IEEE802.3at High Power POE+ Class Programming.

IEEE802.3af method

The class programming in the existing IEEE802.3af specification is fairly straightforward. Once the PSE and PD have completed the signature recognition then the PSE supplies a voltage while measuring the current drawn by the PD. It then 'classifies' the PD into one of the following ranges and applies the required power.

Class	Min power	Max power
0	0.44W	12.95W
1	0.44W	3.84W
2	3.84W	6.49W
3	6.49W	12.95W
4	reserved for IEEE802.3at	

This method is used to limit the overall power budget for a multi-line PSE. For example a 24line PSE may limit the number of Class 0 or 3 PD's that can be connected because it's internal power supply can't generate 24x15.4W.

Basic explanation of IEEE802.3at

Class programming in the new IEEE802.3at standard is much more complicated and needs to be thoroughly understood by anyone contemplating designing their own 'at' compliant PD. The following is a top-level explanation:

After completion of the signature recognition stage the PSE applies a single voltage pulse and measures the current. This is to confirm the Class of the PD. If it measures Class 0,1,2 or 3 it only supplies the power given in the table above. If it measures Class 4 then it will apply a second pulse to reconfirm the class is in fact 4. At this stage it will supply power. This power is limited to a maximum of 57V x 0.6A = 34.2W.

By seeing the 2 pulses from the PSE the PD determines it is connected to an 'at' compatible PSE and signals to the micro-controller in the powered equipment that the PSE can supply upto 34.2W. The micro-controller should then communicate back to the PSE over the ethernet data link. The data is sent according to the ANSI TIA 1057 protocol and contains information such as power type, power value, power priority and power source.

Design Considerations

It should be recognised that there are a number of fairly complicated design considerations for an IEEE802.3at compliant PD. These include:-

- The timing and amplitude of the pulses from the PSE are closely defined and the system can be fooled by spurious signals. The PD must discriminate between valid and invalid pulses.
- The PD must maintain a high voltage safety barrier and any signalling has to pass across the barrier.

- It must pass all regulatory EMC specs. Since by definition the PD contains a dc/dc converter generating high frequency, high voltage spikes then this can cause numerous problems.
- Since the PD it is in fact a ‘power supply’ then heat dissipation is critical and should be considered as an integral part of the design process.

Silvertel’s Ag5100 POE+ module, and its associated application notes, ensures all these issues are addressed without the customer engaging in his own complicated and expensive design process.

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