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## Agenda

- Current Status
- Search for differential cross point switches
- Results
- Technical and commercial comparison
- Summary



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## Current Status regarding Renesas 8V54816A

- EOL
  - Notice: 2022-08-10
  - LTB: 2023-02-10
  - LTS: 2023-08-10
- N.A.T. has secured sufficient amount of devices based on
  - Committed Forecast => guaranteed
  - Avarage Annual Quantities => first-come-first serve
- CLK mux widely used in applications
  - SatCom and SpecCom
  - Physics
  - Quantum Computing

=> need for a replacement




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## Search for differential cross point switches

- Challenges:
  - MTCA requires CLK lines to be MLVDS
  - Random Jitter ≤ 1ps rms
  - Channel-to-Channel skew as small as possible
  - Line parameters tuneable to adjust for special uses cases




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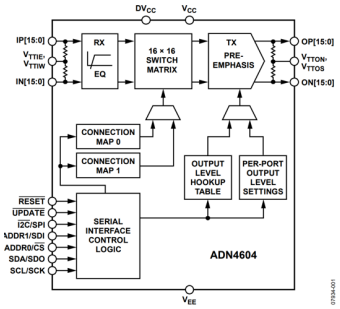
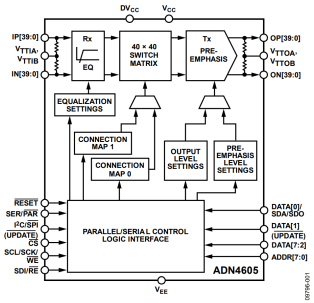
# Differential cross point switches ADN460x

- ADN4604: 16 x 16 crosspoint




- ADN4604: 40 x 40 crosspoint



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# Differential cross point switches ADN460x

- Line parameters
  - Not MLVDS, but parameters are widely tuneable
    - Drive strength
    - Equalization
    - Termination on/off
- Jitter performance
  - Random jitter is <0.8 ps rms
- Channel-to-channel Skew
  - Skew < 200ps



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## Technical Comparison: 8V54816A vs. ADN4605

| | Renesas 8V54816A | Analog Devices ADN4605 |
|---|---|---|
| Random Jitter RMS [ps] | 0.3…0.8 | 0.8 |
| Channel-to-Channel-Skew [ps] | 1600 | 200 |
| Propagation Delay [ps] | 3800 | 920 |
| Total peak-to-peak Jitter [ps] | 20…60 | 25 |
| Differential Output Voltage [mV] | Typical 650 (fixed) | 200…800 (adjustable) |
| Drive Strength [mA] | ~12 (into 50R, MLVDS standard) | 4…24 (adjustable) |
| Minimum Differential Input Voltage Swing [mV] | 50 (threshold MLVDS standard) | 50 |

- ADN4604 and ADN4605 have similar values as 8V54816A
  - CAVEAT: measurement method for jitter not clearly defined
- Technically priomising fit for a replacement




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## Commercial Comparison: ADN4604 vs. ADN4605

- ADN4604 (16 x 16 cross point)
  - About same costs as 8V54816A
  - Next best 1:1 replacement available
  - 1x ADN4604 per CLK fabric (12p)
    => 3 ADN4604 needed
  - Leaves 4 ports per AD4604 for inter MUX, PLL and front panel I/O connections
- ADN4605 (40 x 40 cross point)
  - Costs about 2-3x ADN4604
  - better replacement
  - 1x ADN4604 for all CLK fabrics
    => 1 ADN4605 needed
  - No inter MUX connection required
  - Leaves 4 ports per AD4604 for PLL and front panel I/O connections

=> promising form/fit/function and cost replacement




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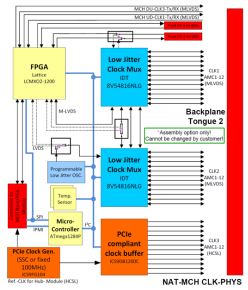
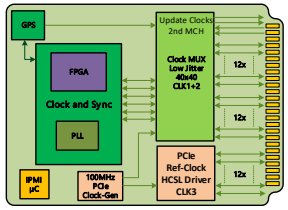
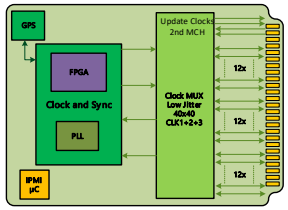
## Comparison: 8V54816A vs. ADN4605

- Current CLK module based on Renesas 8V54816A
- Future CLK module based on Analog Devices ADN4605



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## Summary

- 8V54816A is EOL, sufficient parts on stock but replacement needed
- ADN460x seems to be a good fit
  - Technical parameters comparable to 8V54816A, although tuning is required
  - Commercially ADN4604 comparable to 8V54816A, but 3x ADN4604 needed
  - ADN4605 replaces 3x ADN4604 and still leaves ports for PLL and I/O at FP
- ADN4605 is solution of choice
- N.A.T. plans for 2 assembly options
  1. 1x ADN4604 for CLK1, CLK2, CLK3
  2. 1x ADN4604 for CLK1, CLK2 and separate Ref/CLK HCSL driver for CLK3
- Evaluation by N.A.T. engineering using eval kit is in progress



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# Thank you for your attention !

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