

When using Power over Ethernet (POE), extracting the power is a very important consideration.

Figure 1 shows a basic (10/100 BASE-T) block diagram for connecting Power Sourcing Equipment (PSE) to a Powered Device (PD) that uses an Ag9000 module.

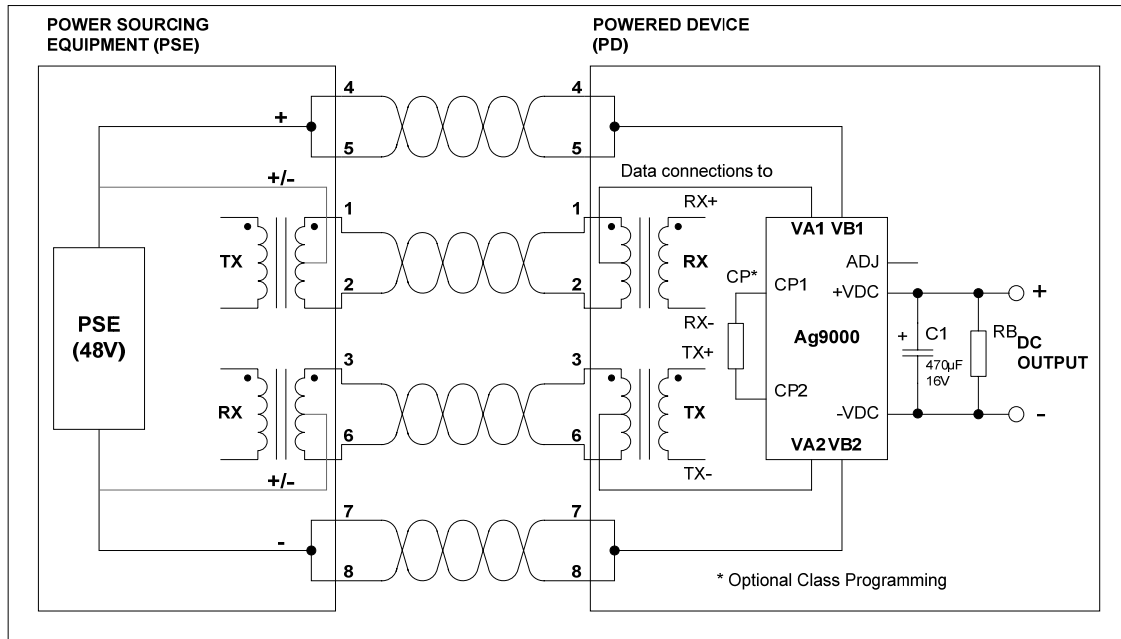


Figure 1: Typical Connection Diagram

Note: The data connections shown in this document are all based on a "Straight-Thru" connection.

The PSE can supply power to the PD by either using the data pair, referred to in the IEEE802.3af specification as the Medium Data Interface (MDI), or by using the spare pair referred to as the Power Interface (PI).

The PSE is allowed to use one of the methods shown in Table 1 to supply power to the PD.

Conductor	Alternative A (MDI-X)	Alternative A (MDI)	Alternative B (All)
1	Negative V_{Port}	Positive V_{Port}	
2	Negative V_{Port}	Positive V_{Port}	
3	Positive V_{Port}	Negative V_{Port}	
4			Positive V_{Port}
5			Positive V_{Port}
6	Positive V_{Port}	Negative V_{Port}	
7			Negative V_{Port}
8			Negative V_{Port}

Table 1: PSE pinout alternatives (IEEE802.3af Table 33-1)

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However the PD must be able to extract the power from the PSE as shown in Table 2.

Conductor	Mode A	Mode B
1	Positive V_{Port} or Negative V_{Port}	
2	Positive V_{Port} or Negative V_{Port}	
3	Negative V_{Port} or Positive V_{Port}	
4		Positive V_{Port} or Negative V_{Port}
5		Positive V_{Port} or Negative V_{Port}
6	Negative V_{Port} or Positive V_{Port}	
7		Negative V_{Port} or Positive V_{Port}
8		Negative V_{Port} or Positive V_{Port}

Table 2: PD pinout (IEEE802.3af Table 33-7)

Therefore one of the requirements of the PD is that it must have input polarity protection to enable it to work with both Mode A and B shown in Table 2. The Ag9000 does have on-board input polarity protection, so there is no need to fit any external rectification as shown in Figure 1.

The selection of a suitable data transformer and RJ45 connector are very important. There are many companies that make these parts individually, but if size is a constraining factor then there are several companies that make an RJ45 with built-in magnetics that are suitable for POE. One such connector from the company XFMRS is the “XFVOIP5E-COMBO-4MS” which shown in Figure 2.

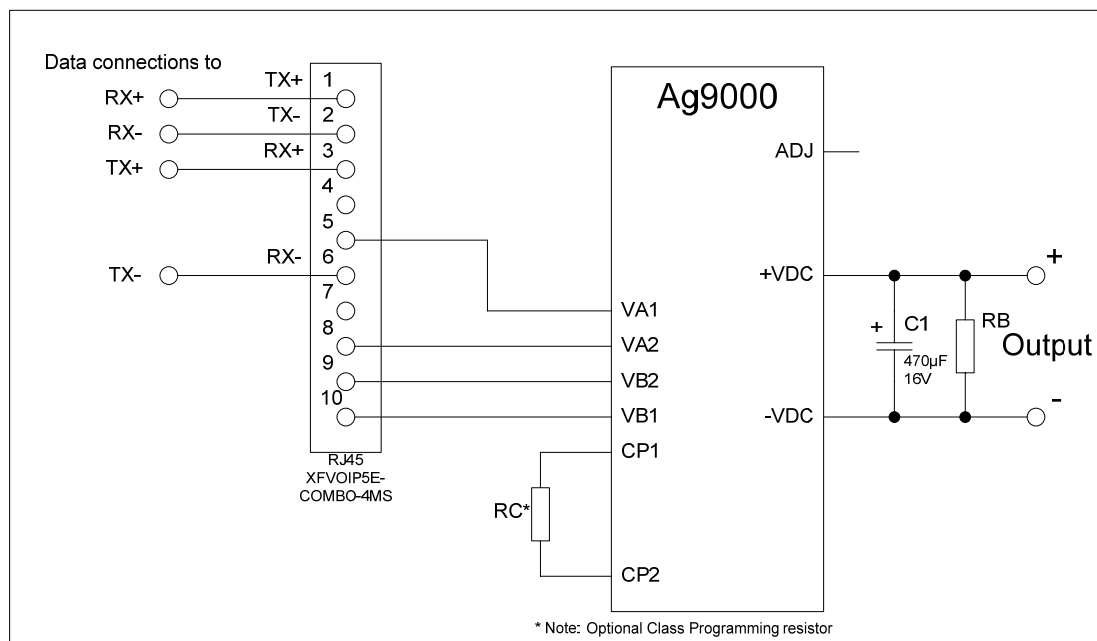


Figure 2: XFMRS – XFVOIP5E-COMBO-4MS

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An alternative from Bothhand is the “PU1T041XA LF” as shown in Figure 3, but there are several companies that manufacture similar products including TRXCOM – “TRJ0514B”.

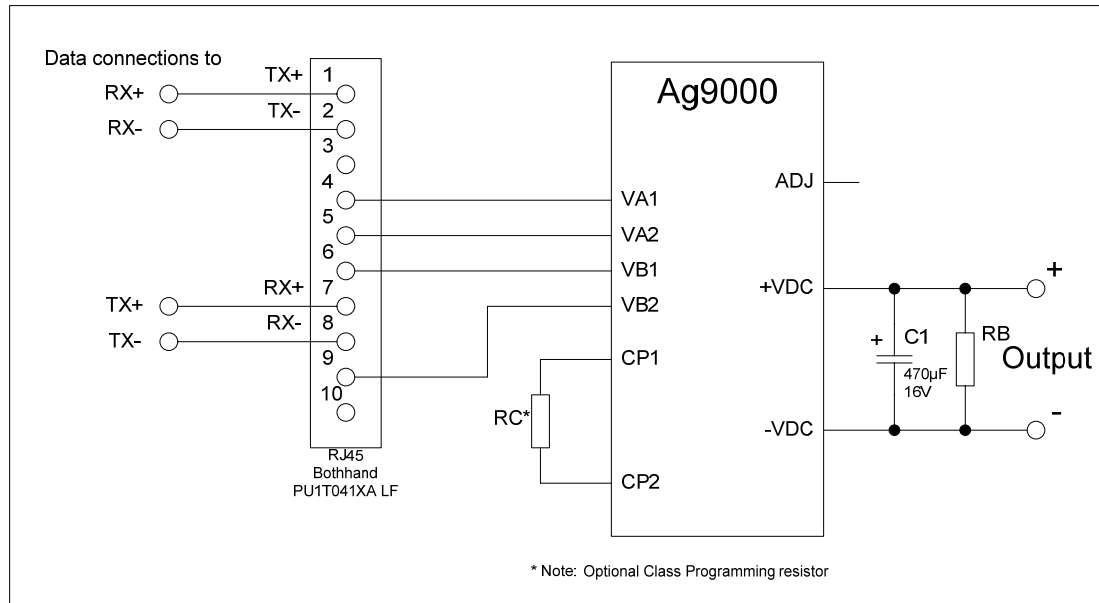


Figure 3: Bothhand – PU1T041XA LF

When considering the data transformer either as a standalone part, or if it is integrated into the RJ45 connector, it is very important that you ensure that it’s IEEE802.3af compliant.