging of the two antennas in Ecco have been optimized to maximize their isolation, thus accommodating a high gain electronic amplifier.

In order to aid the consumer in orienting the device to optimize signal paths to / from the base station, Ecco has visual status indicators. These indicators inform a user that the device is receiving sufficient PCS RF signal to provide enhancement, and an indication of the strength of that signal. The display also provides visual indication if a PCS RF signal does not exist or if the quality of the signal received is too poor for Ecco to enhance coverage.

Ecco employs an adaptive gain control algorithm which continually and automatically optimizes the gain based on a variety of conditions related to the ever-changing surrounding RF environment. This adaptive approach simplifies the product's placement and also eliminates any ongoing need for monitoring, adjustment or reconfiguration by the customer.

Ecco has a "Power" button, which toggles the unit on and off. It also has a "Band Select" button which allows the user to select the desired PCS frequency block,

based on licenses in a given market. The selection of a specific frequency block balances the desire to boost performance, simplify device placement by the consumer, and provide a single standardized product that can be used nationally. The “Band Selection” provides seven settings, corresponding to blocks A through F, where the B block is divided into two pieces. Ecco understands that the A-C channel blocks are 15 MHz wide and the D – F blocks are 5 MHz wide, and filters the signals accordingly.

Ecco™ hides the sophistication of its functions with advanced self-diagnostic software, thus providing a simple to use, consumer product. Ecco is equipped with self-diagnostics designed to detect a variety of problem conditions, including oscillation (typically due to feedback of signals between the antennas), overdriving the unit (typically due to use of the unit too close to a base station or use of a handset too close to Ecco), and general device failure. Under these and other error conditions, Ecco automatically attempts to correct the problem by adjusting various internal functional controls. If the unit is unable to resolve the error condition, it renders itself inoperable, but allows the consumer to diagnose the problem through the use of displayed error codes.

Ecco continuously detects the presence of PCS signal and shuts the power amplifiers off in the absence of signal. This function helps the overall system performance by reducing the aggregated system noise floor.

Product Appearance

The dimensions of Ecco are approximately 7.4” x 8.2” x 3.0” (width, height, depth) and it weighs approximately 2 pounds without batteries. This size is primarily dictated by the isolation requirements between the Server and Donor Antennas. Ecco is designed to blend into any home or office with an aesthetically pleasing look comparable to today’s small consumer electronic equipment.



Ecco LED Panel View