(57) An antenna device, enclosed within an outer shell (Figure 2, 13 & 14), comprising a substrate 12 connected to a printed antenna board (Figure 2, 11). The substrate is connected to a power source 17 and comprises an amplifier 121, which adjusts the gain of the signal, and a by-pass conductor 122, which allows the signal to be transmitted out of the substrate 12. By detecting the strength of a TV signal, a switch is actuated to connect to either the amplifier 121 or the conductor 122. An electric filter 123 is used to determine the quality of the signal. If the quality is good enough the signal is outputted to the TV set 3, otherwise the signal is recursively fed through the process in the substrate until the desired quality is obtained.
FIG. 5
BUILT-IN ANTENNA SIGNAL AMPLIFIER MODULE

BACKGROUND OF THE INVENTION

a) Field of the Invention

The present invention relates to a built-in antenna signal amplifier module, and more particularly to a built-in antenna signal amplifier module, wherein an antenna board is connected with an amplifying substrate which is used to improve the amplifying and gain effect of TV (Television) signals.

b) Description of the Prior Art

The antenna device is an indispensable product for watching TV programs. Except for CATV (Cable TV), an antenna has to be used in order to receive signals to watch TV programs by a user oneself. As shown in FIG. 1, a conventional indoor antenna structure includes primarily a circuit board 4. A center part of the circuit board 4 is a wiring line area 44, and two sides of the circuit board 4 are provided respectively with a receiver board 444. The wiring lines on the receiver boards 444 and the wiring line area 44 are printed simultaneously on the circuit board 4. The receiver boards 444 are used to receive the UHF (Ultra High Frequency) signals; whereas the VHF (Very High Frequency)
signals are received by connecting copper bars 442 in the wiring line area 44. Therefore, the entire device is very simple.

However, often due to the limitation of building structures or other factors, an indoor antenna device is usually provided with a dead sector to reduce the reception effect. In particular, for a remote mountain area or some area with a bad reception effect, the signals cannot be received easily or are too weak that the reception quality of TV is severely affected, causing great annoyance to the user.

In terms of that the conventional antenna signals are not received perfectly to result in interruption of a TV screen or blur on the screen, which affects the right of the user to watch the TV programs, the present invention discloses a built-in antenna signal amplifier module, wherein an antenna box is provided with an amplifying substrate. In addition, by detecting the signal strength to switch between an amplifying module and a conduction module, the received TV signals can be amplified and adjusted automatically, so that the channel pictures can be smoother and clearer, thereby providing a perfect antenna structure.

**SUMMARY OF THE INVENTION**

Accordingly, the present invention discloses a built-in antenna signal amplifier module which is an amplifier for enhancing the TV signals, so
as to improve the TV reception quality. The built-in antenna signal amplifier module is composed primarily of an antenna board, an amplifying substrate, a top shell and a bottom shell. The amplifying substrate is connected with the antenna board to transmit the received TV signals to the amplifying substrate. The amplifying substrate is provided with an amplifying module and a conduction module which are switched by detecting the signal strength, so that the received TV signals can be transmitted out through the amplifying substrate, wherein the amplification gain of the TV signals can be adjusted by the amplifying module in the amplifying substrate to achieve a perfect amplification gain effect.

Upon assembling, the antenna board and the amplifying substrate that have been assembled together are put in the bottom shell and then covered by the top shell. Next, a decoration board is inserted into a positioning slot on the top shell, so that a hook portion of the decoration board can be hooked at a bottom of the bottom shell to clip and fix the top shell and the bottom shell. The amplifying substrate is then connected to a TV set by a wiring line, and the gain effect can be formed to the received TV signals by the amplifying substrate; whereas, the received TV signals are transmitted to a TV set to achieve a perfect
reception quality.

In using the built-in antenna signal amplifier module, the antenna is fixed at the periphery of the TV set by a support bracket to receive the signals. When the received signals are not processed and disordered, the signals should be processed and amplified through the amplifying module of the amplifying substrate. Next, an interference wave of the signal is processed by an electric filter. If the signal is still not perfect after being processed by the electric filter, the signal then should be sent back to the amplifying substrate for processing and adjustment of the amplification gain, and then transmitted to the electric filter. The processed signal is next transmitted to the TV set. On the contrary, if the received signal is good, then it can be transmitted to the electric filter directly through the conduction module of the amplifying module. If, at this time, the signal strength is bad, then the signal should be still transferred to the amplifying substrate for signal detection and adjustment of the amplification gain, until the perfect signal strength is achieved that the signal can be outputted to the TV set.

Accordingly, by the amplifying substrate disposed in the antenna, the received TV signal can be detected and amplified continuously, so as to achieve the perfect TV signal for transmission. This built-in antenna
signal amplifier module is simple in structure, but can accurately improve
the reception quality of the TV signal; therefore, it is provided with an
excellent economic benefit.

To enable a further understanding of the said objectives and the
technological methods of the invention herein, the brief description of the
drawings below is followed by the detailed description of the preferred
embodiments.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 shows a schematic view of a conventional antenna device.

FIG. 2 shows a three-dimensional exploded view of the present
invention.

FIG. 3 shows a flow diagram of signal amplification, according to the
present invention.

FIG. 4 shows a schematic view of the present invention upon
assembling.

FIG. 5 shows a schematic view of the present invention after completing
assembling.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

First, referring to FIG. 2, it shows a three-dimensional exploded view
of the present invention which is composed primarily of an antenna
board 11, an amplifying substrate 12, a top shell 13 and a bottom shell 14. The amplifying substrate 12 is connected with the antenna board 11 to transmit a received TV signal to the amplifying substrate 12, and the amplifying substrate 12 is provided with an amplifying module 121 and a conduction module 122 (as shown in FIG. 3). By utilizing the voltage to perform the switch operation, the received TV signal is transmitting out through the amplifying substrate 12, wherein the TV signal is amplified by the amplifying module 121 in the amplifying substrate 12 to achieve a perfect gain effect.

Referring to FIG. 2 and FIG. 4, upon assembling, the antenna board 11 and the amplifying substrate 12 that have been assembled together are put in the bottom shell 14, and are then covered by the top shell 13. Next, a decoration board 15 is inserted into a positioning slot 131 on the top shell 13, allowing a hook portion 151 of the decoration board 15 to be hooked at a bottom of the bottom shell 14, so as to clip and fix the top shell 13 and the bottom shell 14. In addition, the amplifying substrate 12 is connected with a power 17 to provide the necessary electricity. Next, a wiring line 21 is connected with the amplifying substrate 12 and a TV set 3, and the received TV signal can be amplified by the amplifying substrate 12 and outputted to the TV set 3, thereby achieving a perfect
reception quality.

When the built-in antenna signal amplifier module is in use, as shown in FIG. 3 along with FIG. 5, an antenna box 1 is fixed at a periphery of the TV set by a support bracket 16 to receive a signal 20. When the received signal 20 is not processed and disordered, the signal 20 should be processed and amplified through the amplifying module 121 of the amplifying substrate 12, and then an interference wave of the signal 20 is processed by an electric filter 123 in the amplifying substrate 12. If the signal 20 is still not perfect after being processed by the electric filter 123, the signal 20 should be sent back to the amplifying substrate 12 for processing and reduction of the amplification gain and then transmitted to the electric filter 123. The processed signal 20 is next outputted to the TV set 3. On the contrary, if the received signal 20 is good, it can be transmitted to the electric filter 123 directly through the conduction module 122 of the amplifying substrate 12. If, at this time, the strength of the signal 20 is bad, the signal 20 should be still transferred to the amplifying substrate 12 for signal detection and adjustment of the amplification gain, until a perfect strength of the signal 20 is achieved that the signal 201 can be outputted to the TV set 3.

Accordingly, the present invention utilizes the amplifying substrate
disposed in the antenna to detect the received TV signal and adjust the amplification gain of the signal continuously, so as to achieve the perfect TV signal for transmission. The present invention is simple in structure, but can accurately improve the reception quality of the TV signal; therefore, it is provided with an excellent economic benefit.

It is of course to be understood that the embodiments described herein is merely illustrative of the principles of the invention and that a wide variety of modifications thereto may be effected by persons skilled in the art without departing from the spirit and scope of the invention as set forth in the following claims.
What is claimed is:

1. A built-in antenna signal amplifier module comprising primarily an antenna board, an amplifying substrate and an outer shell, wherein the amplifying substrate is connected with the antenna board, the amplifying substrate is provided with an amplifying module and a conduction module, and the amplifying substrate is connected to a power, such that by detecting the strength of a TV (Television) signal to switch between the amplifying module and the conduction module, the gain of the TV signal is adjusted automatically or the TV signal is conducted directly, allowing the received TV signal to be transmitted out through the amplifying substrate.

2. Built-in antenna signal amplifier module substantially as herein described above and illustrated in the accompanying drawings of FIG. 2 to FIG. 5.
Amendments to claims have been filed as follows

What is claimed is:

1. A built-in antenna device comprising primarily a printed antenna, and a substrate, wherein the substrate is connected with the printed antenna, the substrate is provided with an amplifying module and a conduction module, and the substrate is connected to a power supply, such that by detecting the strength of a TV signal to switch between the amplifying module and the conduction module, the gain of the TV signal is adjusted automatically or the TV signal is conducted directly, allowing the received TV signal to be transmitted out through the substrate, and wherein:

   the conduction module detects the voltage of the TV signal and performs automatically the signal switch operation between the amplifying module and the conduction module;

   the amplifying module is operated by the conduction module when the TV signal is not strong enough, to process the TV signal, and to perform adjustment of the amplification gain of the TV signal according to the strength of the TV signal, to obtain the perfect strength of the TV signal;

   when the TV signal is strong enough, the conduction module directly transmits the TV signal; and
when the TV signal is not strong enough, the conduction module operates the amplifying module automatically to process the TV signal, and to perform an automatic adjustment of the amplification gain of the TV signal.
**Application No:** GB1615489.0  
**Examiner:** Mr Nathan John  
**Claims searched:** 1-2  
**Date of search:** 17 November 2016

**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

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<th>Category</th>
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| X,Y      | 1                 | JP 2008042435 A  
    (DX ANTENNA) Figure 1 and Paragraphs [0005], [0008], [0017] & [0018] |
| X,Y      | 1                 | US 6128466 A1  
    (TERK NEIL) Figures 1, 3 & 4 and Column 4, lines 12-29 & 40-41 |
| X,Y      | 1                 | CN 203435075 U  
    (SHENZHEN JINPIN) Figure 1 and Paragraphs 1 & 4 |
| Y        | 1                 | ES 2408789 A2  
    (TELEVES SA) Machine translation used. WPI Abstract, Figures 1 & 2 and Page 6 |
| Y        | 1                 | CN 202004161 U  
    (YI CHANG HSIANG) WPI & EPDOC Abstracts, Figure 1 and Paragraphs [0013]-[0041]. |
| A        | ~                 | JP 2008124537 A  
    (DX ANTENNA) Whole document |
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International Classification:

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