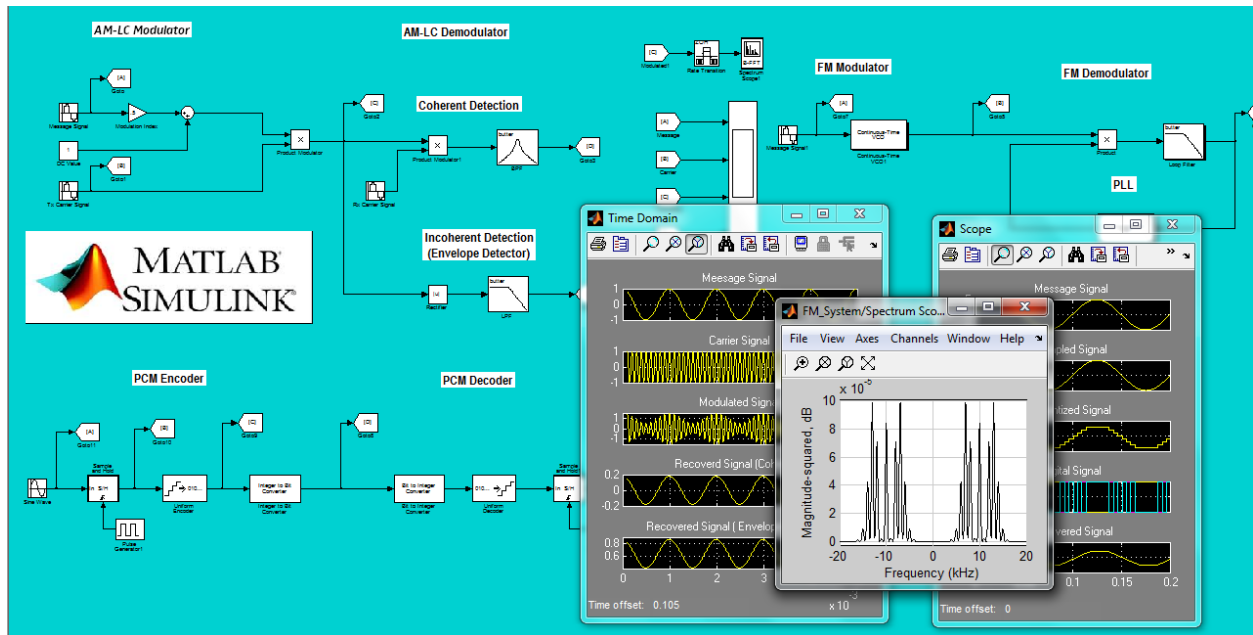


# Modeling Communication Systems Using Simulink

## PCM System Model



Eng. Anas Alashqar

---

# **Modeling Communication Systems Using Simulink: PCM System Model**

Eng. Anas Alashqar

Publication date 16-Dec-2013 21:01:12

Copyright © 2014 Anas Al-ashqar

---

---

# Table of Contents

- 1. Model Version ..... 1
- 2. PCM System Model ..... 2
  - 2.1. Blocks ..... 2
    - 2.1.1. Parameters ..... 2
    - 2.1.2. Block Execution Order ..... 7

---

# List of Figures

2.1. pcm11 ..... 2

---

## List of Tables

2.1. "Analog Filter Design" Parameters .....	2
2.2. "Bit to Integer Converter" Parameters .....	3
2.3. "From" Parameters .....	3
2.4. "From1" Parameters .....	3
2.5. "From2" Parameters .....	3
2.6. "From3" Parameters .....	3
2.7. "From4" Parameters .....	4
2.8. "Goto" Parameters .....	4
2.9. "Goto1" Parameters .....	4
2.10. "Goto2" Parameters .....	4
2.11. "Goto3" Parameters .....	5
2.12. "Goto4" Parameters .....	5
2.13. "Integer to Bit Converter" Parameters .....	5
2.14. "Pulse Generator1" Parameters .....	5
2.15. "Pulse Generator2" Parameters .....	6
2.16. "Sine Wave" Parameters .....	6
2.17. "Uniform Decoder" Parameters .....	7
2.18. "Uniform Encoder" Parameters .....	7

---

# Chapter 1. Model Version

**Version:** 1.5

**Last modified:** Fri Dec 13 15:48:31 2013

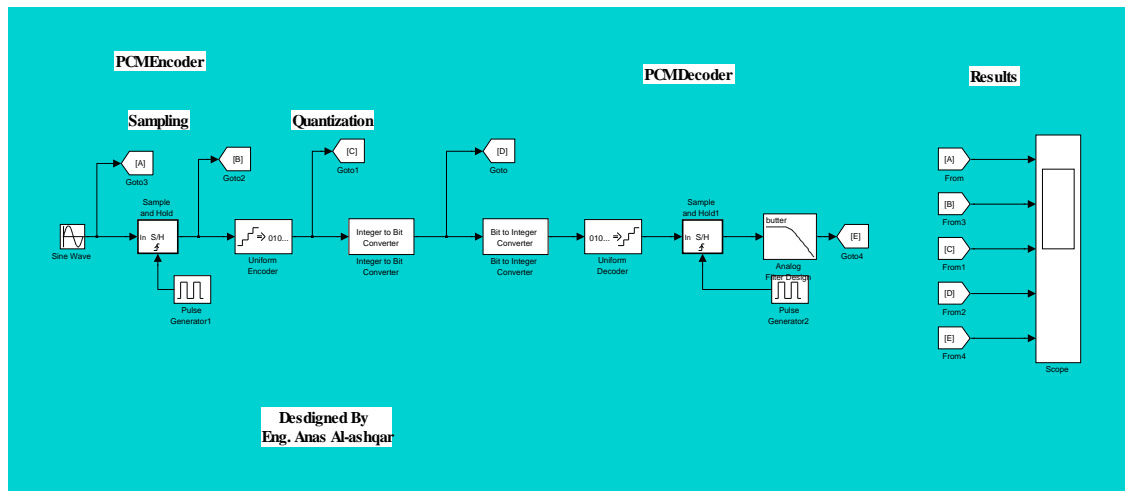
**Checksum:** 3130042882 336461382 1180673315 3895699768

# Chapter 2. PCM System Model

## Table of Contents

2.1. Blocks .....	2
2.1.1. Parameters .....	2
2.1.2. Block Execution Order .....	7

Figure 2.1. pcm11



## 2.1. Blocks

### 2.1.1. Parameters

#### 2.1.1.1. "Analog Filter Design" (StateSpace)

Table 2.1. "Analog Filter Design" Parameters

Parameter	Value
Design method	Butterworth
Filter type	Lowpass
Filter order	2
Passband edge frequency (rad/s)	$2 \cdot \pi \cdot 100$

### 2.1.1.2. "Bit to Integer Converter" (S-Function)

**Table 2.2. "Bit to Integer Converter" Parameters**

Parameter	Value
Number of bits per integer(M)	3
Input bit order	MSB first
After bit packing, treat resulting integer values as	Signed
Output data type	Inherit via internal rule

### 2.1.1.3. "From" (From)

**Table 2.3. "From" Parameters**

Parameter	Value
Goto tag	A
Icon display	Tag

### 2.1.1.4. "From1" (From)

**Table 2.4. "From1" Parameters**

Parameter	Value
Goto tag	C
Icon display	Tag

### 2.1.1.5. "From2" (From)

**Table 2.5. "From2" Parameters**

Parameter	Value
Goto tag	D
Icon display	Tag

### 2.1.1.6. "From3" (From)

**Table 2.6. "From3" Parameters**

Parameter	Value
Goto tag	B



Parameter	Value
Icon display	Tag

### 2.1.1.7. "From4" (From)

**Table 2.7. "From4" Parameters**

Parameter	Value
Goto tag	E
Icon display	Tag

### 2.1.1.8. "Goto" (Goto)

**Table 2.8. "Goto" Parameters**

Parameter	Value
Tag	D
Icon display	Tag
Tag visibility	local

### 2.1.1.9. "Goto1" (Goto)

**Table 2.9. "Goto1" Parameters**

Parameter	Value
Tag	C
Icon display	Tag
Tag visibility	local

### 2.1.1.10. "Goto2" (Goto)

**Table 2.10. "Goto2" Parameters**

Parameter	Value
Tag	B
Icon display	Tag
Tag visibility	local

### 2.1.1.11. "Goto3" (Goto)

**Table 2.11. "Goto3" Parameters**

Parameter	Value
Tag	A
Icon display	Tag
Tag visibility	local

### 2.1.1.12. "Goto4" (Goto)

**Table 2.12. "Goto4" Parameters**

Parameter	Value
Tag	E
Icon display	Tag
Tag visibility	local

### 2.1.1.13. "Integer to Bit Converter" (S-Function)

**Table 2.13. "Integer to Bit Converter" Parameters**

Parameter	Value
Number of bits per integer(M)	3
Treat input values as	Signed
Output bit order	MSB first
Output data type	Inherit via internal rule

### 2.1.1.14. "Pulse Generator1" (DiscretePulseGenerator)

**Table 2.14. "Pulse Generator1" Parameters**

Parameter	Value
Pulse type	Time based
Time (t)	Use simulation time
Amplitude	1
Period (secs)	1/1000
Pulse Width (% of period)	50

Parameter	Value
Phase delay (secs)	0
Sample time	1
Interpret vector parameters as 1-D	on

### 2.1.1.15. "Pulse Generator2" (DiscretePulseGenerator)

**Table 2.15. "Pulse Generator2" Parameters**

Parameter	Value
Pulse type	Time based
Time (t)	Use simulation time
Amplitude	1
Period (secs)	1/1000
Pulse Width (% of period)	50
Phase delay (secs)	0
Sample time	1
Interpret vector parameters as 1-D	on

### 2.1.1.16. "Sine Wave" (Sin)

**Table 2.16. "Sine Wave" Parameters**

Parameter	Value
Sine type	Time based
Time (t)	Use simulation time
Amplitude	5
Bias	0
Frequency (rad/sec)	$10 \cdot \pi \cdot 2$
Phase (rad)	0
Samples per period	10
Number of offset samples	0
Sample time	0
Interpret vector parameters as 1-D	on

### 2.1.1.17. "Uniform Decoder" (S-Function)

**Table 2.17. "Uniform Decoder" Parameters**

Parameter	Value
Peak	5
Bits	3
Overflow mode	Saturate
Output type	Double

### 2.1.1.18. "Uniform Encoder" (S-Function)

**Table 2.18. "Uniform Encoder" Parameters**

Parameter	Value
Peak	5
Bits	3
Output type	Signed integer

## 2.1.2. Block Execution Order

1. Sine Wave [6] (Sin)
2. Pulse Generator1 [5] (DiscretePulseGenerator)
3. HiddenBuf\_InsertedFor\_Sample and Hold\_at\_inport\_1 (SignalConversion)
4. *Sample and Hold*
5. Uniform Encoder [7] (S-Function)
6. Integer to Bit Converter [5] (S-Function)
7. Analog Filter Design [2] (StateSpace)
8. Scope [6] (Scope)
9. Bit to Integer Converter [2] (S-Function)
10. Pulse Generator2 [6] (DiscretePulseGenerator)
11. HiddenBuf\_InsertedFor\_Sample and Hold1\_at\_inport\_1 (SignalConversion)
12. Uniform Decoder [6] (S-Function)
13. *Sample and Hold1*