



802.3da MPD Unit Loads

Michael Paul

analog.com

Unit load introduction into Clause 169

Issues to consider to add unit load power to the specification:

- MPD power levels

- MPD labeling

- MPD power coupling inductance

 - Not in clause 169 at all right now

 - MSE power output

 - Can an MPSE provide less power than 16U when labeled correctly?

Subclause 169.3 System Type Power Requirements

Insert After 1st paragraph (line 35, draft 1p0):

MPDs consume integer units of power called “unit loads”.

For Type0 MPDs one unit load represents 1W. For Type 1 MPDs one unit load represents 2W.

A mixing segment can support up to 16 unit loads. Each MPD is allocated a minimum of 1 unit load and may consume no more than 16 unit loads. The MPD system type and unit load level shall be clearly marked at the TCI mating interfaces so users can track loading on a mixing segment. The sum of unit load levels on a mixing segment shall not exceed 16.

Replace Table 169-1—System Power Types: Remove Table 169-1 footnotes

	30V Max MPSE	50V Max MPSE
System Type	0	1
V_{MPSE(max)}(V)	30	50
V_{MPSE(min)}(V)	26	45
V_{MPD(min)}(V)	18	34
I_{TCI_MSPE(min)}(mA)	889	941
P_{MPSE_16u}(W)	23	42
P_{MPD_1U}(W)	1	2

MPD Unit Load

Add Subsection after 169.5.5.1 MPD Inrush:

169.5.5.2 MPD Power

MPDs consume integer units of load, known as “unit loads”.

For Type0 MPDs one unit load represents 1W. For Type 1 MPDs one unit load represents 2W.

A mixing segment can support up to 16 unit loads. Each MPD is allocated a minimum of 1 unit load and may consume no more than 16 unit loads. The MPD system type and unit load level shall be clearly marked so users can track loading on a mixing segment. The sum of unit loads on a mixing segment shall not exceed 16.

MPD unit load level shall be an integer indicating the maximum power required by the MPD, where $N_{\text{Unit}} * P_{\text{MPD_1U}}$ is greater than the MPDs power requirements for the MPD system type.

MPDs may draw power less than or equal to P_{MPD} based on the unit load level marked at the MPD TCI, after entering the PON_LOAD_ON state.

Modify Table 169-7:

Modify Item 2

Item	Parameter	Symbol	Unit	Min	Max	Type	Additional Information
2	Unit Power	$P_{\text{MPD_1U}}$	W	-	1	0	1 unit load
				-	2	1	1 unit load

Insert after Item 2

Item	Parameter	Symbol	Unit	Min	Max	Type	Additional Information
3	Unit Loading	N_{unit}	-	1	16	All	Must be an integer
4	Input Power	P_{MPD}	W	1	16	0	$P_{\text{MPD_1U}} * N_{\text{Unit}}$
				2	32	1	

MPD Unit Load Inductance

Power coupling inductance can decrease with increasing unit load level

[Paul_02_da_2023_11_13.pdf](#)

Presently, power coupling inductance is only defined in Clause 147

Not specified in Clause 168 or Clause 169

Ideally power coupling inductance is specified in frequency domain

TODO: How and where to specify power coupling inductance going forward?

MPSE Unit Load Supply

It may be useful to allow MPSEs to supply less than 16 unit loads (when properly marked)

For example, a power forwarding application may have less than 16 unit loads of power left

Are MPSEs that supply less than 16 unit loads useful?

Thank You