

NEC
ELECTRON DEVICE

MOS DIGITAL INTEGRATED CIRCUIT

μ PD6300C

LATCH and DRIVER for FIP CMOS LSI

DESCRIPTION

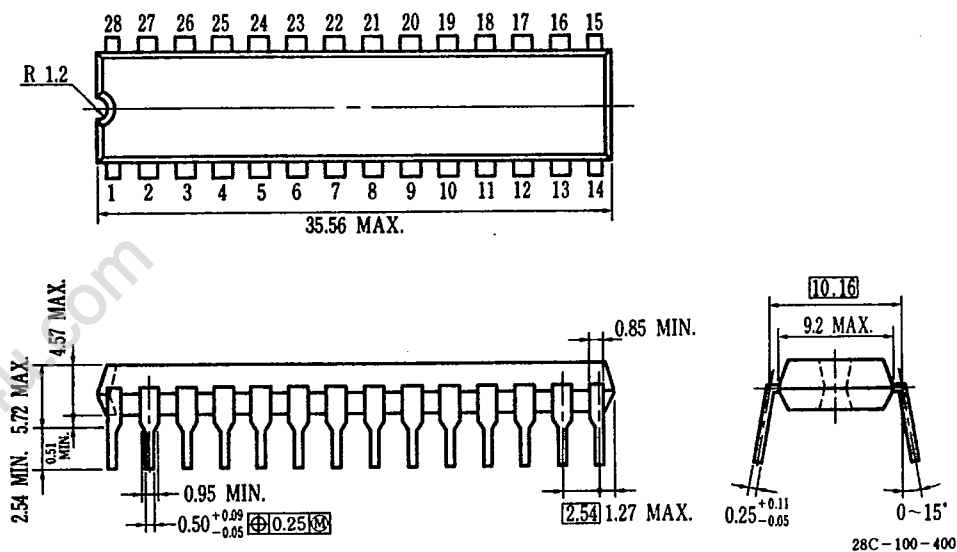
The μ PD6300C is a latch and driver CMOS IC for FIP (Fluorescent Indicator Panel). For multiplex wiring, the μ PD6300C is supplied with the serial interface circuit, 20 bit shift register, 20 bit data latch and 20 bit drivers. The serial data transfer from the data source to the μ PD6300C is accomplished with 3 or 4 signals.

FEATURES

- Serial Input 20 bit Shift Register Incorporated.
- 20 bit Output Data Latch Incorporated.
- 20 bit Output Drivers for FIP.
- Output Characteristics $V_{out} = 40$ V.
 $I_{out} = 5$ mA.
- Serial Interface Format: Compatible with NEC microcomputer.
- Brightness Control Enable: External Duty Control.
- Wide Operating Temperature Range $T_{opt} = -40$ to $+85$ °C.
- 28 PIN Plastic Molded Slim DIP (Dual In line Package).

PACKAGE DIMENSIONS (Unit: mm)

28PIN PLASTIC DIP(400mil)



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NEC Corporation

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ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Supply Voltage at VDD terminal	VDD	-0.3 to +7.0 *1	V
Input Voltage	VIN	-0.3 to VDD *1	V
Output Voltage (1~7, 15~27 Pins)	VO0 to VO19	-35 *1, *2	V
Output Current (1~7, 15~27 Pins)	IO0 to IO19	-5	mA
Operating Temperature Range	Topt	-40 to +85	°C
Storage Temperature Range	Tstg	-55 to +125	°C

Notes: *1; These Voltage are referenced to the VSS.

*2; VDD = 5 V

RECOMMENDED OPERATING CONDITIONS

	CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
	Operating Temperature Range	Topt	-40		+85	°C
	Operating Supply Voltage	VDD	4.5	5.0	5.5	V
*3	Output Voltage (1~7, 15~27 Pins)	VO0 to VO19		-22	-35	V
	Output Current (1~7, 15~27 Pins)	IO0 to IO19		-2.0	-5.0	mA
	Input Voltage High	VIH	0.7 VDD		VDD	V
	Input Voltage Low	VIL	VSS		0.3 VDD	V
	SCK Frequency	fSCK			500	kHz
*4	SCK Cycle Time	tKCY	2.0			μs
*4	SCK High Level Pulse Width	tKH	0.9			μs
*4	SCK Low Level Pulse Width	tKL	0.9			μs
*4	SI Setup Time to SCK↓	tSIK	0.4			μs
*4	SI Hold Time	tKSI	0.4			μs
*5	CS↓→SCK↓ Valid Time	tCSL	0			μs
*5	CS↓→SCK↓ Valid Time	tCSH	0.9			μs
*5	SCK→LH↓ Valid Time	tSKL	0			μs
*5	LH Low Level Pulse Width	tLL	1.8			μs
*5	LH↑→CS↑ Valid Time	tLHC	0.9			μs
*6	LH Delay Time	tLHD			1.9	μs

Notes: *3; These Voltage are referenced to the VDD.

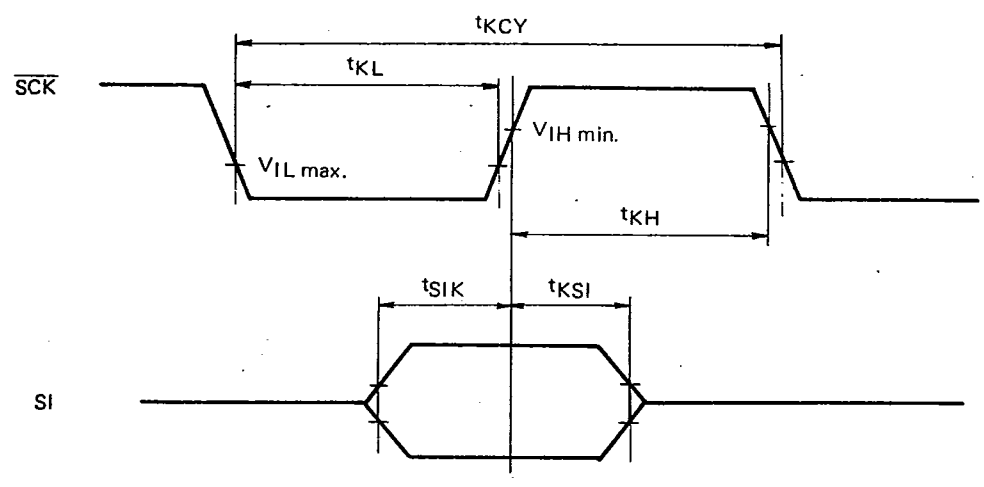
*4; See Fig. 1

*5; See Fig. 2

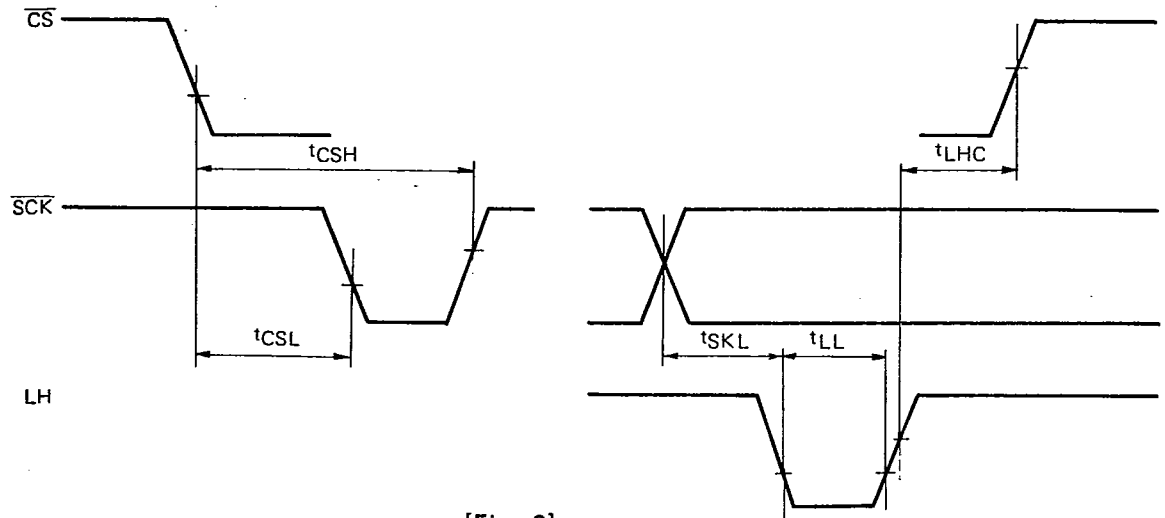
*6; See Fig. 3

ELECTRICAL CHARACTERISTICS (Recommended Operating Conditions)

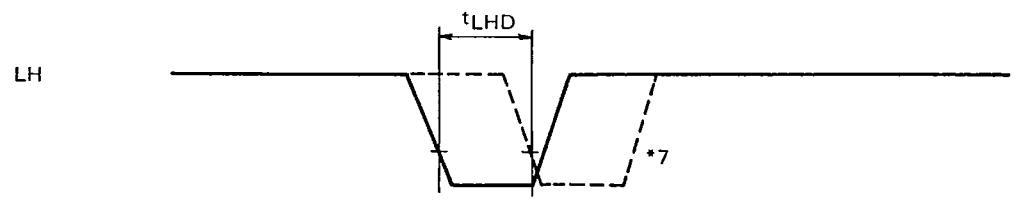
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITION
Input Leakage Current	I_{IL}			± 10	μA	$V_{IN}=V_{SS}$ or V_{DD}
SO Output Voltage High	V_{SOH}	$V_{DD}-1$			V	$I_{SOH}=-1$ mA
SO Output Voltage Low	V_{SOL}			0.4	V	$I_{SOL}=0.8$ mA
Output Voltage High (1~7, 15~27 Pins)	V_O	$V_{DD}-15$			V	$I_O=-5$ mA O ₀ to O ₁₉ Output
Output Leakage Current (1~7, 15~27 Pins)	I_{OLL1}			1.0	μA	$V_O=-10$ V
	I_{OLL2}			10.0	μA	$V_O=-20$ V
Supply Current at V_{DD} Terminal	I_{DD}			1	mA	$V_{DD}=5.5$ V All Input = [High] All Output = Open
\overline{SCK}_i → SO Valid Time	t_{KSO}			0.5	μs	See Fig. 4
Input Capacitance	C_{IN}			15	pF	f=1 MHz



[Fig. 1]

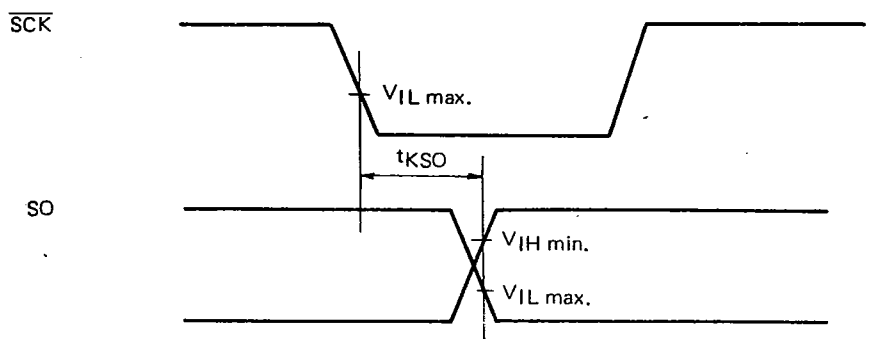


[Fig. 2]



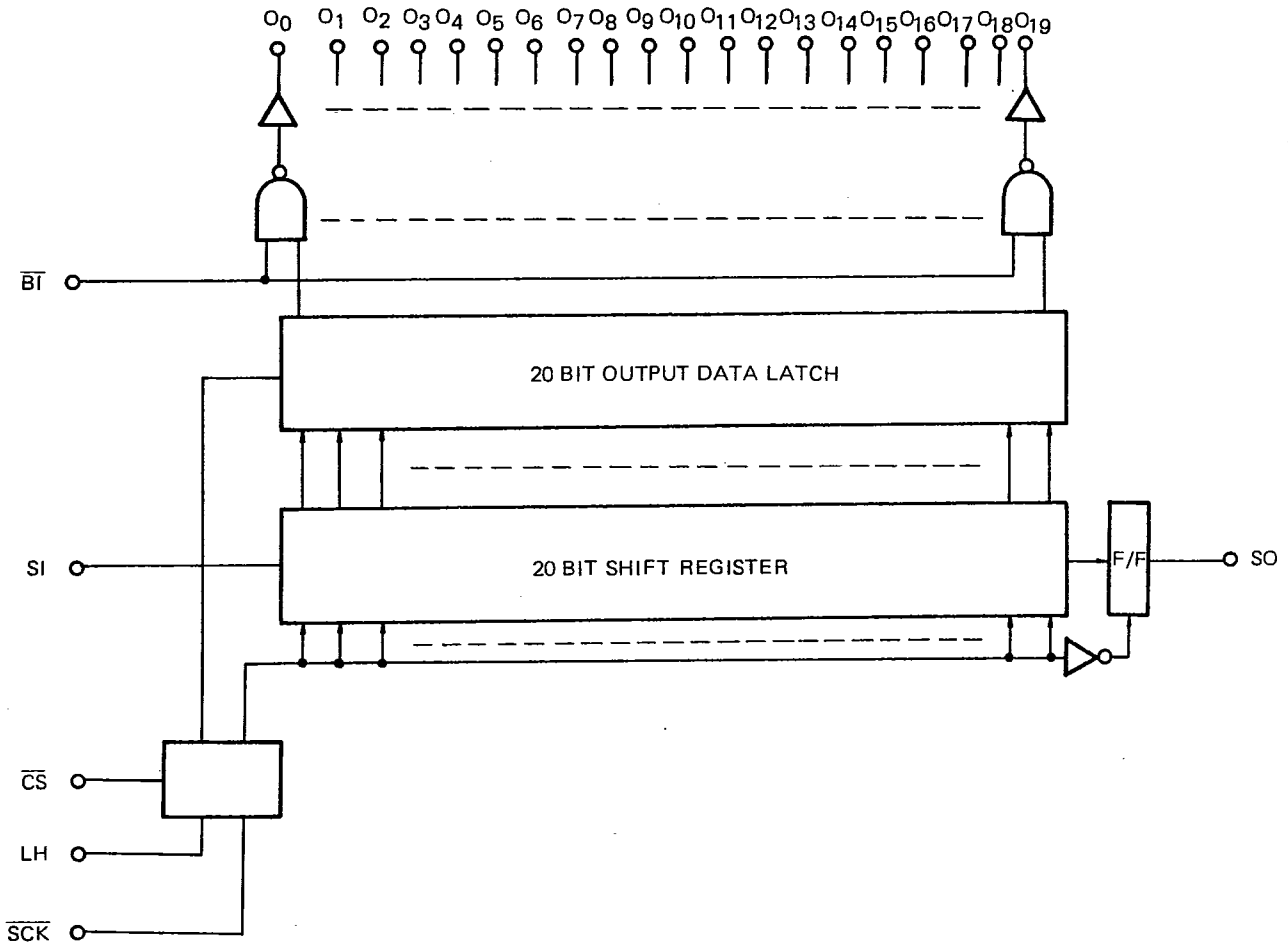
Note: *7; Internal Delay

[Fig. 3]



[Fig. 4]

BLOCK DIAGRAM



μPD6300C

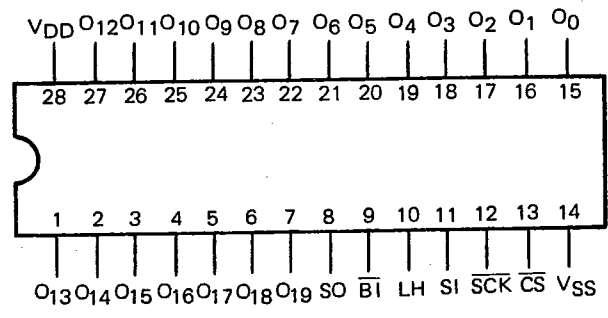
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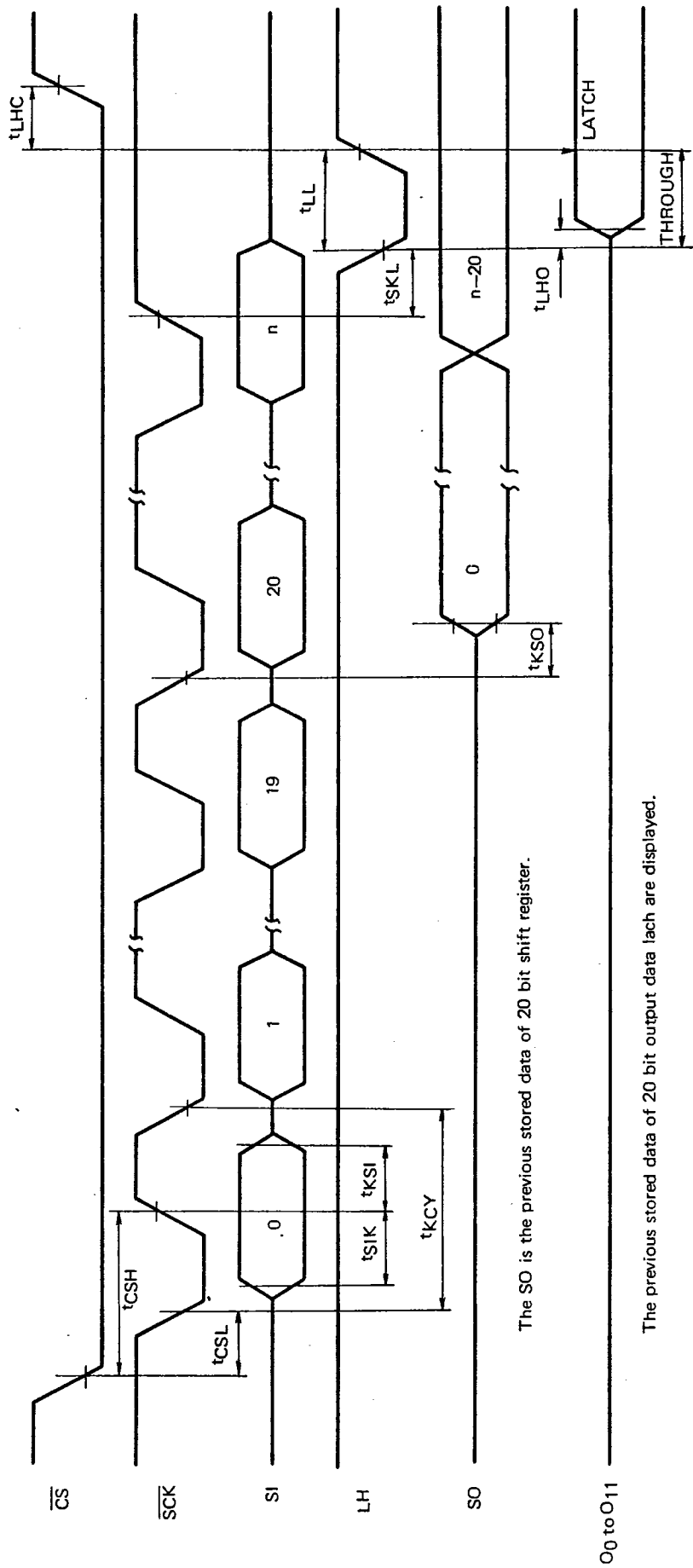
PIN CONNECTION (Top View)



FUNCTION

- O₀ ~ O₁₉** : Output, P ch MOS Open Drain
These 20 Outputs are the Outputs of 20 bit output data latch and can drive FIP directly.
- $\overline{\text{BI}}$** : Blanking Input
When "L" level signal is supplied to the BI, O₀ to O₁₉ are disable.
"H" : O₀ to O₁₉ are active.
- LH** : Latch and Hold Input
When "L" level signal is supplied to the LH,
The data of 20 bit shift register are normally transfered the 20 bit output data latch.
At the time of the rising edge of LH; the data of 20 bit output data latch are hold.
"H" ; The data of 20 bit output data latch are protected.
- SI** : Serial Data Input
- $\overline{\text{SCK}}$** : Serial Clock Input
The SI data are read and stored in the 20 bit shift register at the rising edge of $\overline{\text{SCK}}$.
- SO** : Serial Data Output. CMOS push-pull
The SO is a signal of serial output data from 20 bit sift register.
- $\overline{\text{CS}}$** : Chip Select Input
When the CS is "L" level, the LH and $\overline{\text{SCK}}$ are active.

TIMING CHART

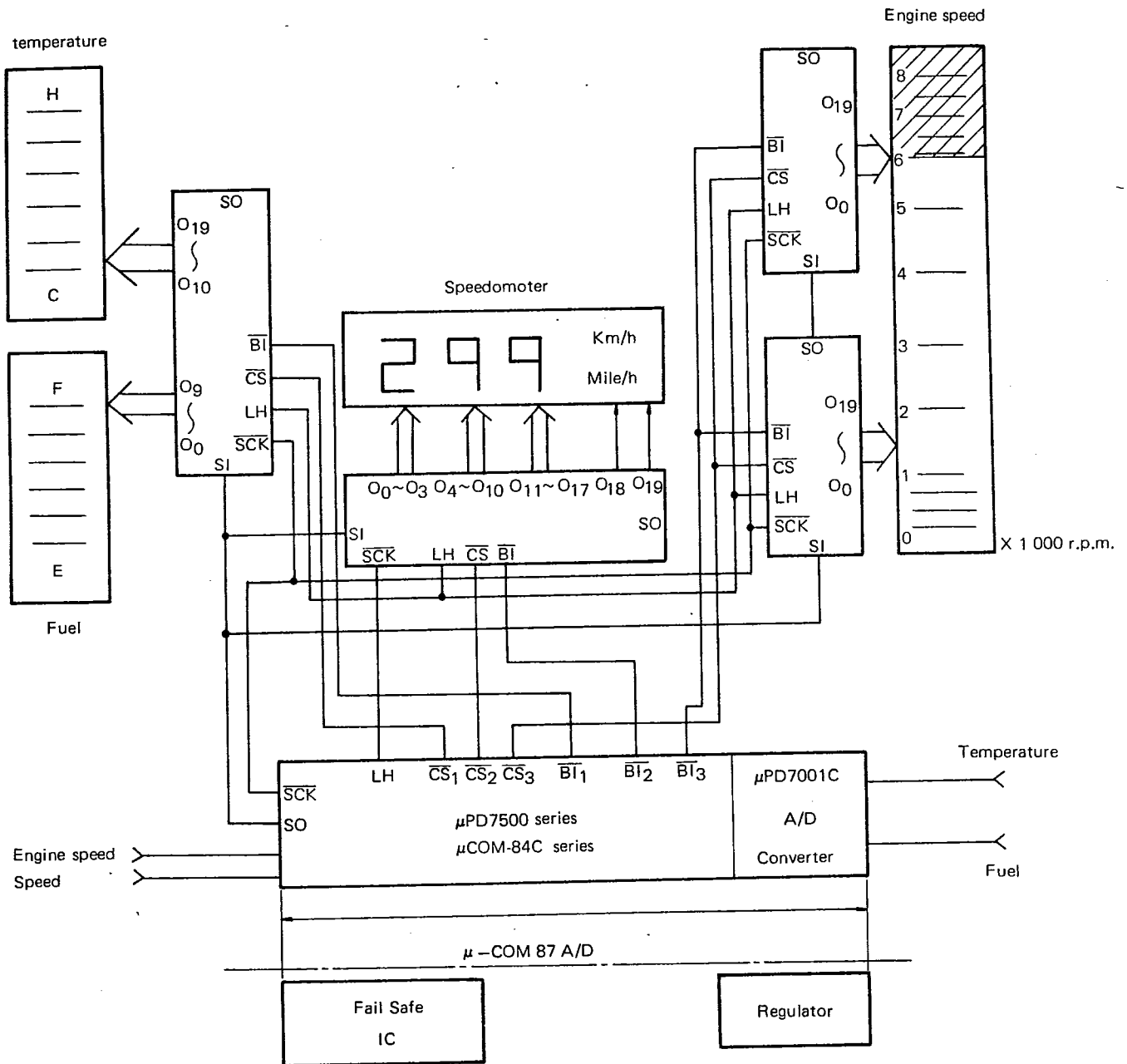


The SO is the previous stored data of 20 bit shift register.

The previous stored data of 20 bit output data lach are displayed.

APPLICATION CIRCUIT

AUTOMOTIVE DASHBOARD SYSTEM



EXAMPLE OF SOFTWARE

Using of serial I/O of μ-COM75 series

Subroutine of 24 bit data transfer

SI OUT : ANP 6, 0BH

: LH LI 05H

LOOP : LAM HL⁻

TAM SIO

SIO

SKI 2

JCP \$-2

DLS

JCP LOOP

ANP 6, 7

ORP 6, 8

ORP 6, 4

RT

RAM (ADD)				
	3	2	1	0
00H	03	02	01	00
01H	07	06	05	04
02H	011	010	09	08
03H	015	014	013	012
04H	019	018	017	016
05H	023	022	021	020

P62 - CS

P63 - LH

