

Experiment 6:

Modulation and Pulse Shaping

포항공과대학교 전자전기공학과
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Outline

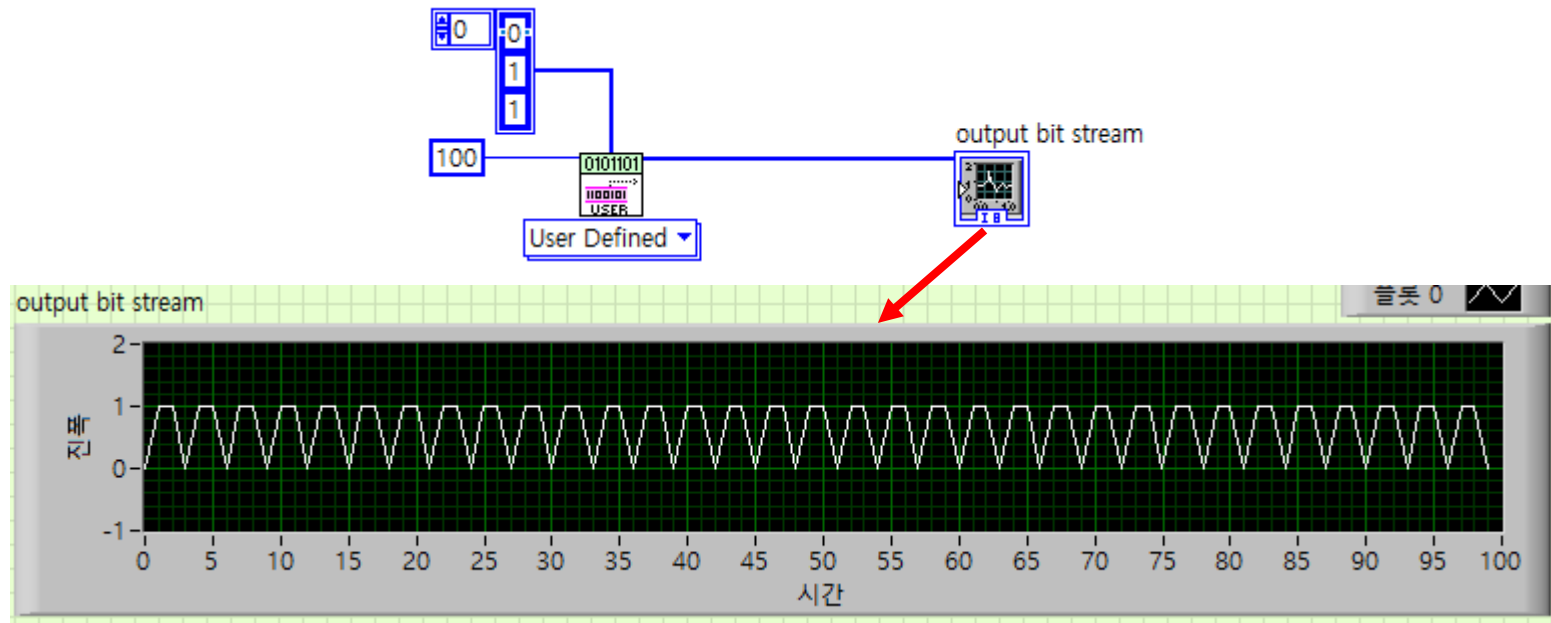
1. Modulation and Pulse Shaping
2. Today's Experiment
3. About Report

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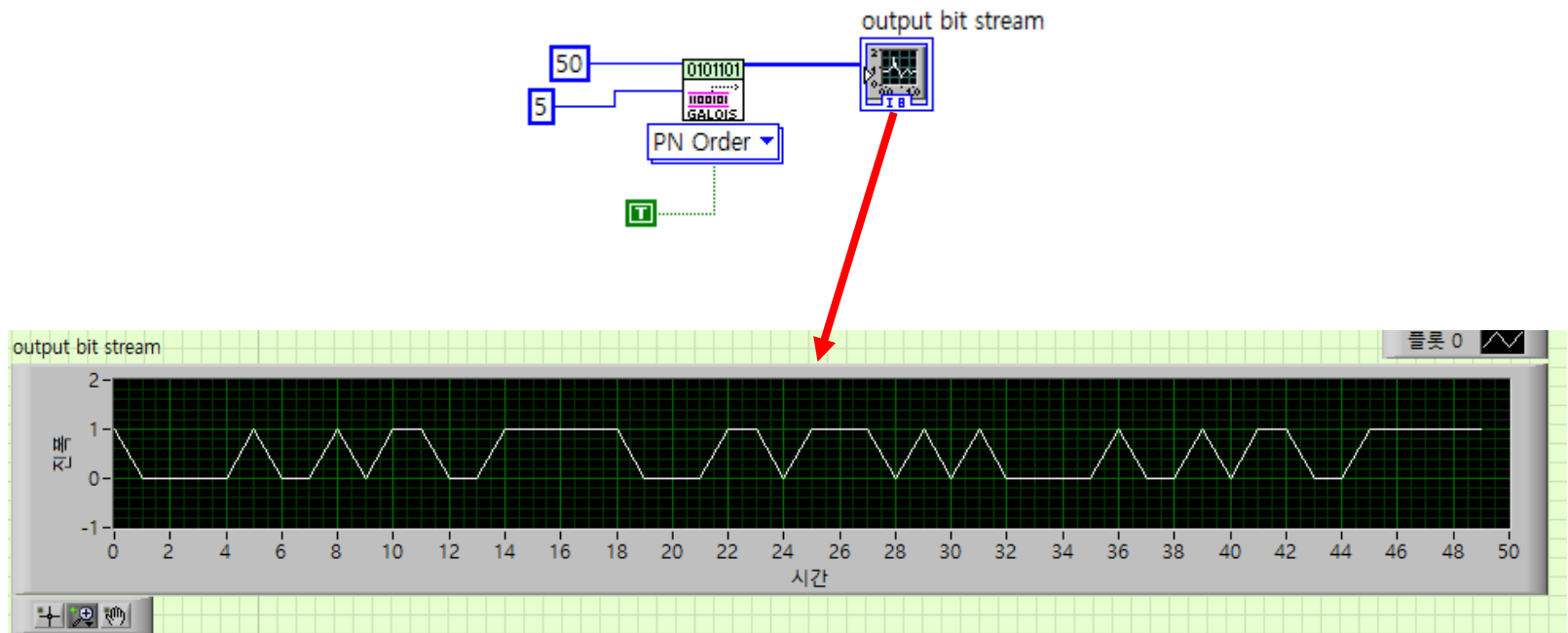
Modulation and Pulse Shaping

- Bit array generation
 - 함수 팔레트 → RF communications → Modulation → Digital
→ MT generate bits (poly).vi
 - Mode 1 : User Defined
 - ex) “0 1 1”이 반복되는 길이 100의 bit stream



Modulation and Pulse Shaping

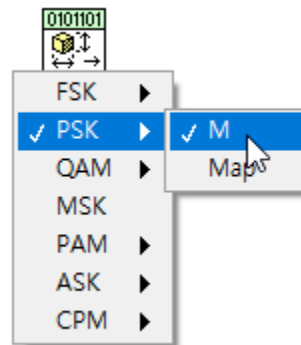
- Bit array generation
 - Mode 2 : PN sequence
 - ex) 길이 50, order 5인 PN sequence



Modulation and Pulse Shaping

- Modulation

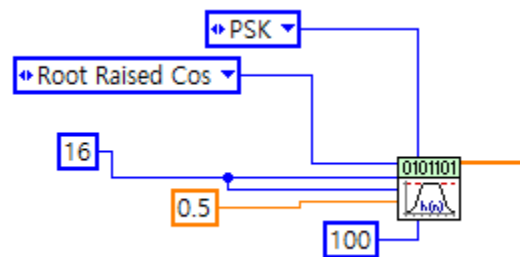
- System parameter : modulation scheme 결정, 관련 parameter 출력
- Modulation → Digital → Utilities → Sys params
- Samples per symbol : symbol 하나당 sample 개수
- M : M-PSK에서 M의 값



Modulation and Pulse Shaping

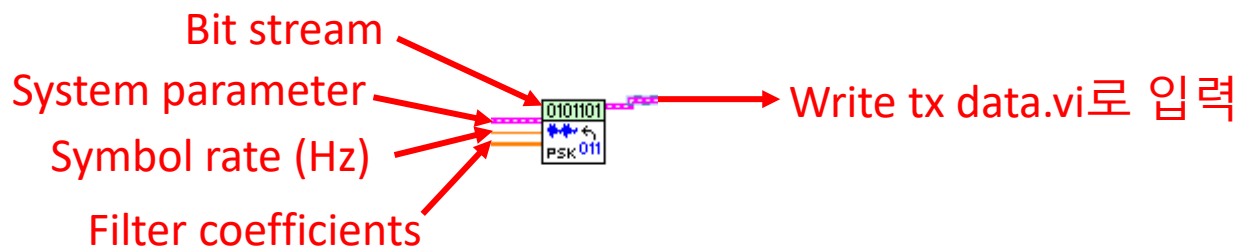
- Modulation

- Filter coefficients : pulse shaping에 사용할 filter 결정
- Modulation → Digital → Utilities → Filter coefficients
- 입력 : Samples per symbol, filter 종류, roll-off factor
- 출력 : upsampling에 사용될 pulse shaping filter와 상응하는 matched filter



Modulation and Pulse Shaping

- Modulation
 - Modulation → Digital → Modulation
 - bit stream, filter coefficients, system parameter를 입력으로 받아 modulation 진행.
 - Symbol rate : 어떻게 계산해야 하는지 고민, 적절한 값을 입력.
 - 출력 : complex waveform “cluster”
 - 이 출력을 write tx data.vi에 입력하여 USRP로 전송.
 - 타입을 single channel -> Complex Double Cluster [CDB cluster] 로 선택.



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Today's Experiment

- Order 8인 m-sequence(PN sequence)를 generate하여
- BPSK로 modulation하여 전송하고,
- 이를 spectrum analyzer로 관찰하자.
- Filter : none
- Samples per symbol : 최소 10, 짝수로.
- Center frequency : 2.3765GHz

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About report

- Due: 2024. 10. 21 (월) 오후 4:59
- Must be included :
 - 전송 결과
 - 코드(block diagram), 프런트 패널, spectrum analyzer 결과
 - IQ rate, samples per symbol가 spectrum analyzer 결과에 미치는 영향
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