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Compute Project

INDICATOR SPECIFICATION PROPOSAL

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Objective

Adopt an OCP specification where indicators are clearly visible, consistent, accommodate color-blind data center personnel, only communicate actionable information, and do not conflict with other diagnostic tools.

Guiding principals

Indicators should:

1. Be consistent – common symbols, LED colors, intensity, message
2. Have a purpose – must provide actionable information
3. Be simple – no decoder ring necessary
4. Never conflict with indicators on other products

Indicator colors

Table 1. Permitted indicator colors

Color	Meaning(s)	Nominal Value (nm)	Acceptable Range (nm)
Blue	Power On, Functioning, Status Good, Link, Active	470	445-480
Amber	Fault, Locate	590	583-593

Indicator intensity

1. The luminosity requirement depends on the indicator implementation. The luminosity of any light pipe viewing surface shall be controlled within the parameters below:

Table 2. Permitted luminosity of light pipes

Color	Nominal Value (Cd/m^2)	Acceptable Range (Cd/m^2)
Blue	1000	850-1150
Amber	2000	1700-2300

2. When LEDs with integrated glass viewing surfaces are used, the luminous intensity shall be controlled within the parameters below:

Table 3. Permitted intensity

Color	Nominal Value (mCd)	Minimum (mCd)
Blue	10	8
Amber	15	12

Indicator intensity – view angle

- +/-40 degree view angle horizontally and vertically
- +/- 25% luminosity intensity within this range
- +/- 55 degree view angle whenever possible
- Indicator cross-talk should not cause an increase of more than 20 Cd/m^2 in adjacent indicators

Indicator behaviors

Indicators should be constrained to the following three behaviors:

OFF
ON (steady on)
BLINK (1 Hz rate – 0.5s on, 0.5s off)

Indicator placement

- Indicators should be visible on the front or rear panel of a system when viewing the panel from a perpendicular direction
- Indicators should always be surrounded by a panel to reduce background visual noise and provide a location for printed legends
- Indicator pairs must be arranged as: blue-left/amber-right, or blue-above/amber-below

Indicator nomenclature

- Where possible, all indicators should be identified with a legend that is adjacent to the indicator
- Text should be in black Arial condensed bold font with a minimum of 2.5mm font size

Meaning	Legend		
	Preferred	Alternate 1	Alternate 2
Power On/Good	⏻	POWER	PWR
AC Good	∿OK	AC OK	
DC Good	⎓OK	DC OK	
Fault/Locate	⚠		
Status	STATUS	STS	
Fan		FAN	
Over Temperature		OVER TEMP	
Under Voltage	LOW V		
Drive #	#	DRIVE #	#
End of Life Reached (BBU)	END OF LIFE	EOL	
Backup, due to AC Outage	BACKUP	BACK	BCK

Indicator states

Separate LEDs (preferred)		Combined Blue/Amber LED (use only if space is limited)	Meaning(s) Communicated by each LED (one or more meanings may be valid for blue LED)	
Blue	Amber		Blue	Amber
OFF	OFF	OFF	Off/Not Functioning/Not Present. Service Action Allowed.	No Fault
ON	OFF	BLUE ON	On/Functioning. Link Established – No Activity.	No Fault
BLINK	OFF	BLUE BLINK	On/Functioning. Drive/Network Activity.	No Fault
OFF	ON	AMBER ON	Off/Not Functioning. Service Action Allowed.	Fault
OFF	BLINK	AMBER BLINK	Off/Not Functioning/Not Present. Service Action Allowed.	Locate
N/A[1]	N/A[1]	BLUE/AMBER Alternate	On/Functioning. Firmware Update in Progress. No Service Action Allowed	

Indicator States As Applied to Specific Hardware

6.1 System Power Control/Status

If the product has a power button, it is permissible to integrate the Blue LED with the button. There should be a separate amber LED paired with the Power LED to indicate Fault or Locate. The blue power LED should not be used for these functions.

In the Permitted States descriptions, "/" = "and/or", "+" = "with"

Table 5. System power control/status LEDs

Permitted States	Separate LEDs	
	PWR (Blue)	**FAULT/LO** (Amber)
System Off/Service Action Allowed		
System On/Status OK		
System Off + Fault		
System On + Locate		
System Off + Locate		
System On + Fault		

6.2 System General Status

Some products have LEDs that indicate the overall status for particular types of modules within the system chassis. For example, a pair of status LEDs might indicate the condition of all of the fan modules, without reporting the condition of any particular fan module. In this case, the locate function is inappropriate.

Table 6. System general status LEDs

Permitted States	Separate LEDs (preferred)		Combined Blue/Amber LED (limited space)
	STS (Blue)	**FAULT** (Amber)	**STS**
All Modules (e.g Fans, PSUs, etc.) present and OK.			
One or more modules are not plugged in.			
One of more modules has a fault or alarm condition.			

6.3 Generic Module/Compute Node Status

Table 7. Generic module/compute node status LEDs

Permitted States	Separate LEDs (preferred)		Combined Blue/Amber LED (limited space)
	STS (Blue)	**FAULT/LOC** (Amber)	**STS**
Module Off/Service Action Allowed			
Module On/Status OK			
Module Off + Fault			
Module Off + Locate			
Module On + Locate			
Firmware Update in Progress	N/A	N/A	

6.4 PSU Status

If multiple fault conditions exist for Power Supply Units (PSUs), there should be separate amber LEDs for each type of fault that is being identified (e.g. under voltage, AC outage, etc.). In this case, the general FAULT LED should be used for the LOCATE function.

Table 8. PSU status LEDs

Permitted States				
AC	**AC OK** (Blue/Amber)	**FAULT/LOC** (Amber)	**LOW V** (Amber)	**BACK UP** (Amber)
AC OK				
AC Fault				
AC Under Voltage				
Backup due to AC Outage				
Locate				
Firmware Update in Progress				
DC	**DC OK** (Blue)	**FAULT/LOC** (Amber)	**LOW V** (Amber)	**SHUT DOWN** (Amber)
DC OK				
DC Voltage out of Regulation				
DC Shutdown				

6.5 BBU Status

Table 9. BBU status LEDs

Permitted States	Separate LEDs			
	BBU OK (Blue)	**FAULT/LOC**(Amber)	**LOW V** (Amber)	**EOL** (Amber)
Sleep				
BBU On/Available + Status OK				
BBU Fault				
BBU Under Voltage				
End of Life Reached				
BBU Off/Not OK + Locate				
BBU On/OK + Locate				

6.6 QSFP Module Status

Each QSFP module has a corresponding receive (RX) and transmit (TX) LED on the QSFP cage into which it is plugged. The table below lists the permitted states for both receive and transmit.

Table 10. QSFP module status LEDs

Permitted States (both RX and TX LEDs)	Combined Blue/Amber LED
Link is Down	
Link Established + No Activity	
Link Established + Activity	
Port Error	
Locate	

6.7 HDD

Table 11. HDD LEDs

Permitted States	Separate LEDs (preferred)		Combined
	DRIVE (Blue)	**FAULT/LOC**(Amber)	**Blue/Amber LED (limited space)** **DRIVE**
No Drive/Drive Off/Drive Not Seated/No Link			
Drive On + Link Established + No Activity			
Drive On + Link Established + Activity			
Drive Off + Fault			
Locate			

6.8 Fan Module

Table 12. Fan module LEDs

Permitted States	Separate LEDs (preferred)		Combined Blue/Amber LED (limited space)
	FAN (Blue)	**FAULT/LOC** (Amber)	**FAN**
Fan Off			
Fan On and is within Normal Speed Range			
Fan Off + Fault/Below Threshold Speed			
Locate			

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