

## Introduction

In HDBaseT applications, you have the option of adding Power over Ethernet (PoE). But because of the very fast transmission rates used; special care has to be taken to minimise the effect of any noise generated from the PoE affecting the data.

This application note will explain the different PoE options and give guidance on EMI prevention techniques.

## PoE Options

The HDBaseT Alliance has written a Power over HDBaseT (PoH) specification, which in essence is an extension on the PoE specification IEEE802.3at.

The PoH specification now allows the Power Sourcing Equipment (PSE) to use all four pairs to transmit power (within the Cat5e or Cat6 cable). Were as the IEEE802.3at specification only allows power to be transmitted over two pairs.

In addition to using all four pairs, the PoH specification allows the PSE to transmit up to 95W, which opens up a wider range of application. But the PoH specification is also backwards compatible with IEEE802.3at to allow for lower power applications.

## PoH Solution

Figure 1 shows a block diagram for a PoH solution using the Valens 5 Play circuit.

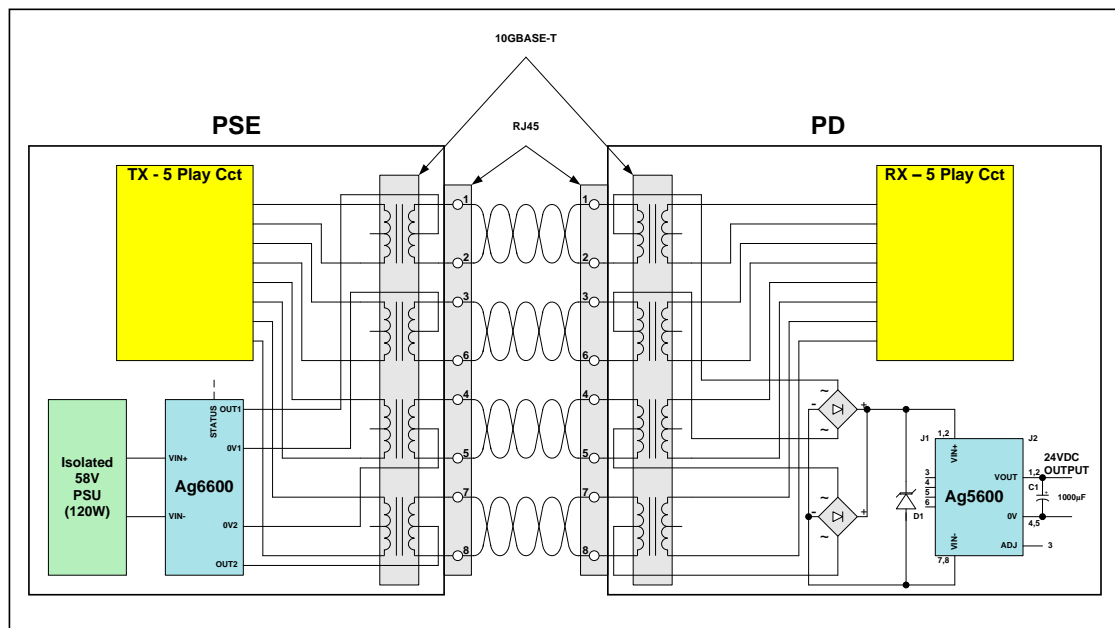


Figure 1: PoH Application Drawing

The Ag6600 module shown in the PSE in Figure 1 does not have a dc/dc converter, so will not add any noise to the TX 5 Play circuit. The Isolated PSU supplying power to the Ag6600 may need to have a filtering, but this will depend on its performance.

The Ag5600 module shown in the PD in Figure 1 does have an on-board dc/dc converter, so will need some input filtering to prevent any noise this generates from affecting the signal to the RX 5 Play circuit.

From the tests that we have conducted one simple and inexpensive approach is to connect three MPZ2012S102A (TDK) ferrite chip beads in series with each centre tap. These ferrite chip beads are quite small (0805 package) and only cost ~\$0.03 (USD) each; Figure 2 shows this configuration (L1 to L12).

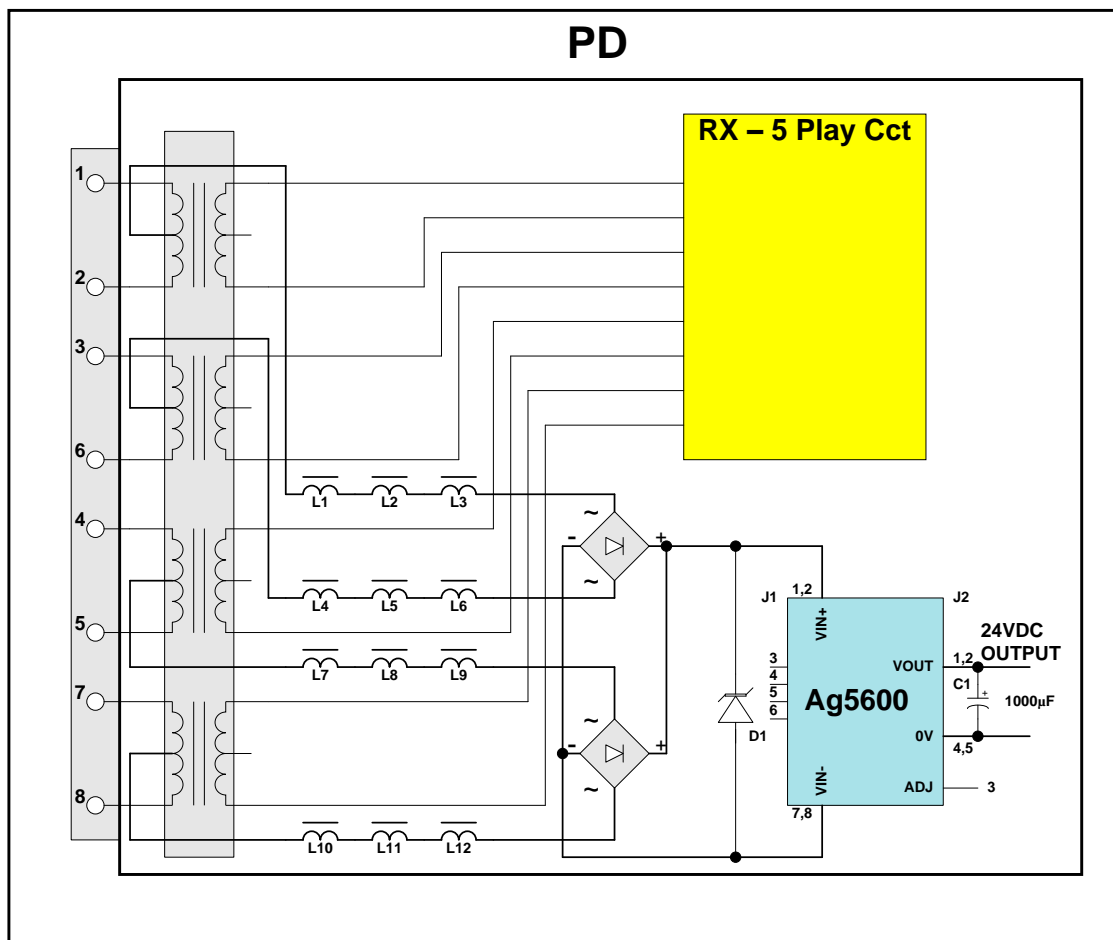


Figure 2: PoH with Ferrite Chip Beads

If noise continues to be an issue, even with the ferrite chip beads in series with each centre tap. The addition of a “V” capacitor filter will reduce the noise further, see Figure 3.

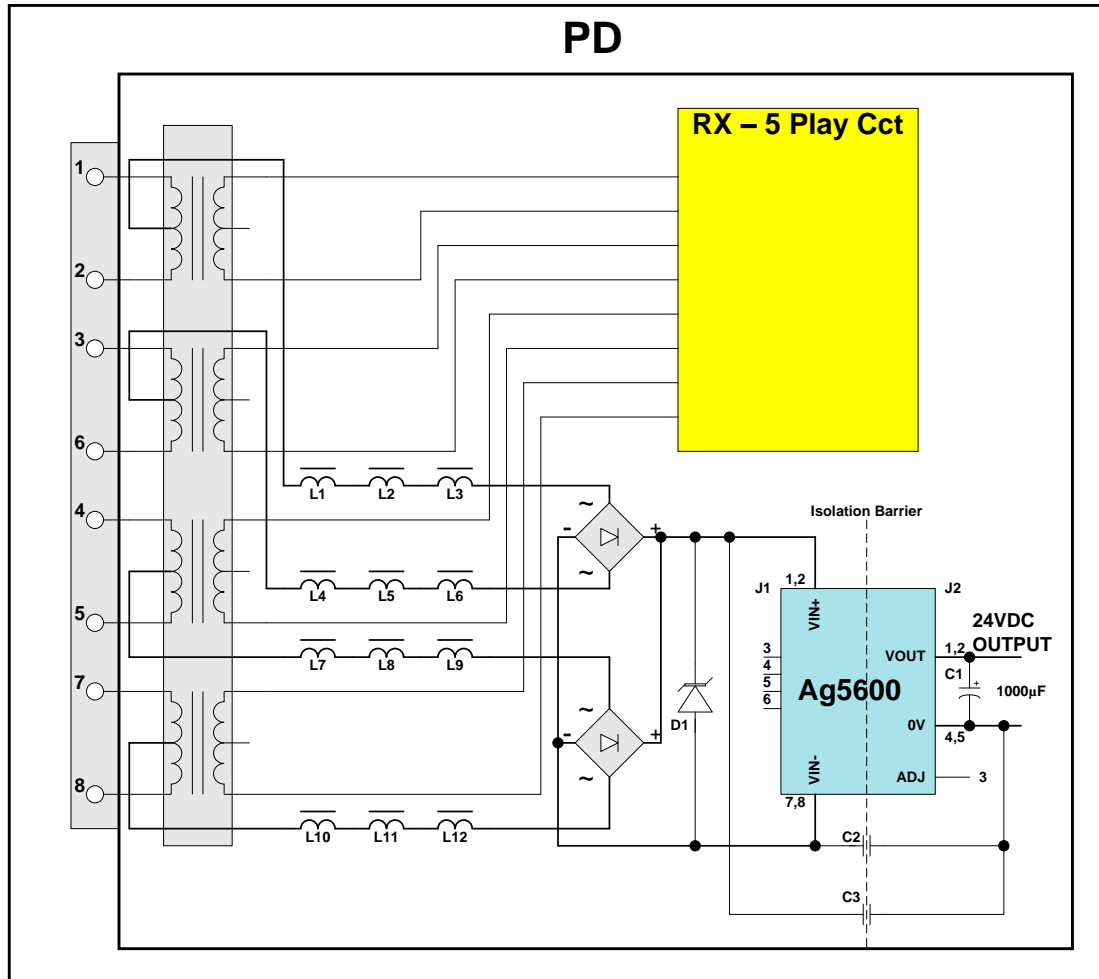


Figure 3: PoH with Ferrite Chip Beads and “V” Capacitor Filter

C2 and C3 can be 4.7nF to 10nF. Because these capacitors cross the isolation barrier, they will need to be capable of handling the 1500Vdc impulse test.

PoE Solution

The following shows how the same techniques used for PoH can be implemented with IEEE802.3at Type 2 and Type 1 (IEEE802.3af) modules.

In Figure 4 and 5 the ferrite chip beads can be MPZ2012S102A for IEEE802.3at Type 2 applications and MMZ2012S102A for Type 1 (IEEE802.3af) applications.

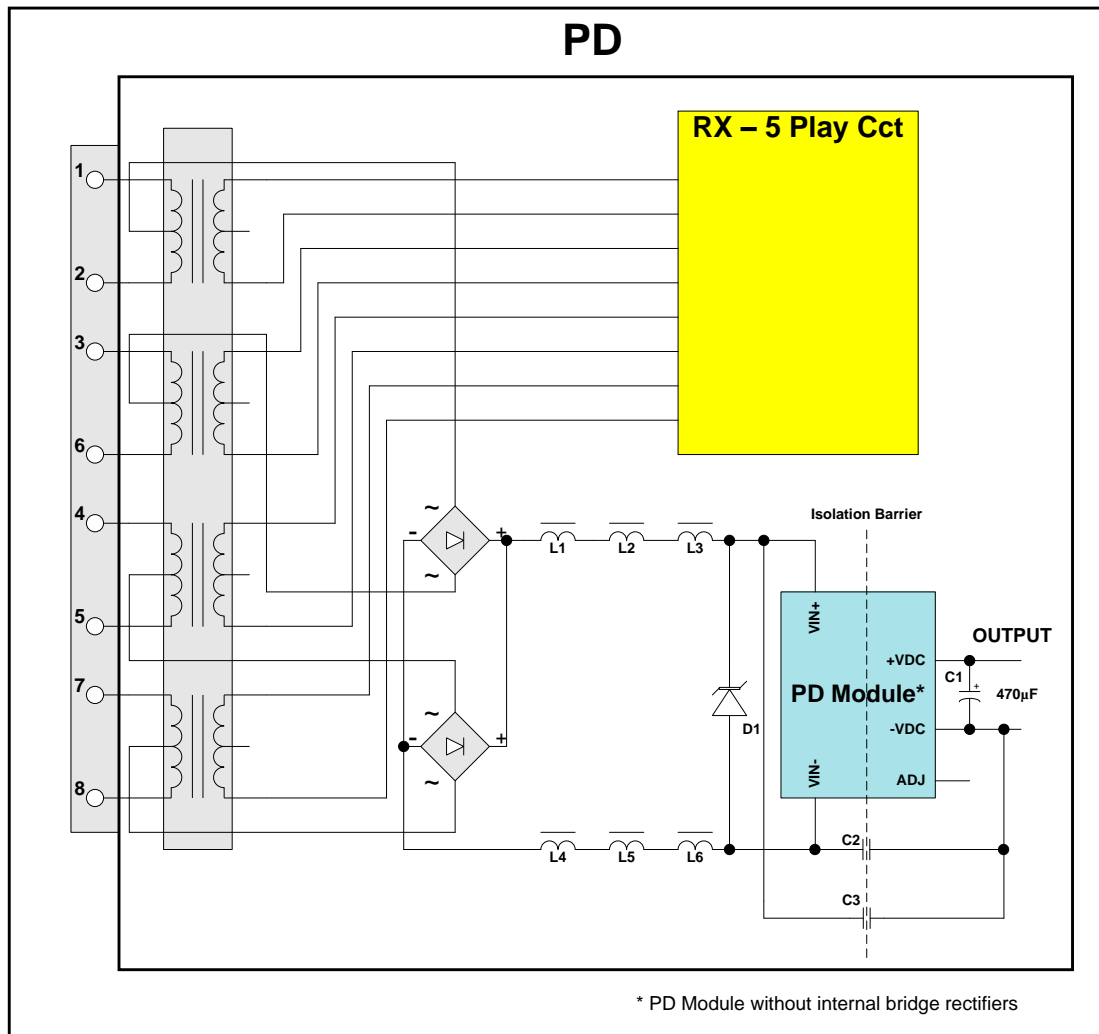


Figure 4: PoE Solution for Module without Internal Bridge Rectifiers

C2 and C3 can be 4.7nF to 10nF. Because these capacitors cross the isolation barrier, they will need to be capable of handling the 1500Vdc impulse test.

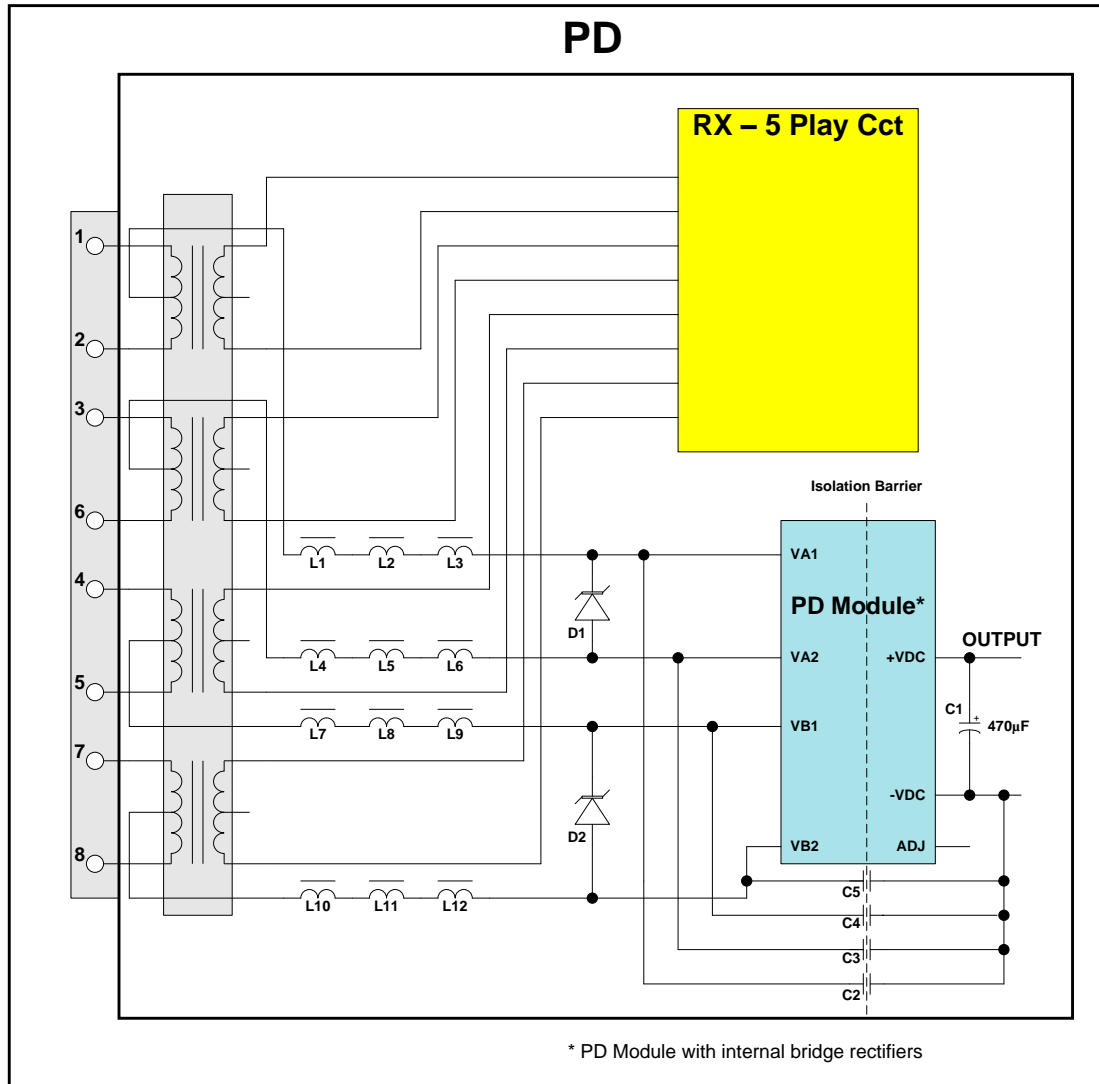


Figure 5: PoE Solution for Module with Internal Bridge Rectifiers

C2 to C5 can be 4.7nF to 10nF. Because these capacitors cross the isolation barrier, they will need to be capable of handling the 1500Vdc impulse test.

### Comments

The techniques detailed in this application note have been shown to reduce noise that can affect the performance of HDBaseT.