Slide 1

ASCII and Other Codes

The most widely employed code in data communications is the *American Standard Code for Information Interchange*, hereafter referred to as the *ASCII* code. The ASCII code is a 7 or 8 bit code, but other bits are present as will be shown. With 7 bits, the number of possible distinct words is 2^7 = 128. This value is sufficient to encode all letters (both upper and lower-case), numerals, punctuation marks, and a number of special characters. Other characters may be added as will be shown.

Slide 2

ASCII Code Overview

- As a matter of interest, the code will be displayed on the next slide.
- Bit 7 is considered as the most significant bit and bit 1 is considered as the least significant bit.
- In serial transmission, the order of transmission progresses from the least significant bit to the most significant bit.

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Slide 3

Bits								
7	0	0	0	0	1	1	1	1
6	0	0	1	1	0	0	1	1
5	0	1	0	1	0	1	0	1
Bits 4321								
0000	NUL	DLE	SP	0	@	P	`	p
0001	SOH	DC1	!	1	A	Q	a	q
0010	STX	DC2	"	2	B	R	b	r
0011	ETX	DC3	#	3	C	S	c	s
0100	EOT	DC4	$	4	D	T	d	t
0101	ENQ	NAK	%	5	E	U	e	u
0110	ACK	SYN	&	6	F	V	f	v
0111	BEL	ETB	'	7	G	W	g	w
1000	BS	CAN	(	8	H	X	h	x
1001	HT	EM	)	9	I	Y	i	y
1010	LF	SUB	*	:	J	Z	j	z
1011	VT	ESC	+	;	K	[	k	{
1100	FF	FS	,	<	L	\	l	|
1101	CR	GS	-	=	M	]	m	}
1110	SO	RS	.	>	N	^	n	~
1111	SI	US	/	?	O	_	o	DEL

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Slide 4

ASCII Asynchronous Serial Transmission

- The signal usually rests at the *mark* level until the transmitter is ready.
- The beginning of the transmission is initiated by a transition from *mark* to *space*. This starts a reference clock at the receiver.
- The next 7 (or sometimes 8) bits are transmitted in the order from LSB to MSB.
- A parity bit may then be inserted.
- A stop bit is a transition to the *mark* level.
- The process is illustrated on the next slide with W, which in binary is 1010111.

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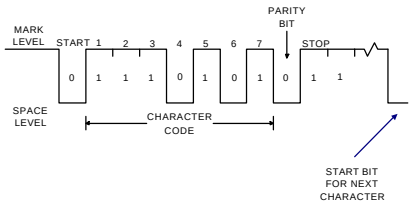
Slide 5

Asynchronous Serial Data Format



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Slide 6

Baudot Code Overview

- The *baudot code* is an older 5-bit code used extensively in teletype machines.
- Since only 32 characters are possible, it is necessary to assign dual meanings to some characters.
- Bit 5 is considered as the most significant bit and bit 1 is considered as the least significant bit.
- As in ASCII, the order of serial transmission progresses from the least significant bit to the most significant bit.

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Slide 7

Bits 54321	LETTERS Case	FIGURES case
11111	(LTRS)	
11011	(FIGS)	
00000	(BLANK)	
00100	(SPACE)	
01000	(LINE FEED)	
00010	(CARRIAGE RETURN)	
00011	A	-
11001	B	?
01110	C	:
01001	D	(WRU) or $
00001	E	3
01101	F	! or % (or none)
11010	G	& or @ (or none)
10100	H	# or £ (or none)
00110	I	8
01011	J	(BELL) or '
01111	K	(
10010	L	)
11100	M	.
01100	N	,
11000	O	9
10110	P	0
10111	Q	1
01010	R	4
00101	S	' or (BELL)
10000	T	5
00111	U	7
11110	V	= or ;
10011	W	2
11101	X	/
10101	Y	6
10001	Z	+ or "

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Slide 8

Other Codes

- *Extended Binary Coded Decimal Interchange Code* (*EBCDIC*). This is an 8-bit code developed by IBM.
- *Gray Code*. This code is characterized by the fact that successive levels involve a change in only one bit. Therefore, an error in a single bit would never result in any error greater than one position.

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Slide 9

Summary

- The *American Standard Code for Information Interchange* (*ASCII*) is the most widely employed code used in modern computer and alpha-numeric data communication systems.
- The ASCII code utilizes 7 or 8 bits permitting either 128 or 256 possible characters.
- Serial data transmission requires a start bit, a stop bit, the data code, and possibly a parity bit.

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