

BRITISH STANDARDS INSTITUTION

2 PARK STREET, LONDON. W1A 2BS

Specification available from:- AS SHOWN IN PD 9002
AND CECC 00 200 AND

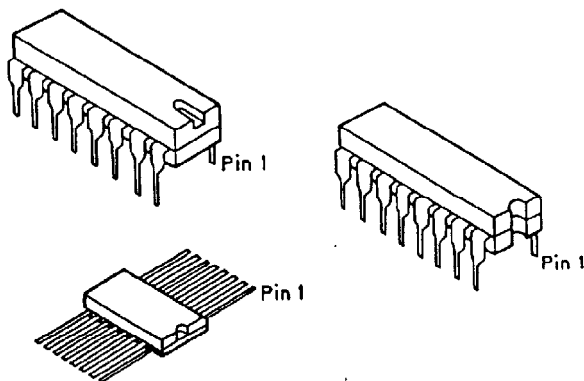
BS CECC 90103 - 045

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**ELECTRONIC COMPONENTS OF ASSESSED QUALITY
DETAIL SPECIFICATION IN ACCORDANCE WITH:**BS CECC 90 000 : 1976
BS CECC 90 100 : 1977**MANUFACTURERS TYPE NUMBER**54LS96
64LS96
74LS96
84LS96Outline not to scale: Isometric projection
Marking information see clause 1Refer to IEC 191-1-50a (type A50C)
Dual-in-Line (plastic or ceramic)
refer to Appendix A1.3
Flatpack (metal or ceramic)SEE PD 9002 AND CECC 00 200
For ordering information see
clause 1**5-BIT SHIFT REGISTER**TYPICAL CONSTRUCTION
SILICON MONOLITHIC
BIPOLAR TTL-LOW-POWER
SCHOTTKYASSESSMENT LEVELS
R, S, T AND V1. Type description

1.1 Truth table (see page 2)

Refer to Qualified Products List PD 9002 and/or CECC 00 200
for details of manufacturers approved to this specification

1.1 Truth table (contd)

INPUTS									OUTPUTS				
CLEAR	PRESET ENABLE	PRESETS					CLOCK	SERIAL	Q _A	Q _B	Q _C	Q _D	Q _E
		A	B	C	D	E							
L	L	X	X	X	X	X	X	X	L	L	L	L	L
L	X	L	L	L	L	L	X	X	L	L	L	L	L
H	H	H	H	H	H	H	X	X	H	H	H	H	H
H	H	L	L	L	L	L	L	X	Q _{AO}	Q _{BO}	Q _{CO}	Q _{DO}	Q _{EO}
H	H	H	L	H	L	H	L	X	H	Q _{BO}	H	Q _{DO}	H
H	L	X	X	X	X	X	L	X	Q _{AO}	Q _{BO}	Q _{CO}	Q _{DO}	Q _{EO}
H	L	X	X	X	X	X	↑	H	H	Q _{An}	Q _{Bn}	Q _{Cn}	Q _{Dn}
H	L	X	X	X	X	X	↑	L	L	Q _{An}	Q _{Bn}	Q _{Cn}	Q _{Dn}

H = High level

L = Low level

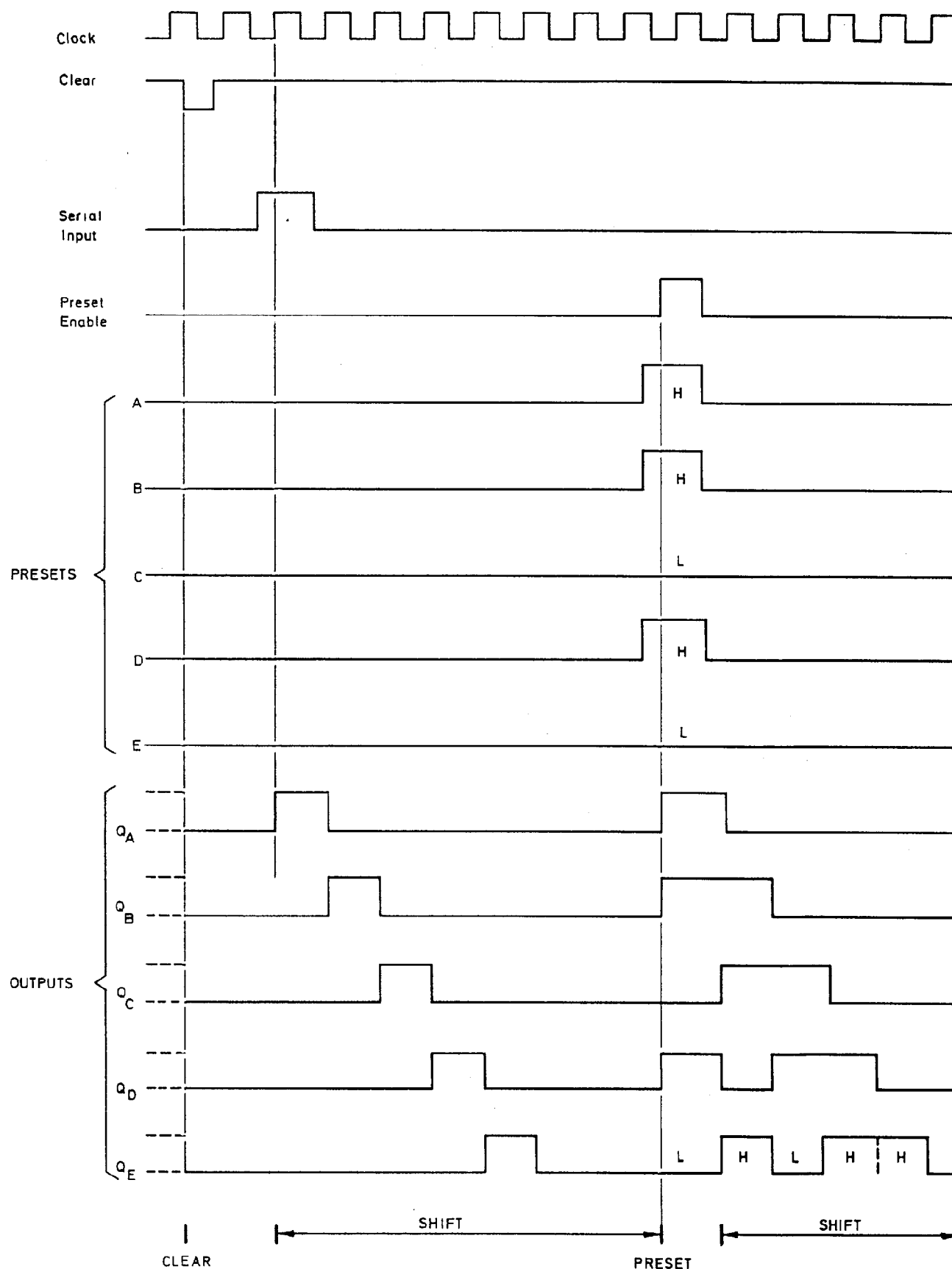
X = Logic level irrelevant

↑ = Transition from Low to High level

Q_{AO} Q_{EO} = The level of Q_A Q_E etc., respectively before the indicated steady level conditions are established

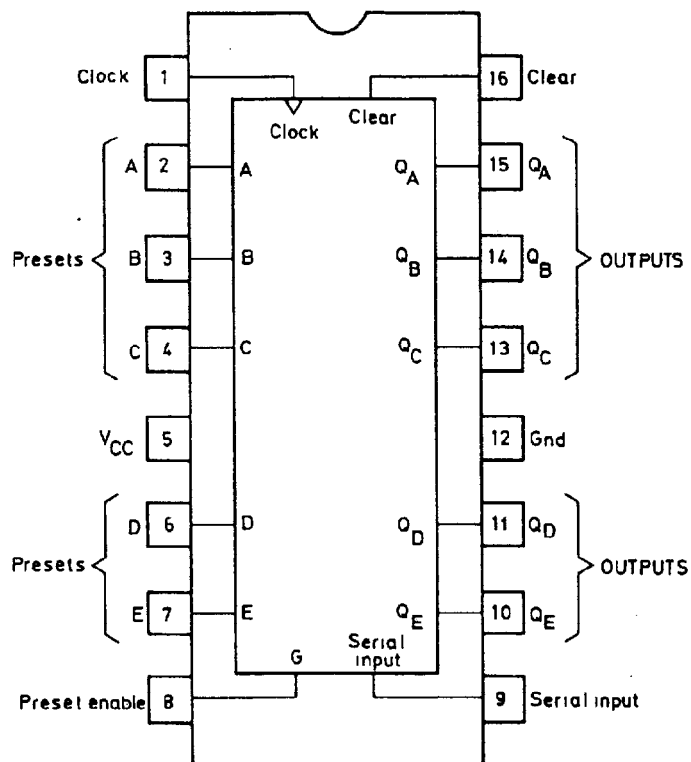
Q_{An} Q_{En} = The level of Q_A Q_E etc., respectively before the most recent ↑ transition of the clock

1.1.1 Typical operating waveform diagram



1.2 Terminal identification, type designation and marking

1.2.1 Terminal identification



5-bit shift register

1.2.2 Type designation

TEMPERATURE RANGE	PACKAGE		
	Ceramic Dual-in-Line	Plastic Dual-in-Line	Ceramic Flatpack
0 + 70	74LS96J	N	W
-25 + 85	84LS96J		
-40 + 85	64LS96J		
-55 +125	54LS96J		

1.2.3 Marking

Each integrated circuit shall bear the following markings:

- (1) Terminal identification
- (2) Type designation
- (3) Date code
- (4) Factory identification code (unless derived from trademark)
- (5) Manufacturers trade name or mark
- (6) Mark of conformity (unless a certificate of conformity is used)

1.3 Ordering information

Orders for these integrated circuits shall contain the following minimum information:

Manufacturers integrated circuit type designation, screening procedures and assessment levels as detailed to this CECC specification number.

(For details of screening procedures see Appendix A1.1).

2. Limiting conditions of use (not for inspection purposes)

2.1	Maximum continuous supply voltage	V_{CC}						-0,5V +7,0V
2.2	Maximum input voltages							
2.2.1	Maximum input voltage	V_I						-0,5V +7,0V
2.2.2	Maximum input voltage between multiple emitter transistor inputs	V_{II}						+5,5V
2.3	Minimum and maximum operating temperatures	$T_{amb}(^{\circ}C)$	min. max.	54LS -55 +125	64LS -40 +85	74LS 0 +70	84LS -25 +85	
2.4	Minimum and maximum storage temperatures	$T_{stg}(^{\circ}C)$	min. max.	-65 +150	(All types)			

3. Recommended operating conditions and associated characteristics (not for inspection purposes)

3.1 Recommended operating conditions.

These apply over the operating ambient temperature range unless otherwise stated.

3.1 (contd)

Description	Symbol	Type	Value	Unit
Positive supply voltage range	V_{CC}	54LS 64/74/84LS	4,5 - 5,5 4,75 - 5,25	V V
Minimum value of High level input voltage	V_{IHB}	All types	2,0	V
Maximum value of High level input voltage	V_{IHA}	All types	5,5	V
Minimum value of Low level input voltage	V_{ILB}	All types	-0,3	V
Maximum value of Low level input voltage	V_{ILA}	54LS 64/74/84LS	0,7 0,8	V V
Maximum value of Low level output current for each output	I_{OLA}	54LS 64/74/84LS	4,0 8,0	mA mA
Maximum value of output current for each output at V_{OH}	I_{OHA}	All types	-400,0	μA
DC noise margin at Low level ($V_{ILA} - V_{OLA}$) at High level ($V_{OHB} - V_{IHB}$)	V_{NL} V_{NH}	All types 54LS 64/74/84LS	0,3 0,5 0,7	V V V

3.2 Associated characteristics

3.2.1 Minimum and maximum values are given for the worst case operation over the ambient temperature range, except for those conditions marked with an asterisk (*)

	54LS	64LS	74LS	84LS	
T _{amb} min.	-55	-40	0	-25	°C
T _{amb} max.	+125	+85	+70	+85	
V _{CC} min.	4,5	4,75			V
V _{CC} max.	5,5	5,25			

3.2.2

Characteristics	Conditions	$V_{CC}(V)$	Symbol	Min.	Max.	Unit
Total supply current per package	Clear input grounded. All other inputs and outputs open.	V_{CC} max.	I_{CC}	-	20,0	mA
High level input current	$V_{IH(1)} = 7,0V$ Applied to each input in turn $V_{IH(2)} = 2,7V$ Applied to each input in turn	V_{CC} max.	$I_{IH(1)}$ $I_{IH(1)}$ $I_{IH(2)}$ $I_{IH(2)}$	- - - -	0,5 0,1 100,0 20,0	mA mA μA μA
Low level input current	$V_{IL} = 0,4V$ Applied to each input in turn	V_{CC} max.	$-I_{IL}$ $-I_{IL}$	- -	2,0 0,4	mA mA
Input clamping voltage	$-I_{IC} = 18,0mA$	V_{CC} min.	$-V_{ICA}$	-	1,5	V
Output voltage	$V_{IN} = V_{ILA}^*$ or 2,0V as appropriate** 54LS $I_{OH} = -400,0\mu A$ 64/74/84LS $I_{OH} = -400,0\mu A$ All types $I_{OL(1)} = 4,0mA$ (1) 64/74/84LS $I_{OL(2)} = 8,0mA$ (2)		V_{OH} V_{OH} $V_{OL(1)}$ $V_{OL(2)}$	2,5 2,7 - -	- - 0,4 0,5	V V V V
Output short circuit current	$V_O = 0V$ (3)	V_{CC} max.	$-I_{OS}$	15,0	130,0	mA
Propagation times	$T_{amb} = 25^\circ C^*$ test conditions as in Sub-group A5	5,0V	t_{PHL} t_{PHL} t_{PLH} t_{PLH}	- - - -	40,0 55,0 40,0 35,0	ns ns ns ns

- (1) Fan out = 10, (2) Fan out = 20,
(3) Only one output at a time, duration $t \leq 1$ sec
*See 3.2.1 of this specification
**Refer to truth table