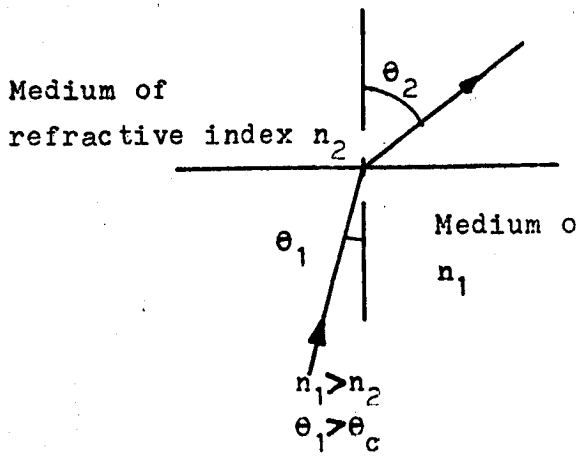
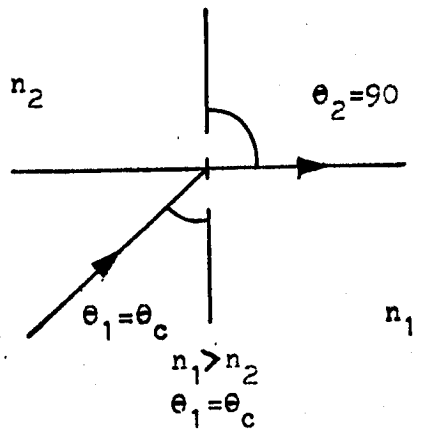
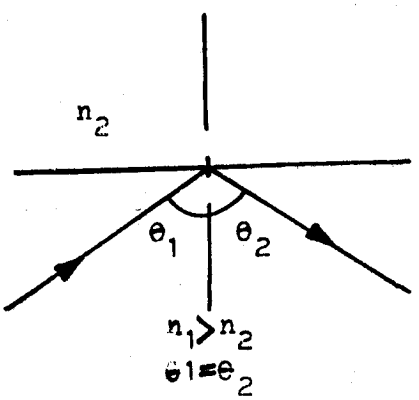
SEQUENCE OF PRESENTATION

1. INTRODUCTION TO OPTICAL FIBERS
2. INTRODUCTION TO DATA TRANSMISSION
3. MANCHESTER CODE MODULATOR
4. MULTIPLEXING
5. MANCHESTER CODE DEMODULATOR
6. DEMULTIPLEXING
7. ERROR DETECTION
8. INTERFACING THE OPTICAL EQUIPMENT
9. CONCLUSIONS

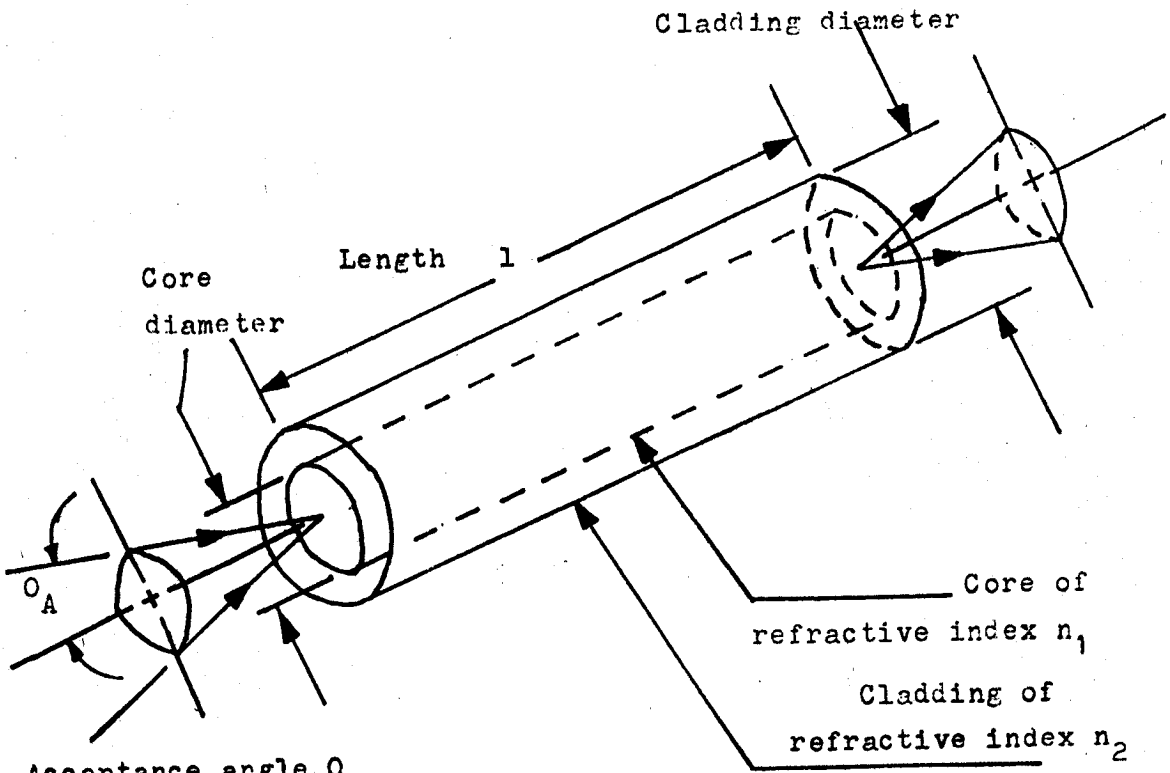
TOTAL INTERNAL REFLECTION







OPTICAL FIBER

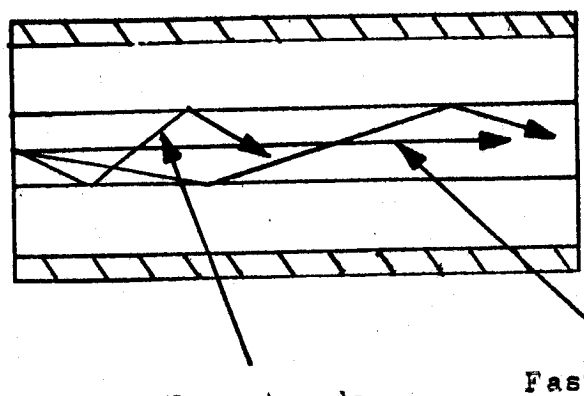


Acceptance angle O_A

Numerical aperture N.A. = sin O_A

Transmission loss = $\alpha_0 l$

MODES OF PROPACATION IN OPTICAL FIBER

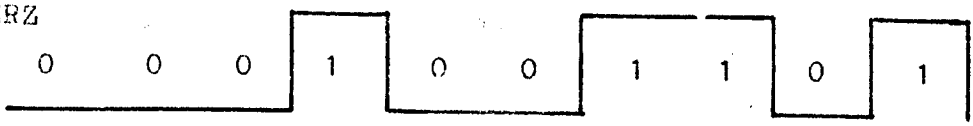


DATA COMMUNICATION CODES

Codes used in data communication are divided in two major catagories:

1. NON-SEIF CLOCKING

(a) NRZ

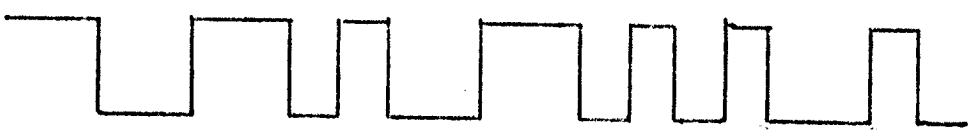


(b) RZ

2. SEIF CLOCKING

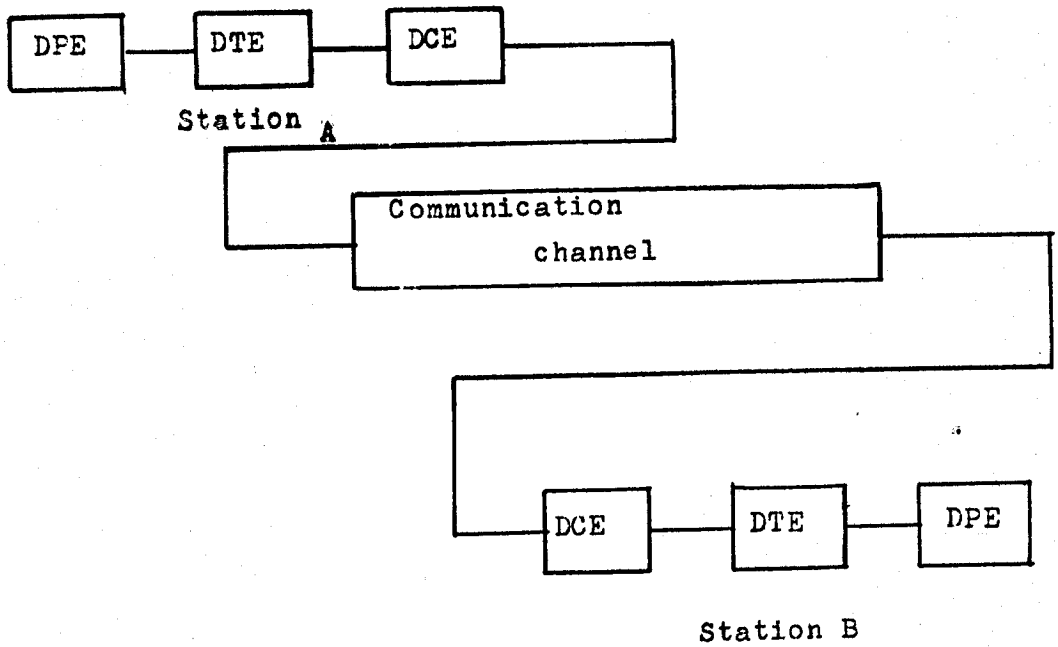
(a) MANCHESTER CODE

(b) BI-PHASE MARK CODE



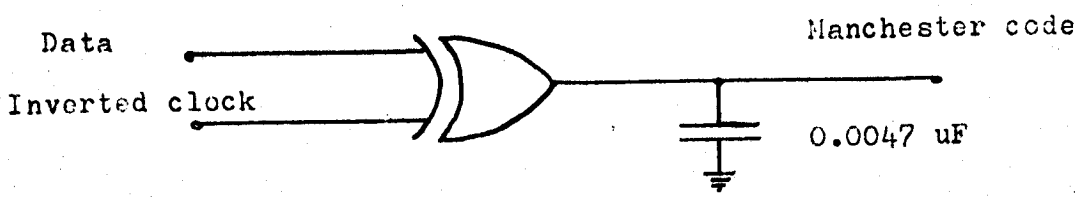
(c) BI-PHASE SPACE CODE

DATA COMMUNICATION SYSTEM



DPE- Data Processing Equipment
DTE- Data Terminal Equipment
DCE- Data Communication Equipment

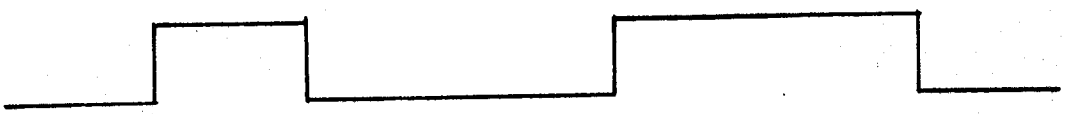
MANCHESTER CODE MODULATOR



WAVEFORMS

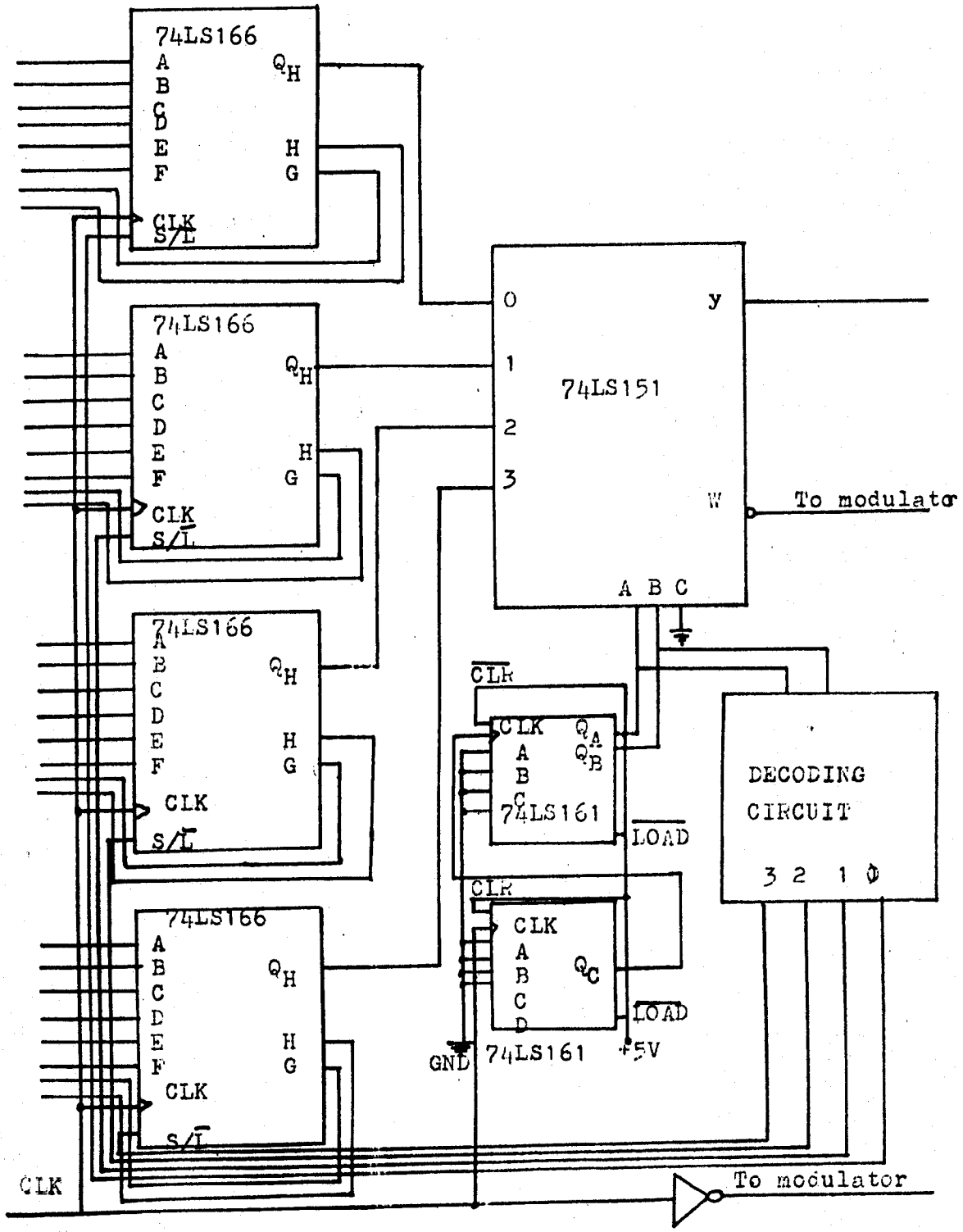
Inverted clock

Data

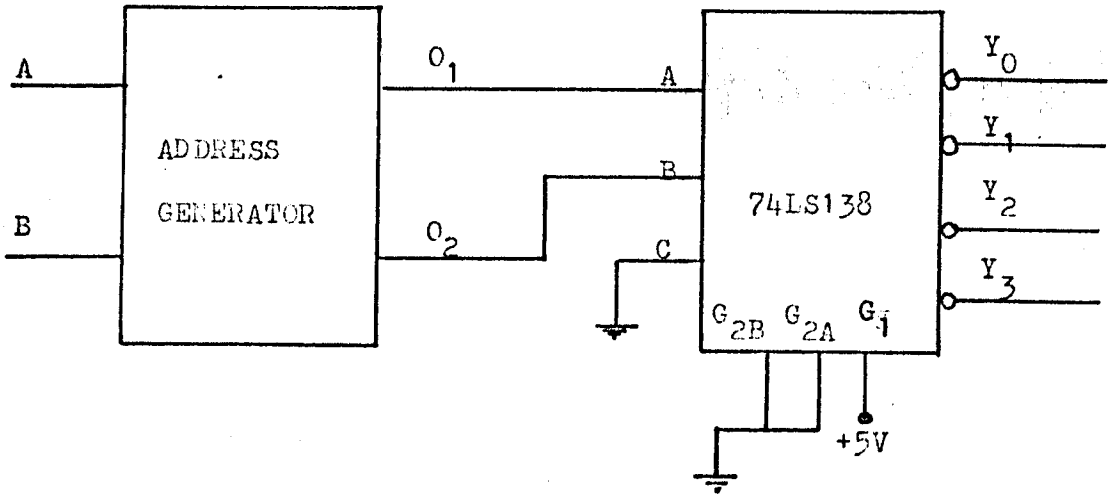


Manchester code

MUI TIPLEXER



DECODING CIRCUIT

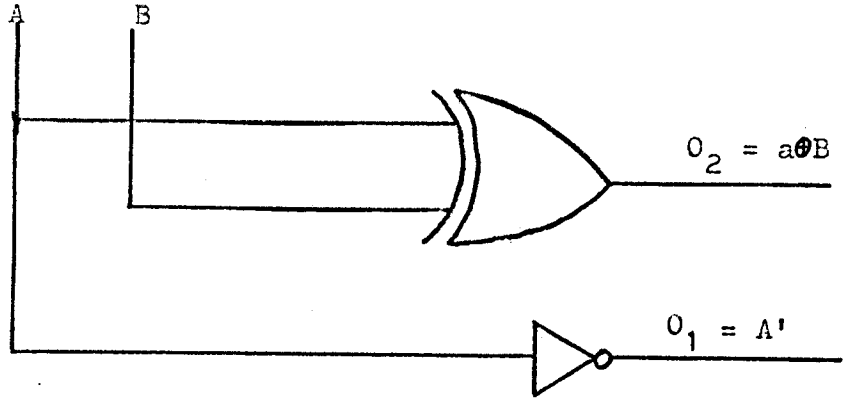


ADDRESS GENERATOR

TRUTH TABLE

INPUTS		OUTPUTS	
B	A	O_2	O_1
0	0	0	1
0	1	1	0
1	0	1	1
1	1	0	0

BLOCK DIAGRAM



DEMODULATION TECHNIQUES

Demodulation can performed in two ways;

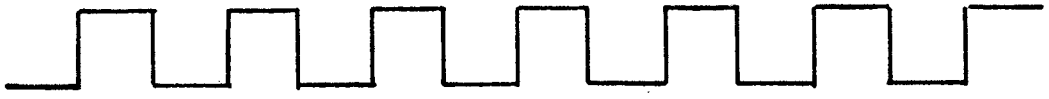
1. XORing the data with the Manchester code to extract the clock

2. XORing the clock with the Manchester code to extract the data

MANCHESTER CODE

DATA

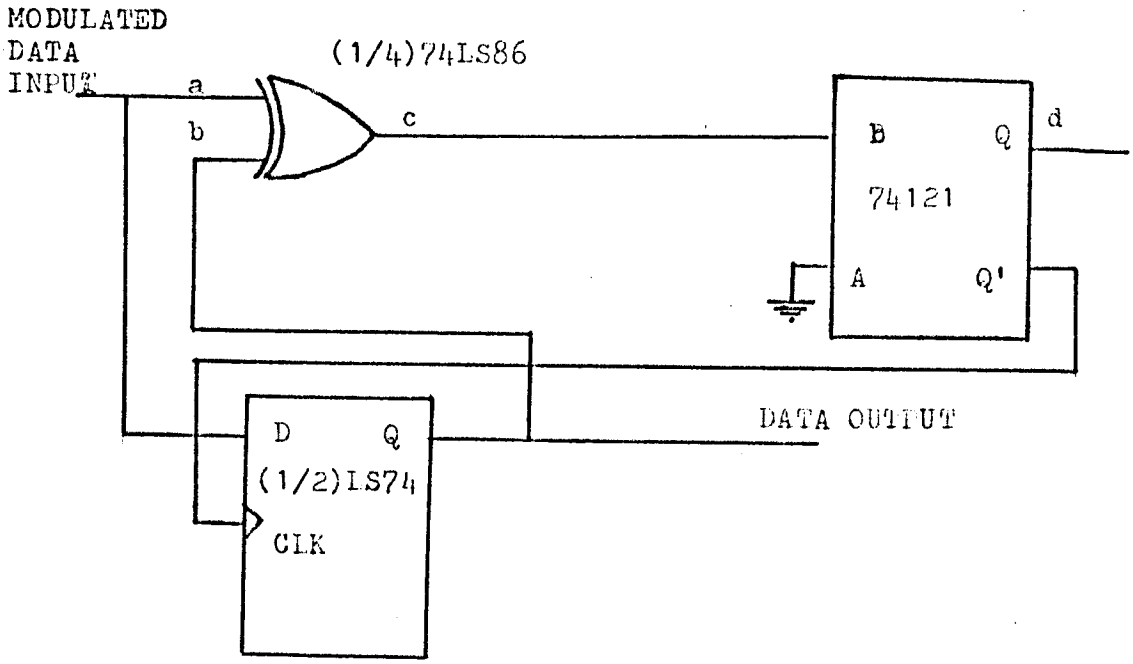
CLOCK



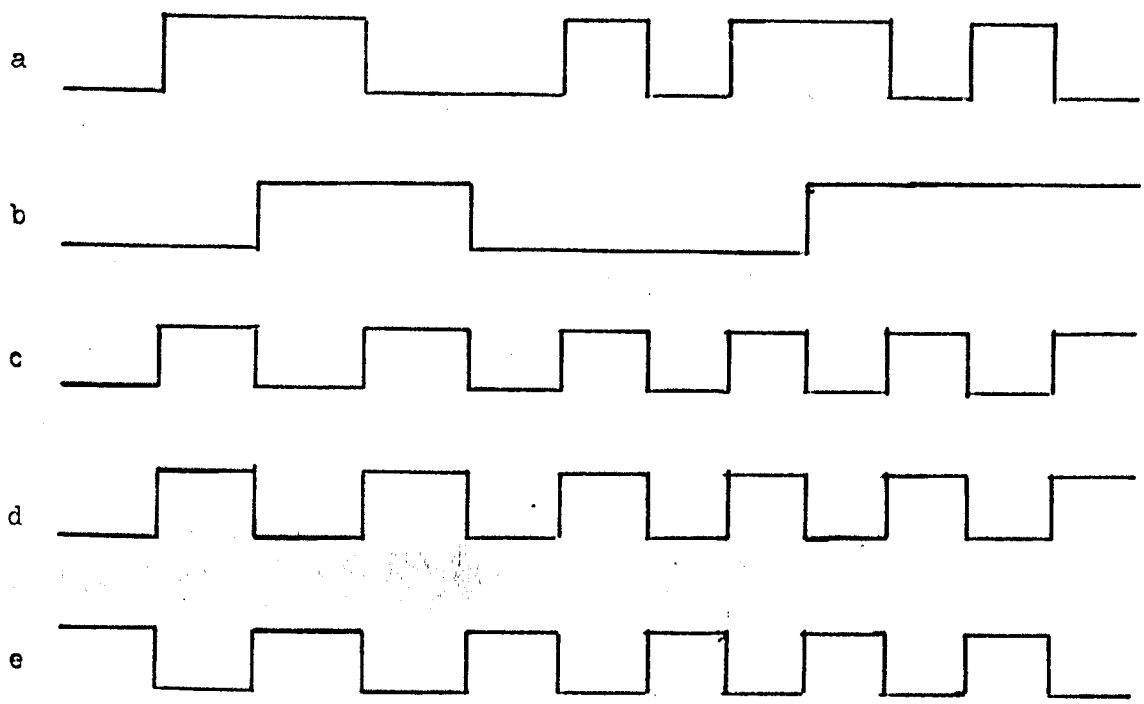
XORING THE CLOCK WITH THE CODE

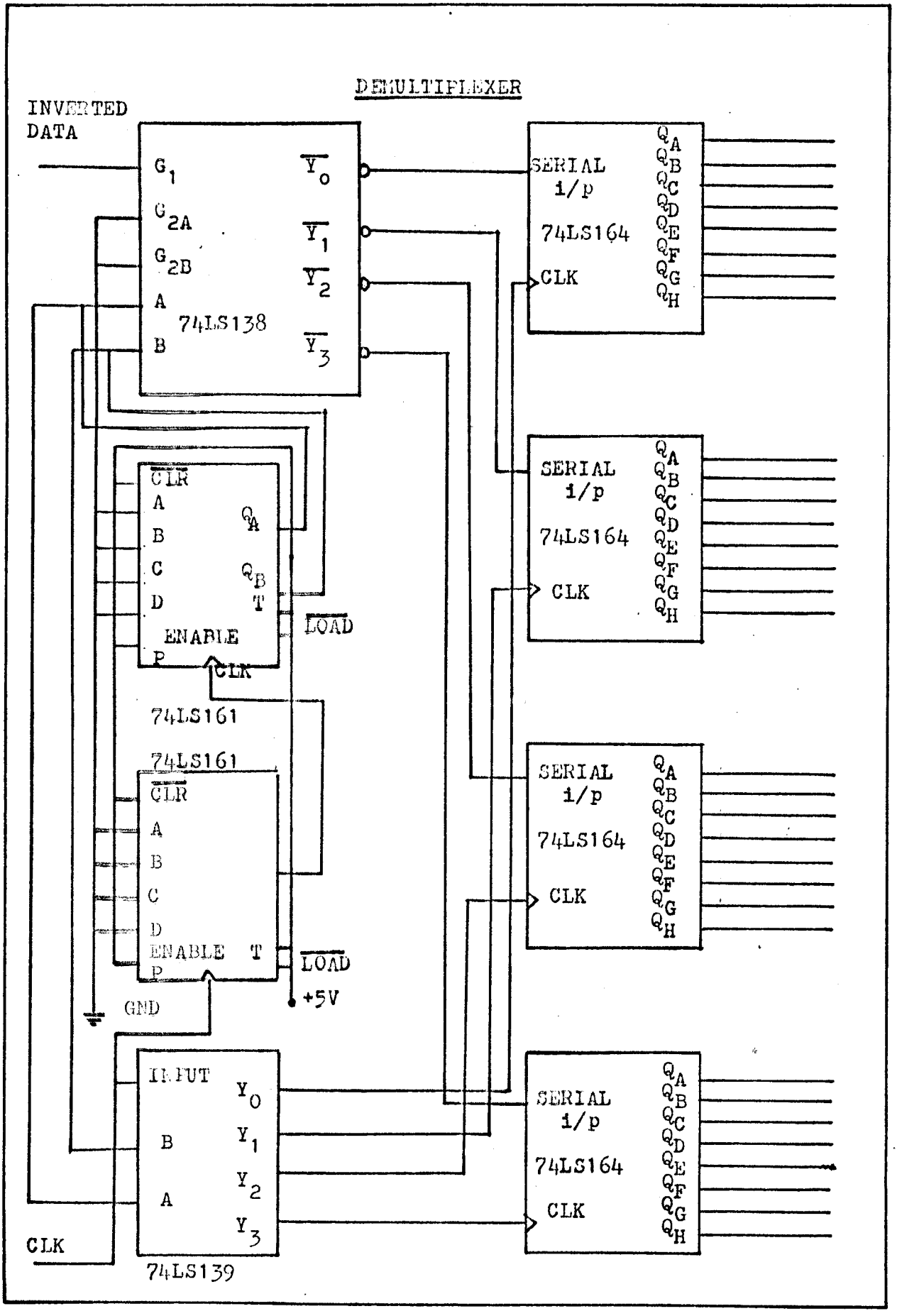
XORING THE DATA WITH THE CODE

MANCHESTER CODE DEMODULATOR

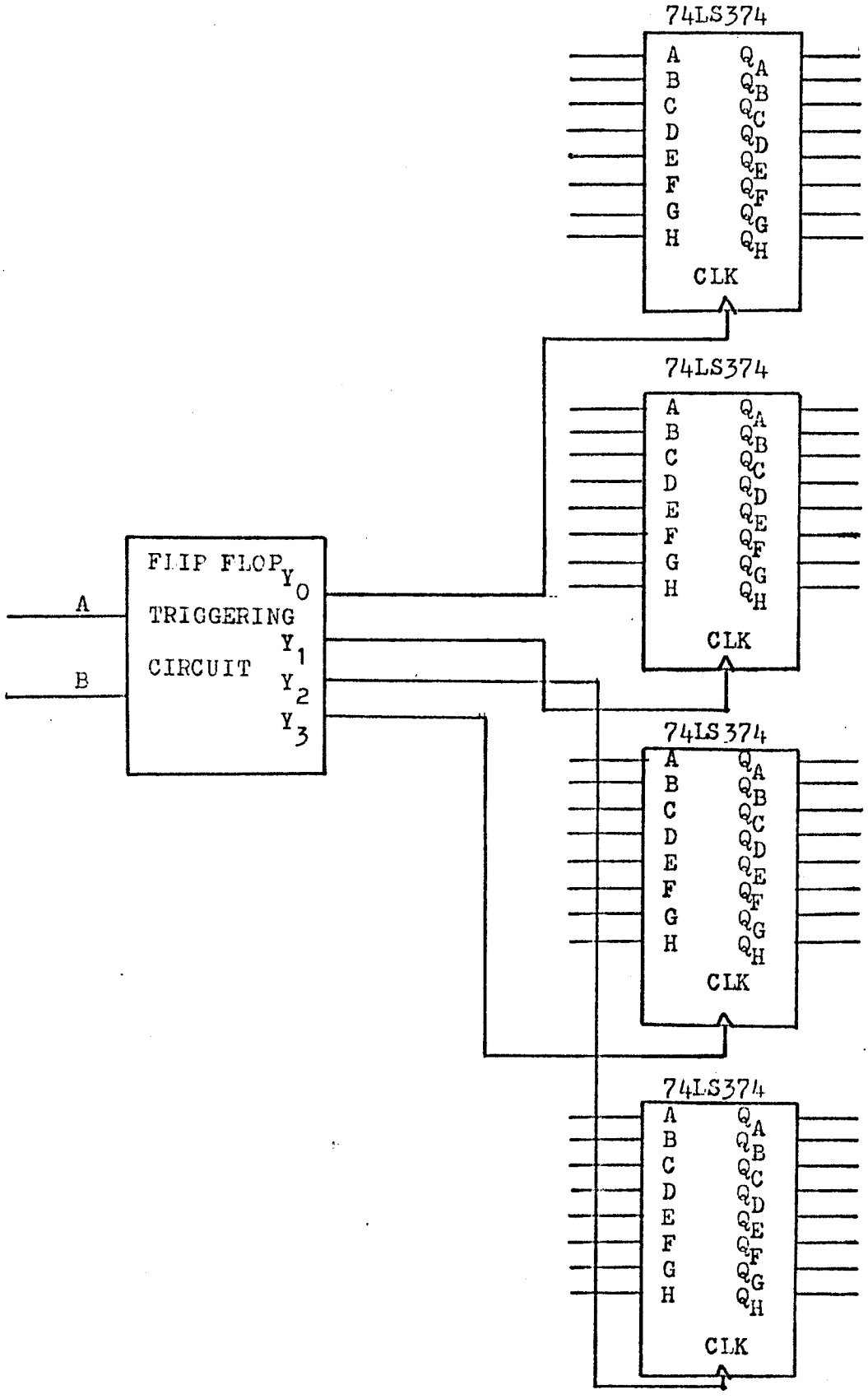


WAVEFORMS




DEMULTIPLEXER
INVERTED DATA
G1
G2A
G2B
A
B
Y0
Y1
Y2
Y3
74LS138
SERIAL i/p
74LS164
CLK
QA
QB
QC
QD
QE
QF
QG
QH
CLR
C
D
ENABLE P
T
LOAD
74LS161
GND
+5V
INPUT
74LS139

DATA STORAGE CIRCUIT

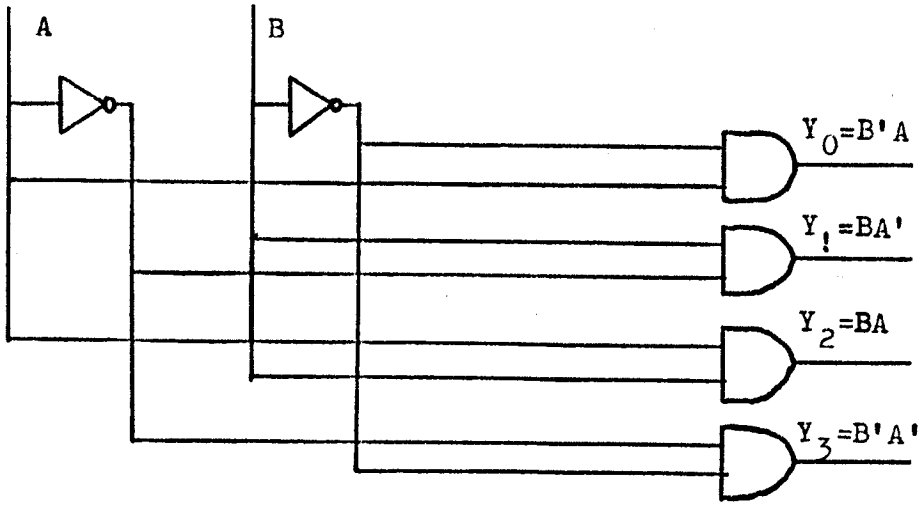


FLIP FLOP TRIGGERING CIRCUIT

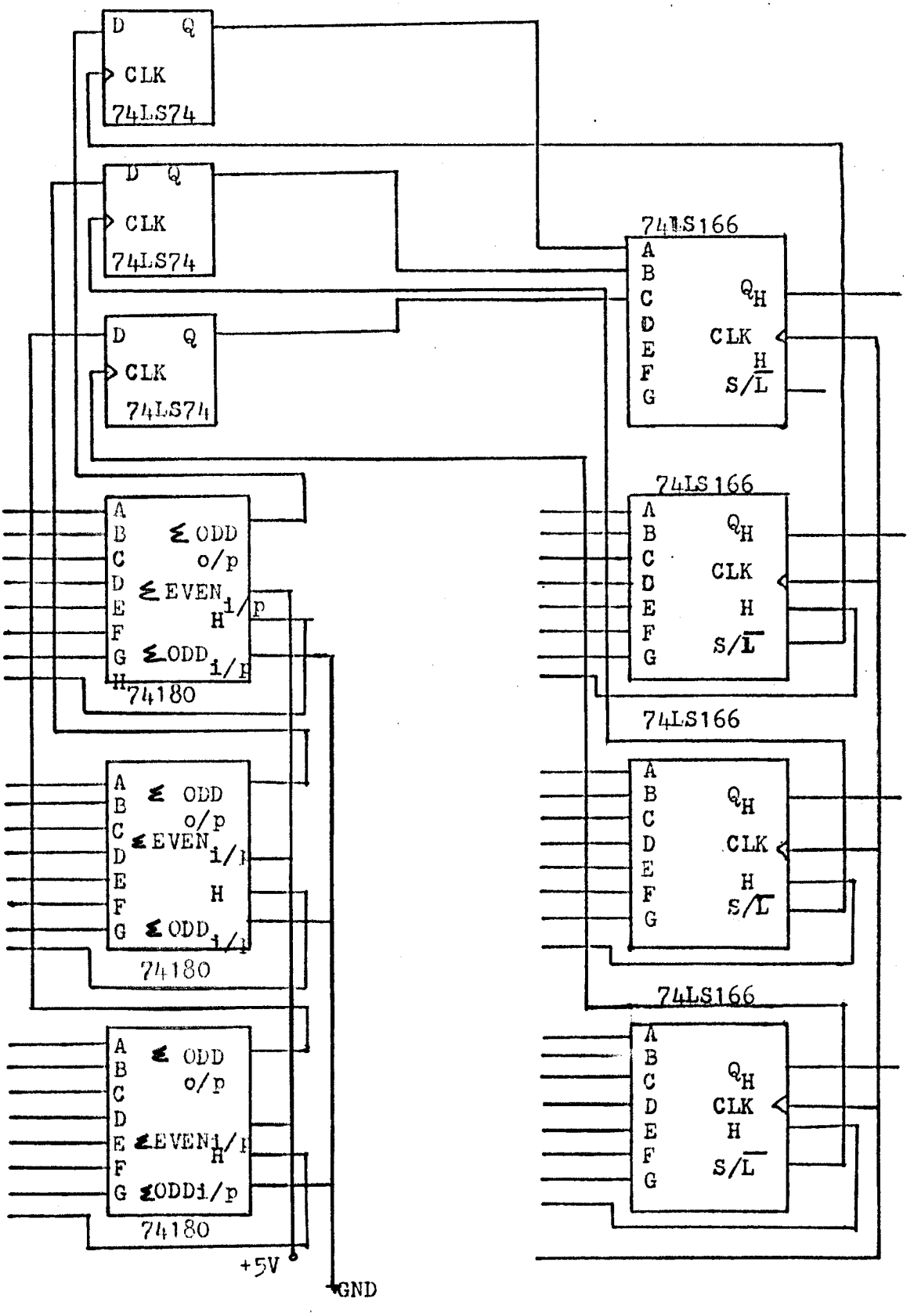
TRUTH TABLE

INPUTS		OUTPUTS			
B	A	Y_0	Y_1	Y_2	Y_3
0	0	0	0	0	1
0	1	1	0	0	0
1	0	0	1	0	0
1	1	0	0	1	0

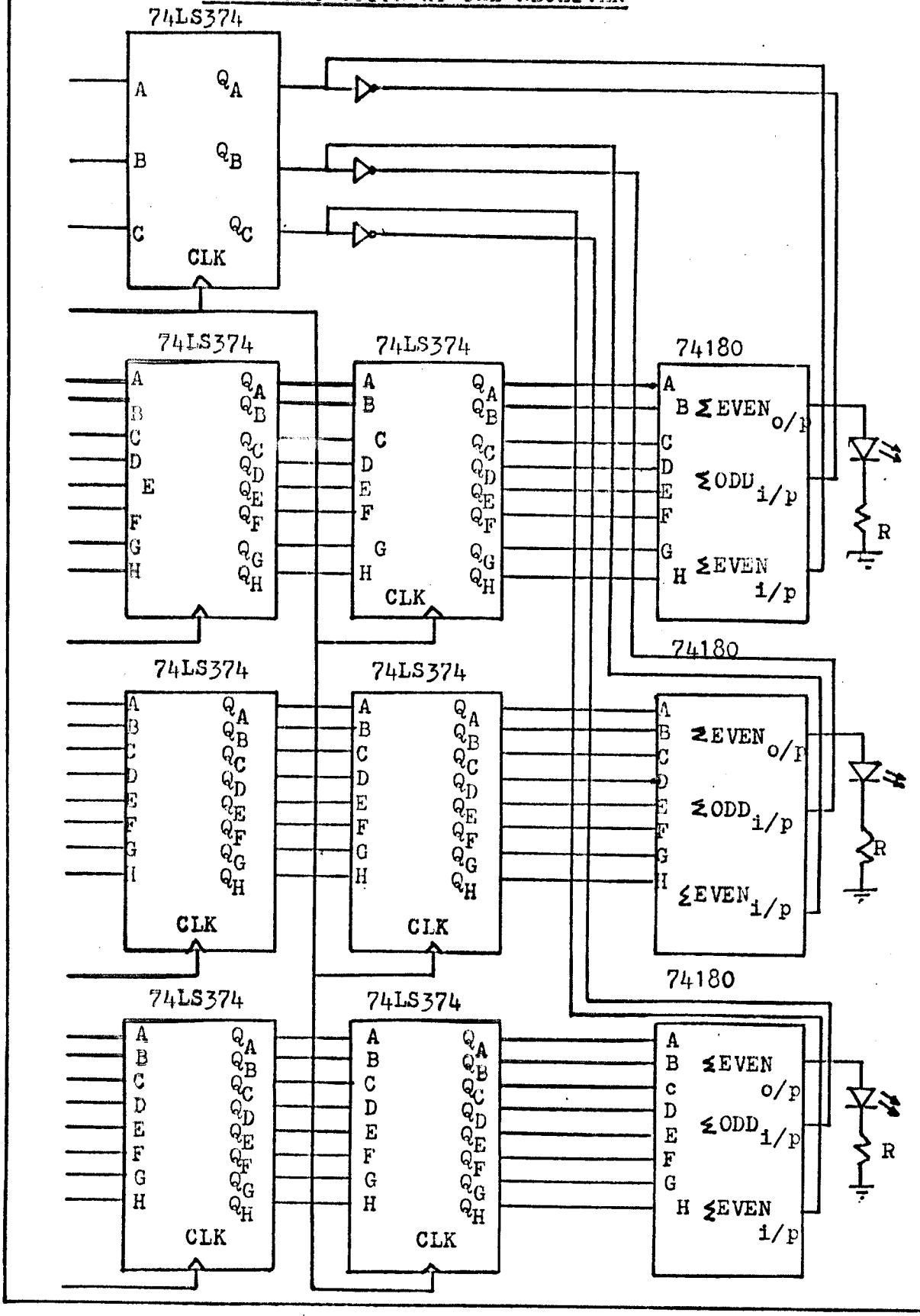
BLOCK DIAGRAM



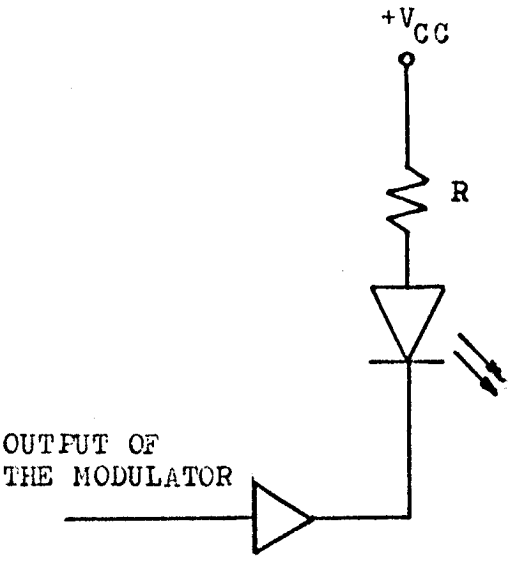
PARITY GENERATION AT THE TRANSMITTER



ERROR DETECTION AT THE RECEIVER



INTERFACING THE EMITTER



I_{FMAX} =100 mA
Operating at 70% of the maximum ratings

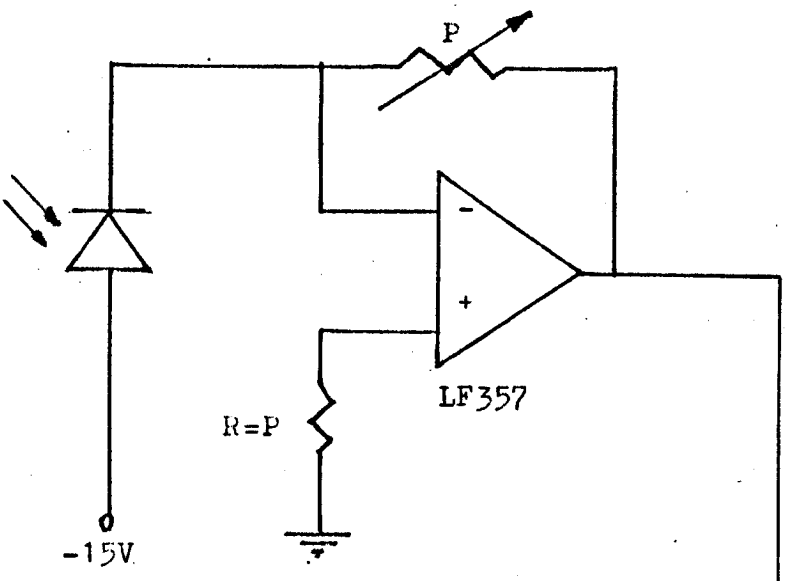
V_F (typ) = 1.6 V

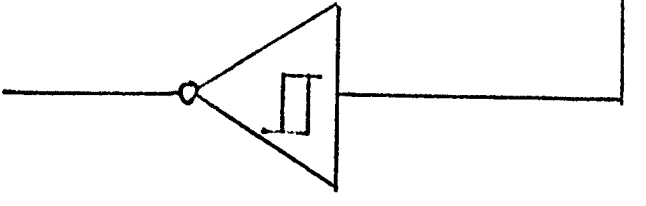
R= (V_{CC} - V_F - V_{CESAT})/ I_F

R = (5-1.6-0.2)/70 mA

= 45.71 Ω

INTERFACING THE DETECTOR





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