



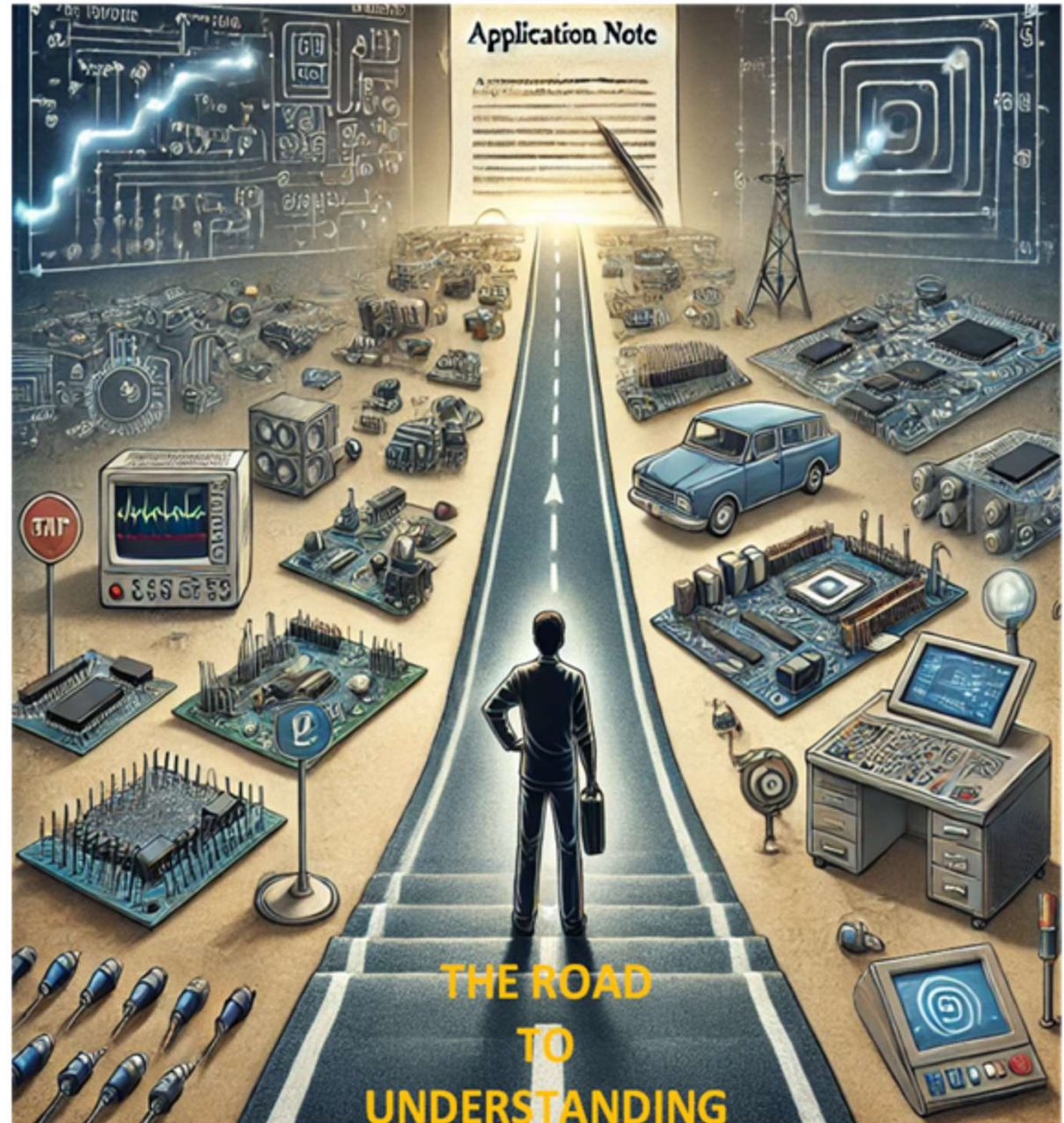
END OF THE ROAD, I NOW UNDERSTAND MORE



The Truth About Application Notes

- A Guide for Less Experienced Engineers
- Application notes are technical documents provided by manufacturers to assist engineers in effectively utilizing their products. While they offer valuable insights, it's crucial to approach them critically, as their quality and depth can vary.

Power Point Presentation By
Andy Carpenter 2025

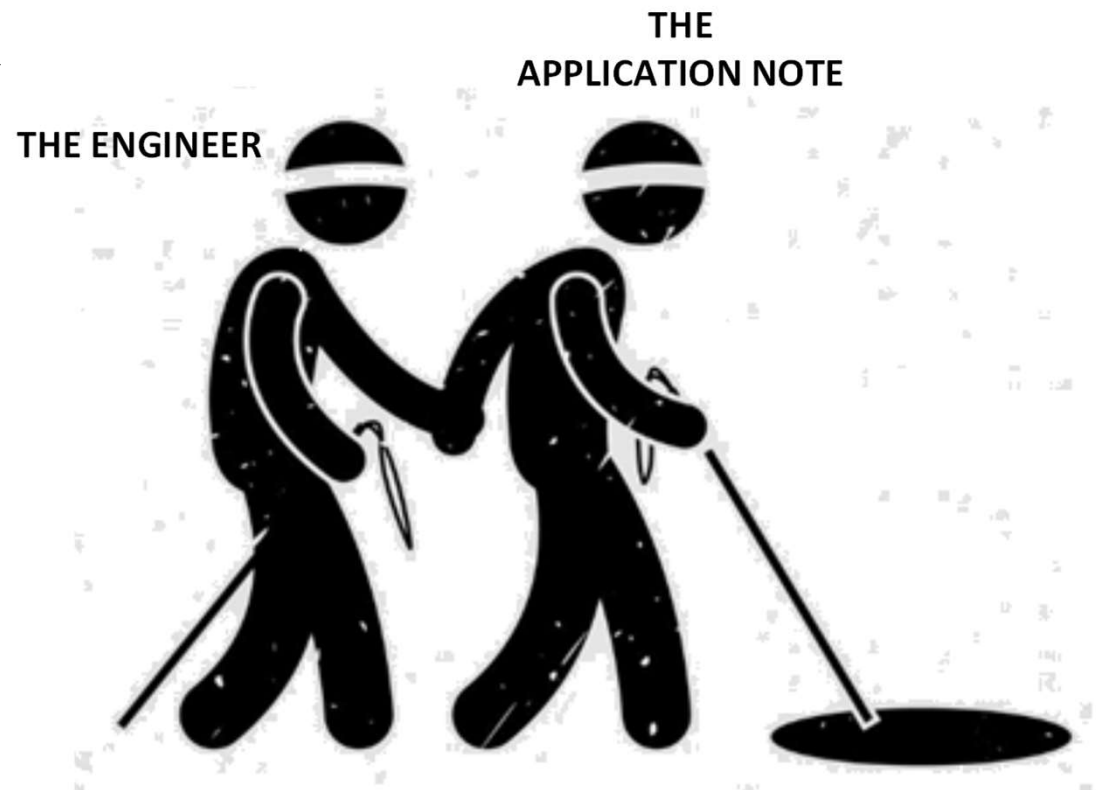


START OF THE ROAD JUST USING THE APPLICATION NOTE



The Truth About Application Notes

- "Application notes are technical documents provided by manufacturers to assist engineers in utilizing their products effectively. While they offer valuable insights, it's essential to approach them critically, as their quality and depth can vary. “
- “Blind reliance without verification can lead to design challenges.” Andy C....

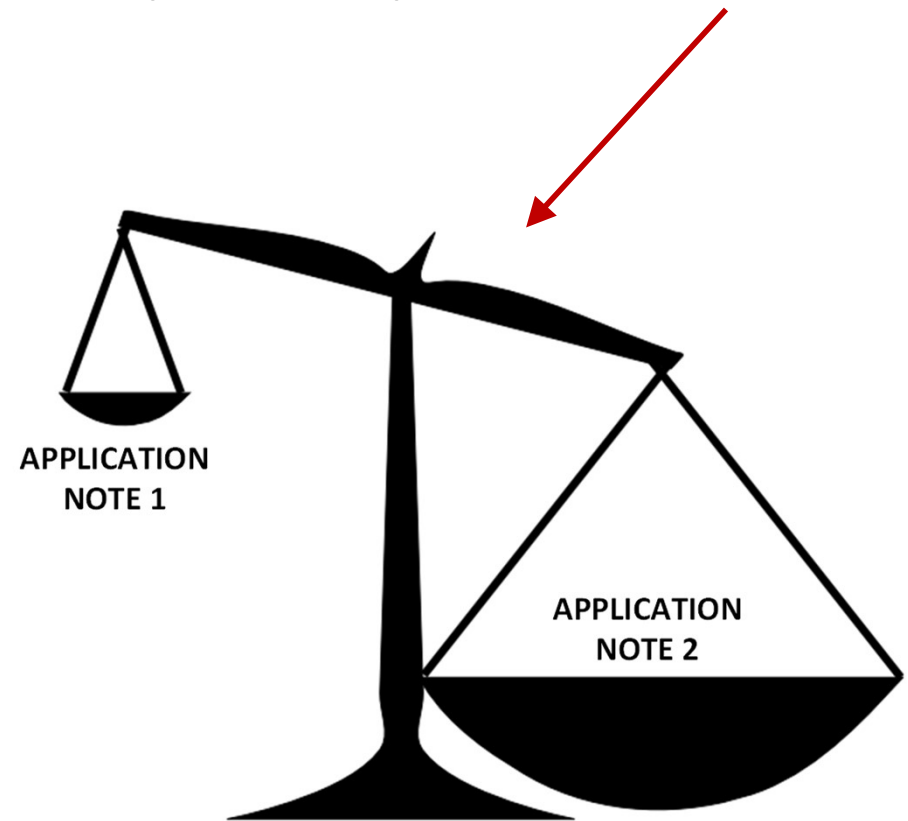




Introduction

- "Application notes serve as guides for implementing specific components or technologies. They are essential tools for engineers but require careful evaluation to ensure the information aligns with real-world applications and specific project requirements."
- Remember "Not all application notes are created equal."

Only as good as the effort and experience put in them !!!





The Good: Benefits of Application Notes

- "These notes provide quick references, practical design examples, and manufacturer-specific best practices. They can expedite the design process by offering tested solutions and insights directly from the component creators."
- "However, it's crucial to understand their context and limitations."
- "Remember the application note when created may not be representative of your environment you using it in."



The Bad: Limitations of Application Notes

- "Some application notes may exhibit marketing bias, present oversimplified circuits, lack context, or contain outdated information. Engineers should be cautious and not rely solely on these documents without further verification."
- "Critical assessment and testing are necessary to ensure reliability."



Insights from Industry Experts

- "Experts like Eric Bogatin emphasize the importance of independent verification. As he states, '**If you haven't measured it, you don't know it,**' highlighting the need for empirical testing to confirm application note claims.
- “Trust, but verify.” - Eric Bogatin
- “Think for yourself, don’t rely on information you can't verify” - Andy C
- From an aerospace point of view “**REMEMBER YOU CAN'T CONFIGURE TRUST**” Andy C



Case Study Example 1

- "An engineer followed an application note that led to performance issues due to idealized conditions not matching the real-world environment."
- "Only through testing and simulation, the design was adjusted to meet actual operational requirements, underscoring the need for critical evaluation."
- I personally see this all the time.....



Case Study Example 2

- “How many times have you read an ADC or DAC application note and it mandates split references for analogue and digital reference planes, only then to tell you to tie them together.”
- “In complex mixed signal designs with lots of mixed signal IC’s its impractical to do this which is why we use multiple ground planes all stitched together to create a very low impedance. This together with a good understanding of S.I and P.I mitigate the application note.”
- “But I have seen designs where engineers insist on creating multiple analogue and digital planes because the application note specifies it. The designs well they ended up an EMI mess and gave poor performance.”

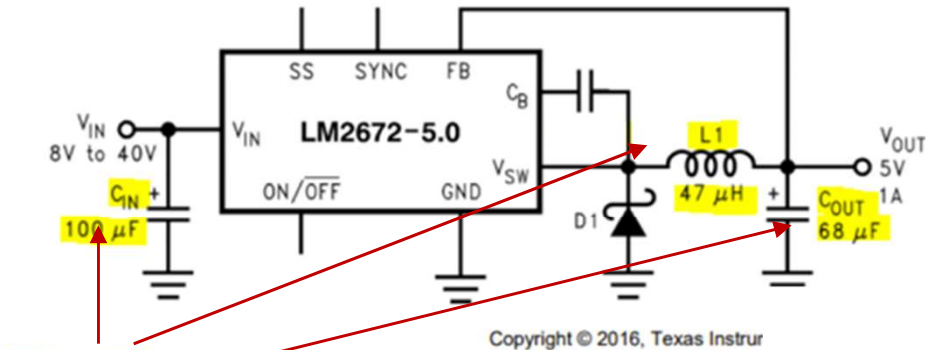


Datasheet Errors Also Exist is not just Application Notes 😊

The LM2672-5.0 Datasheet

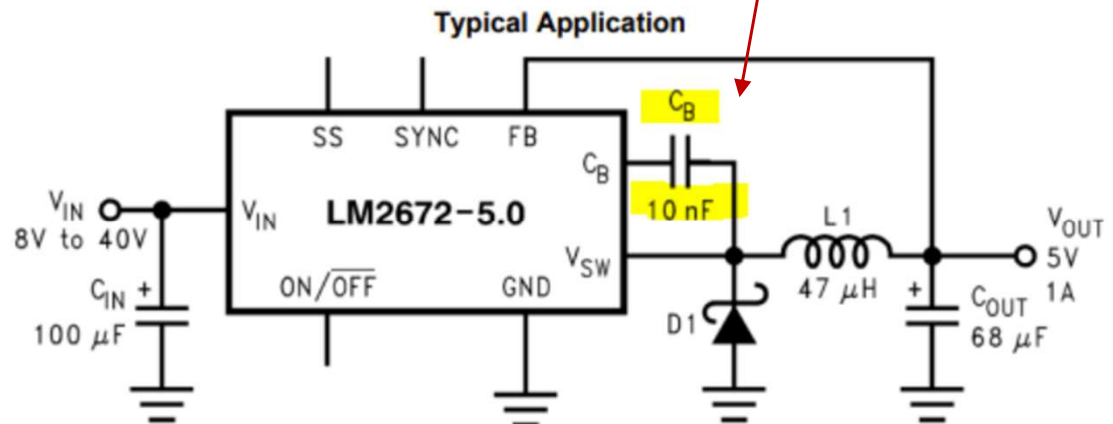
It should be noted that this has been fixed now

10.2.1 Typical Application for Fixed Output Voltage Versions



C_{IN} = 22- μ F, 50-V Tantalum, Sprague 199D Series
 C_{OUT} = 47- μ F, 25-V Tantalum, Sprague 595D Series
 D1 = 3.3-A, 50-V Schottky Rectifier, IR 30WQ05F
 L1 = 68- μ H Sumida #RCR110D-680L

Figure 20. Fixed Output Voltage Typical Application



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Fixed output voltage versions

Pin Functions

NAME	PIN		I/O	DESCRIPTION
	SOIC, PDIP	WSON		
C_B	1	1	I	Boot-strap capacitor connection for high-side driver. Connect a high quality 100-nF capacitor from C_B to V_{SW} Pin.
FB	4	8	I	Feedback sense input pin. Connect to the midpoint of feedback divider to set V_{OUT} for ADJ version or connect this pin directly to the output capacitor for a fixed output version.
GND	6	11, 12	—	Power ground pins. Connect to system ground. Ground pins of C_{IN} and C_{OUT} . Path to C_{IN} must be as short as possible.
NC	—	2, 3, 5, 7, 10, 13	—	No connection pins.
ON/OFF	5	9	I	Enable input to the voltage regulator. High = ON and low = OFF. Pull this pin high or float to enable the regulator.
SS	2	4	I	Soft-start capacitor pin. Connect a capacitor from this pin to GND to control the output voltage ramp. If the feature not desired, the pin can be left floating.
SYNC	3	6	I	This input allows control of the switching clock frequency. If left open-circuited the regulator is switched at the internal oscillator frequency, typically 260 kHz.
V_{IN}	7	14	I	Supply input pin to collector pin of high side FET. Connect to power supply and input bypass capacitors C_{IN} . Path from V_{IN} pin to high frequency bypass C_{IN} and GND must be as short as possible.
V_{SW}	8	15, 16	O	Source pin of the internal High Side FET. This is a switching node. Attached this pin to an inductor and the cathode of the external diode.



Datasheet Errors Also Exist is not just Application Notes 😊



↳ [Precision ADCs](#) > [Q&A](#) > [Errors in AD74412R data sheet](#)



Errors in AD74412R data sheet



Clarks on Sep 8, 2022

Category: Datasheet/Specs

Product Number: AD74412R and maybe AD74413R

I want to report a few errors in the Data Sheet for the AD74412R. I suspect that many of these errors also exist in the AD74413R but I have not checked.

1. There are contradictions in the document regarding how the RANGE bits should be set for Current Input, Externally Powered and Current Input, Loop Powered as follows:

pg 39 indicates Externally Powered should have range bits of 010 while Loop Powered should be 001. I believe this page is in error.

pg 53 indicates Externally Powered should have range bits of 001 while Loop Powered should be 010. I believe this page is correct.

Pg 42 Table 18 also discusses these setting. I believe it is correct.

2. On page 48, in Figure 43, the legend for the top waveform is labeled SYNC and the next waveform is labeled SCLK. Those labels are reversed. The top waveform should be SCLK and the next one should be SYNC.



Incorrect Application Notes for Integrated Circuits

- "Instances exist where application notes contained inaccuracies, such as overstated performance claims or inadequate error correction guidance. These highlight the necessity for engineers to critically assess and validate the information provided, rather than accepting it at face value."
- "Instances also exist where an engineer uses an application note or datasheet and then sometime later the contents change. These mistakes happen, always record the version no and date of the source you use."
- "Always check to see if there are any updates in the sources you use."



Who Typically Writes Application Notes?

- "Often, less experienced engineers draft application notes under the supervision of seasoned professionals. While this provides learning opportunities, it can also lead to varying quality and depth in the documentation." ***This is normal, people have to learn.***

“ However, awareness of this can inform how much trust to place in them.”
- "Discussions among professionals suggest that application notes are significant marketing tools, sometimes authored by junior engineers. “
- However, experts like Jim Williams a true expert in his own right have also contributed, indicating variability in authorship and expertise. This variability necessitates critical assessment."



Best Practices for Using Application Notes

- **A key takeaway here is if you don't remember anything else!!!**
“Use application notes as initial guides rather than definitive solutions. “
- “Always verify information through testing, cross-reference multiple sources, and ensure a thorough understanding of the underlying design principles.”
- “If your unsure, then ask other more experienced engineers. “
- “Always reference the App Note and Datasheet by Version and Date.”
- “This approach will help mitigate potential pitfalls.”



Conclusion

- "While application notes are valuable resources, they are not infallible. Engineers must approach them with a critical mindset, verify claims through independent testing, and apply their expertise to ensure reliable and effective designs. Questioning and testing are key to successful implementation."



References

- "[1] Electronics Stack Exchange, 'How reliable are application notes?', Available: <https://electronics.stackexchange.com/questions/26010/how-reliable-are-application-notes>
- [2] Wikipedia, 'Jim Williams (analogue designer)', Available: [https://en.wikipedia.org/wiki/Jim_Williams_\(analog_designer\)](https://en.wikipedia.org/wiki/Jim_Williams_(analog_designer))
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- [5] Toshiba, 'CMOS Logic ICs Usage Considerations,' Available: <https://toshiba.semicon-storage.com/info/docget.jsp?did=63525>
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Inspirational Quotes:

- *"Scientists study the world as it is; engineers create the world that has never been." — Theodore von Karman*
- *"Engineering is the closest thing to magic that exists in the world." — Elon Musk*
- *"The engineer has been, and is, a maker of history." — James Kip Finch*