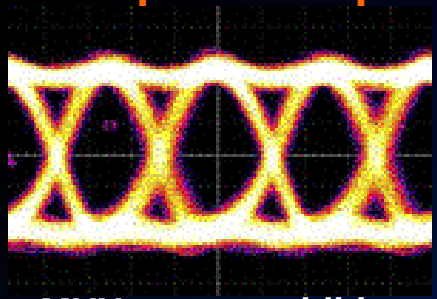
Retiming of Transmit Data

Applications:

- Optical and laser communications
- Test instrumentation
- Satellite communications
- Date rate up to 13, 25, or 50 Gbps
- Frequency up to 13, 25, or 50 GHz

43 Gbps DFF Input

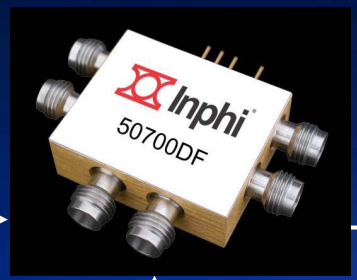


MUX output exhibits duty cycle distortion

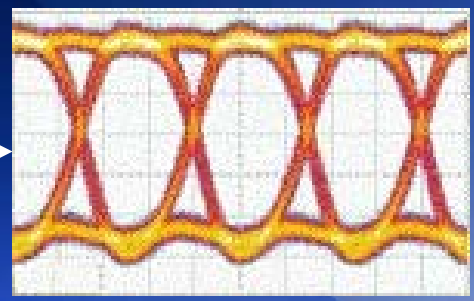
D0

Dn

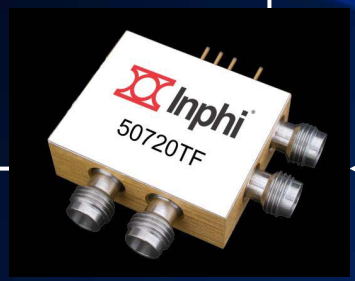
MUX (1/2 Rate)



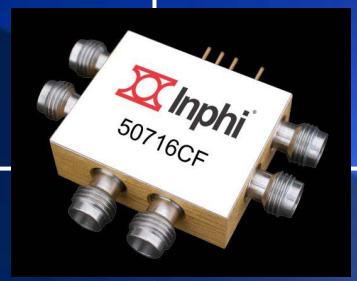
43 Gbps DFF Output



D flip-flop retimes and cleans up duty cycle distortion



TFF divides clock by 2 to drive ½-rate MUX



1:2 clock fanout sharpens the edges of VCO and distributes clock signals to DFF and TFF

VCO

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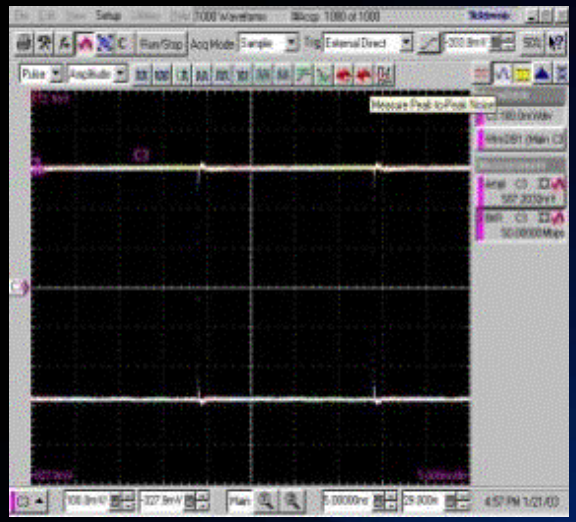
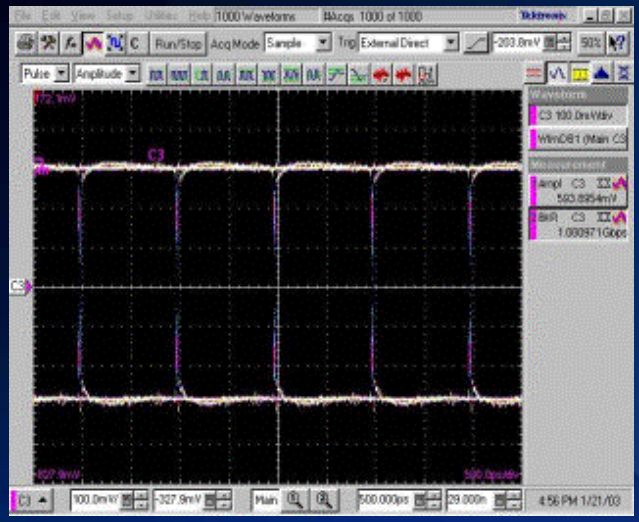
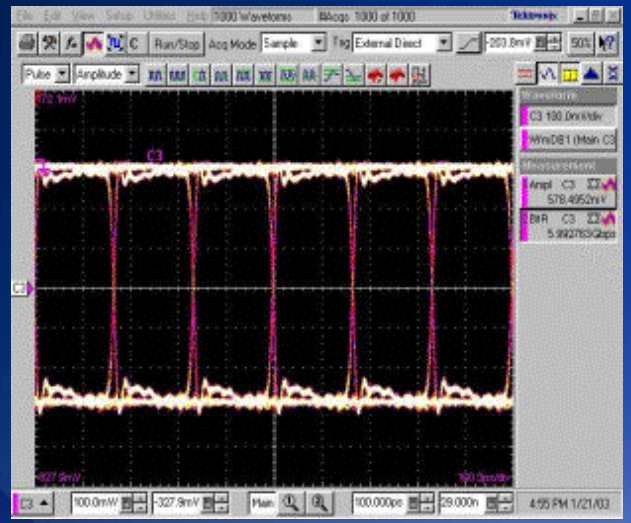
D Flip-Flops, Broadband Operations



50 MHz Clock, 50 Mbps Data
PRBS (2^{31})-1



1 GHz Clock, 1 Gbps Data
PRBS (2^{31})-1



6 GHz Clock, 6 Gbps Data
PRBS (2^{31})-1

- All Inphi HSL products are designed for broadband operations
- Products work down to DC with a square wave clock, ~50 MHz with sine wave
- A clock fanout (13716CF) can be used to generate a square wave clock from a sine wave

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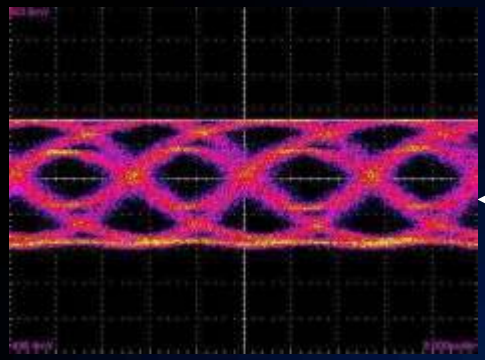
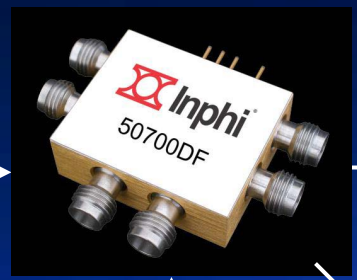
Decision of Received Data

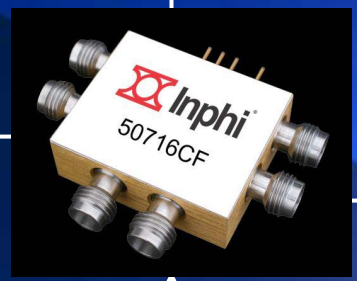
50 Gbps Data Input



Noisy data from fiber or over the air

Amp





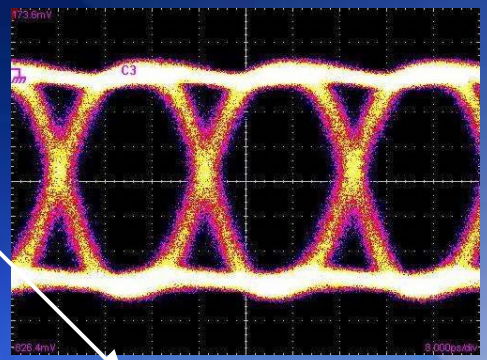
1:2 clock fanout sharpens the edges of VCO and drives DFF

VCO

Applications:

- Optical and laser communications
- Test instrumentation
- Satellite communications
- Date rate up to 13, 25, or 50 Gbps
- Frequency up to 13, 25, or 50 GHz

50 Gbps Data Output



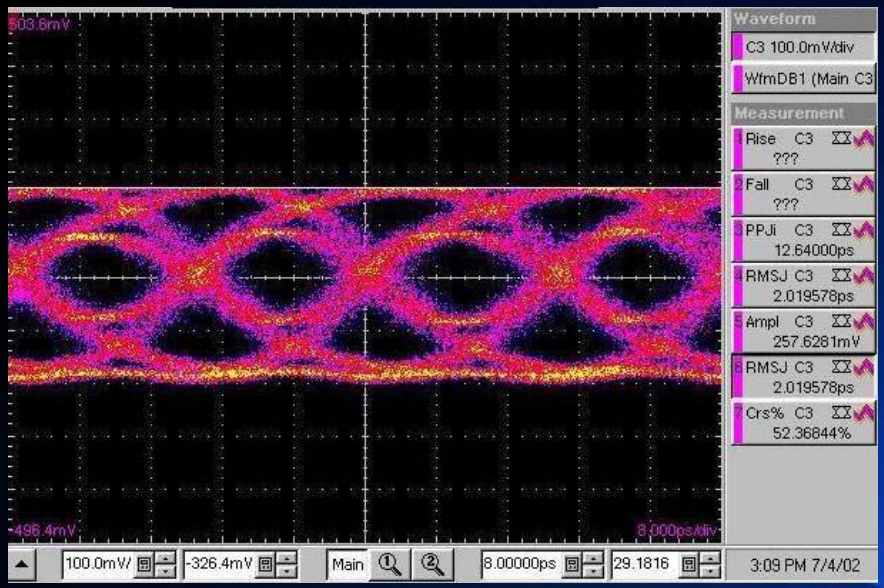
D flip-flop retimes and cleans up received data

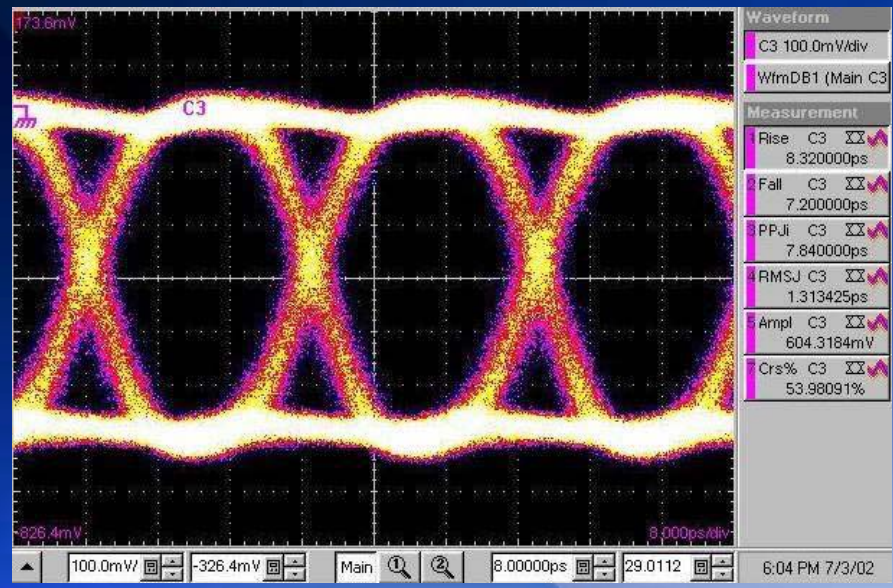
Mixer or DEMUX

Inphi® Think fast.

Inphi® 50700DF D Flip-Flop

Output Data Eye: 50 Gbps
Using 4 x 12.5 Gbps Mux to Feed Input





DATA IN

DATA OUT

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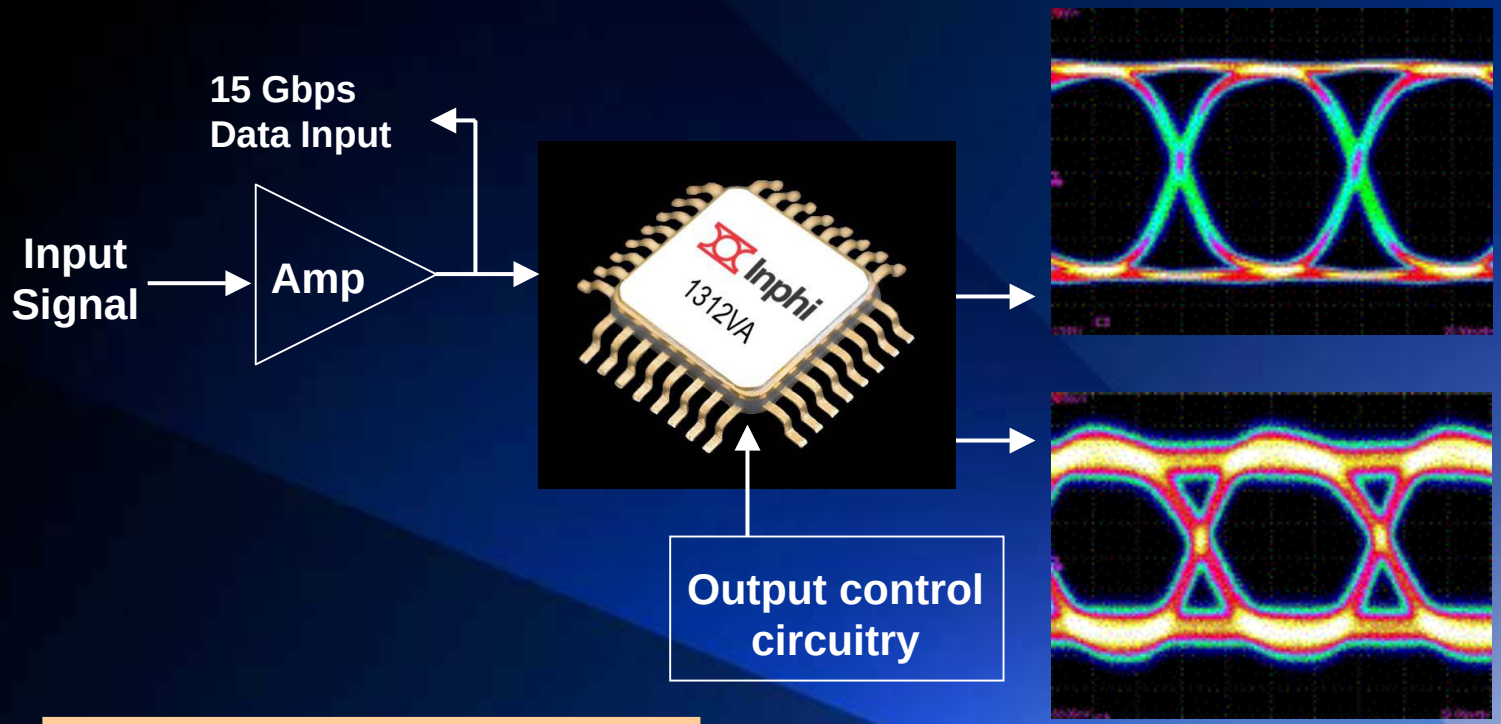
Variable Output Amplitude Drivers

>36 dB Output Amplitude Control



Applications:

- Automatic test equipment (ATE)
- Test & measurement instruments
- Data rate up to 13 or 20 Gbps

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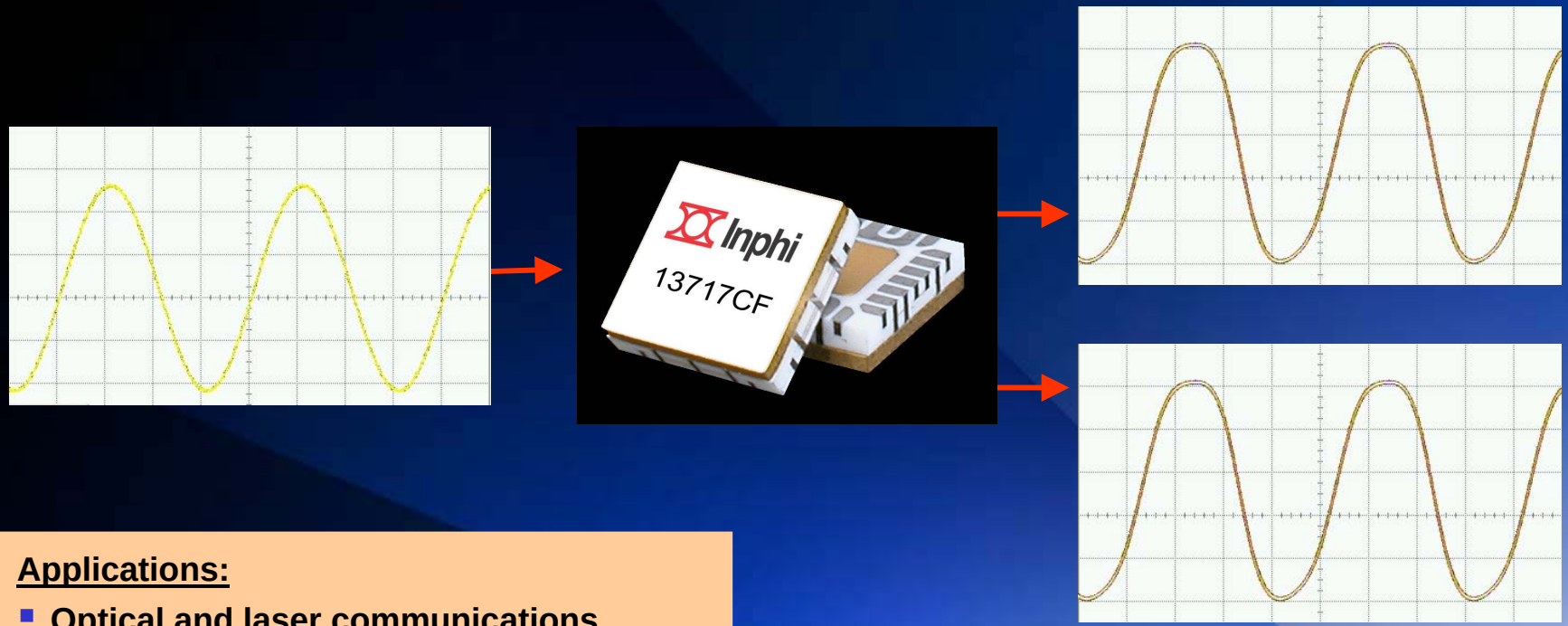
Local Oscillator (LO) Distribution



Applications:

- Optical and laser communications
- Test instrumentation
- Satellite communications
- Point-to-point radios
- Frequency up to 13, 25, or 50 GHz

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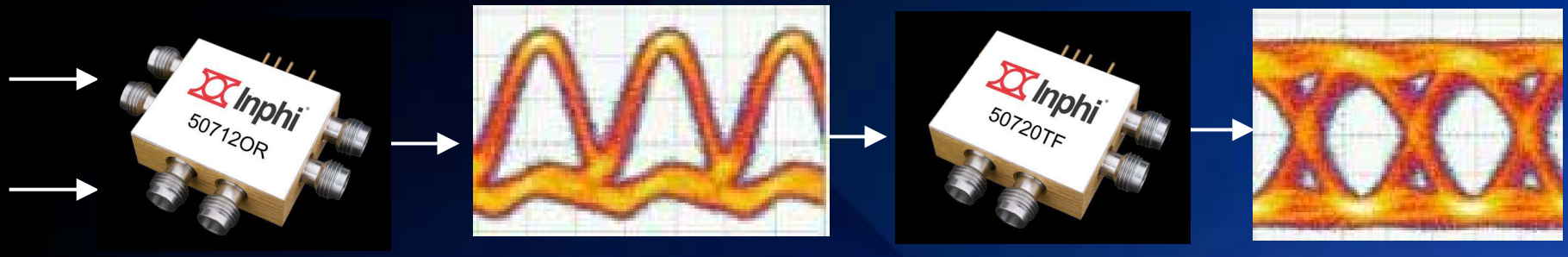
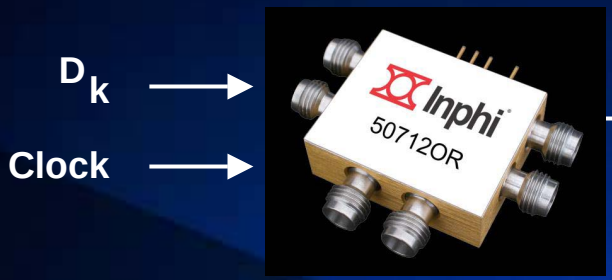
Differential Encoding





Applications:

- Telecom duobinary transmission
- High-speed communications
- Satellite communications
- Frequency up to 13, 25, or 50 GHz

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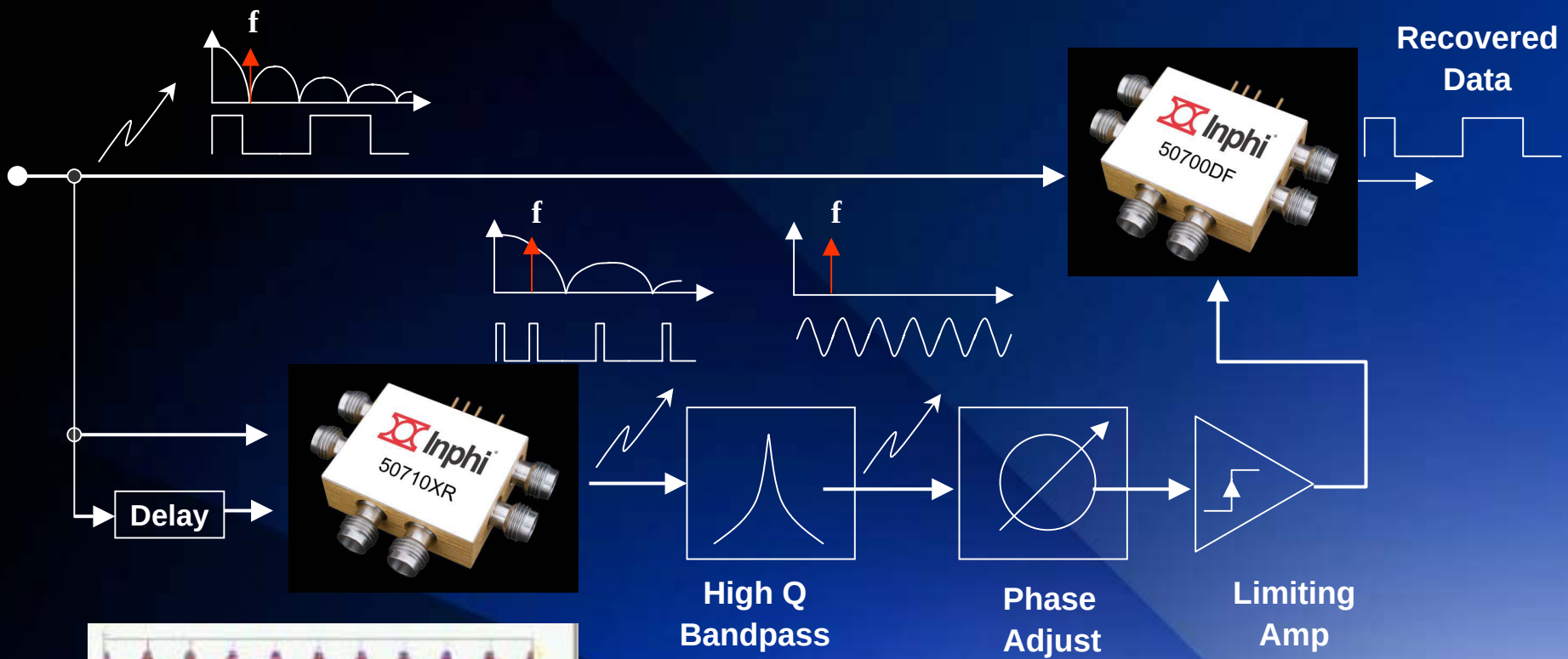
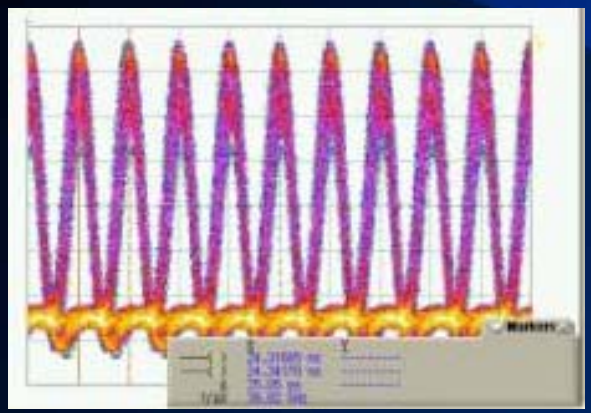
Clock Recovery





40 Gbps 50710XR XOR eye

2^{31} – 1 PRBS with inputs out of phase by 12.5 ps

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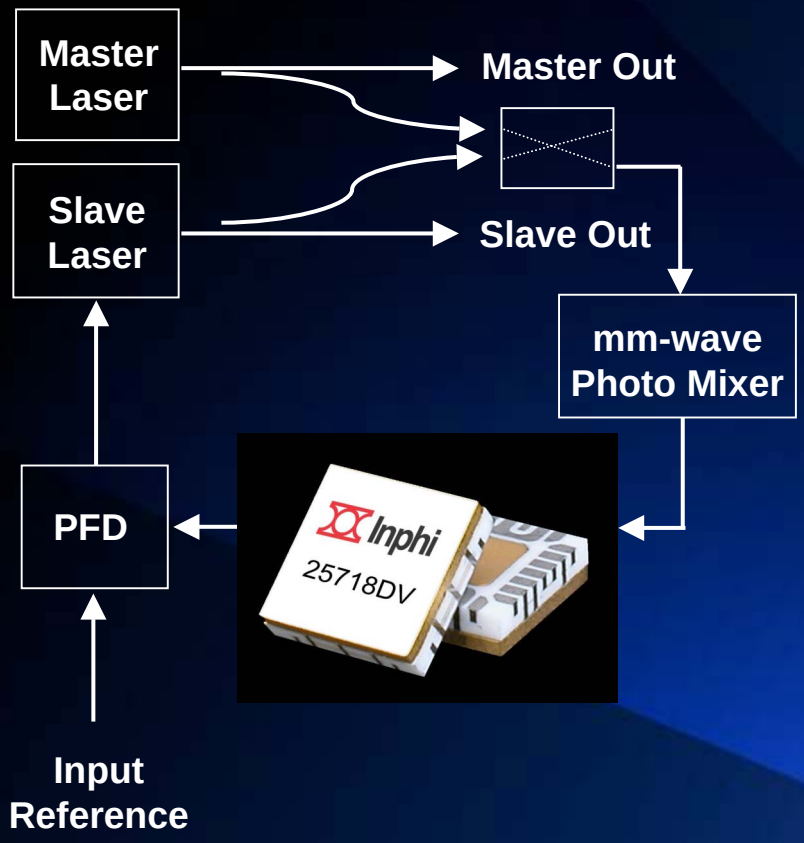
Laser Synthesizer



Applications:

- Phase lock a tunable laser to a fixed laser up to 13, 25, or 50 GHz
- Divide-by-8 reduces phase noise by 20log(8) = 18 db at input of the PLL
- Laser-based radar to monitor weather, wind shear, and other atmospheric gases
- Generate stable LO signal up to 100 GHz for demanding applications
- Test instrumentation

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