PHILIPS

Data handbook

Electronic components and materials

Integrated circuits

Book
IC05N 1984
New series

HE4000B logic family - uncased ICs - CMOS

HE4000B LOGIC FAMILY UNCASED INTEGRATED CIRCUITS

CMOS

NOTICE This book is published as part of the new series of data handbooks; see page vii for details.

DATA HANDBOOK SYSTEM

Our Data Handbook System comprises more than 50 books with specifications on electronic components, subassemblies and materials. It is made up of four series of handbooks:

ELECTRON TUBES	BLUE
SEMICONDUCTORS	RED
INTEGRATED CIRCUITS	PURPLE
COMPONENTS AND MATERIALS	GREEN

The contents of each series are listed on pages iv to viii.

The data handbooks contain all pertinent data available at the time of publication, and each is revised and reissued periodically.

When ratings or specifications differ from those published in the preceding edition they are indicated with arrows in the page margin. Where application information is given it is advisory and does not form part of the product specification.

Condensed data on the preferred products of Philips Electronic Components and Materials Division is given in our Preferred Type Range catalogue (issued annually).

Information on current Data Handbooks and on how to obtain a subscription for future issues is available from any of the Organizations listed on the back cover.
Product specialists are at your service and enquiries will be answered promptly.

ELECTRON TUBES (BLUE SERIES)

The blue series of data handbooks comprises:

T1 **Tubes for r.f. heating**

T2a **Transmitting tubes for communications, glass types**

T2b **Transmitting tubes for communications, ceramic types**

T3 **Klystrons, travelling-wave tubes, microwave diodes**

ET3 **Special Quality tubes, miscellaneous devices** (will not be reprinted)

T4 **Magnetrons**

T5 **Cathode-ray tubes**
Instrument tubes, monitor and display tubes, C.R. tubes for special applications

T6 **Geiger-Müller tubes**

T7 **Gas-filled tubes**
Segment indicator tubes, indicator tubes, dry reed contact units, thyratrons, industrial rectifying tubes, ignitrons, high-voltage rectifying tubes, associated accessories

T8 **Picture tubes and components**
Colour TV picture tubes, black and white TV picture tubes, colour monitor tubes for data graphic display, monochrome monitor tubes for data graphic display, components for colour television, components for black and white television and monochrome data graphic display

T9 **Photo and electron multipliers**
Photomultiplier tubes, phototubes, single channel electron multipliers, channel electron multiplier plates

T10 **Camera tubes and accessories**

T11 **Microwave semiconductors and components**

T12 **Vidicons and Newvicons**

T13 **Image intensifiers**

T14 **Infrared detectors**

SEMICONDUCTORS (RED SERIES)

The red series of data handbooks comprises:

S1 **Diodes**
Small-signal germanium diodes, small-signal silicon diodes, voltage regulator diodes($< 1{,}5$ W), voltage reference diodes, tuner diodes, rectifier diodes

S2 **Power diodes, thyristors, triacs**
Rectifier diodes, voltage regulator diodes ($> 1{,}5$ W), rectifier stacks, thyristors, triacs

S3 **Small-signal transistors**

S4a **Low-frequency power transistors and hybrid modules**

S4b **High-voltage and switching power transistors**

S5 **Field-effect transistors**

S6 **R.F. power transistors and modules**

S7 **Microminiature semiconductors for hybrid circuits**

S8 **Devices for optoelectronics**
Photosensitive diodes and transistors, light-emitting diodes, displays, photocouplers, infrared sensitive devices, photoconductive devices.

S9 **Power MOS transistors**

S10 **Wideband transistors and wideband hybrid IC modules**

INTEGRATED CIRCUITS (PURPLE SERIES)

The purple series of data handbooks comprises:

EXISTING SERIES

IC1 **Bipolar ICs for radio and audio equipment**

IC2 **Bipolar ICs for video equipment**

IC3 **ICs for digital systems in radio, audio and video equipment**

IC4 **Digital integrated circuits**
CMOS HE4000B family

IC5 **Digital integrated circuits – ECL**
ECL10 000 (GX family), ECL100 000 (HX family), dedicated designs

IC6 **Professional analogue integrated circuits**

IC7 **Signetics bipolar memories**

IC8 **Signetics analogue circuits**

IC9 **Signetics TTL logic**

IC10 **Signetics Integrated Fuse Logic (IFL)**

IC11 **Microprocessors, microcomputers and peripheral circuitry**

NEW SERIES

IC01N	**Radio, audio and associated systems** Bipolar, MOS	
IC02N	**Video and associated systems** Bipolar, MOS	
IC03N	**Telephony equipment** Bipolar, MOS	
IC04N	**HE4000B logic family** CMOS	
IC05N	**HE4000B logic family uncased integrated circuits** CMOS	(published 1984)
IC06N	**PC54/74HC/HCU/HCT logic families** HCMOS	
IC07N	**PC54/74HC/HCU/HCT uncased integrated circuits** HCMOS	
IC08N	**10K and 100K logic family** ECL	
IC09N	**54/74: STD, LS, S, F logic series** TTL	
IC10N	**Memories** MOS, TTL, ECL	
IC11N	**Analogue - industrial**	
IC12N	**Semi-custom gate arrays & cell libraries** ISL, ECL, CMOS	
IC13N	**Semi-custom integrated fuse logic** IFL series 20/24/28	
IC14N	**Microprocessors, microcontrollers & peripherals** Bipolar, MOS	

Note

Books available in the new series are shown with their date of publication.

COMPONENTS AND MATERIALS (GREEN SERIES)

The green series of data handbooks comprises:

C1 **Assemblies for industrial use**
PLC modules, PC20 modules, HNIL FZ/30 series, NORbits 60-, 61-, 90-series, input devices, hybrid ICs

C2 **Television tuners, video modulators, surface acoustic wave filters**

C3 **Loudspeakers**

C4 **Ferroxcube potcores, square cores and cross cores**

C5 **Ferroxcube for power, audio/video and accelerators**

C6 **Synchronous motors and gearboxes**

C7 **Variable capacitors**

C8 **Variable mains transformers**

C9 **Piezoelectric quartz devices**
Quartz crystal units, temperature compensated crystal oscillators, compact integrated oscillators, quartz crystal cuts for temperature measurements

C10 **Connectors**

C11 **Non-linear resistors**
Voltage dependent resistors (VDR), light dependent resistors (LDR), negative temperature coefficient thermistors (NTC), positive temperature coefficient thermistors (PTC)

C12 **Variable resistors and test switches**

C13 **Fixed resistors**

C14 **Electrolytic and solid capacitors**

C15 **Film capacitors, ceramic capacitors**

C16 **Permanent magnet materials**

C17 **Stepping motors and associated electronics**

C18 **D.C. motors**

C19 **Piezoelectric ceramics**

C20 **Wire-wound components**

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flip-flops

Counters

Registers

FUNCTIONAL INDEX (continued)

Special functions

Octal circuits

NUMERICAL INDEX

NUMERICAL INDEX (continued)

GENERAL

Introduction

The uncased integrated circuits detailed in this publication are all of the CMOS HE4000 family. For full technical data, reference should be made to the equivalent packaged integrated circuit in data handbook Digital Integrated Circuits CMOS HE4000B Family.

Explanation of device data

The device data sheets in this publication are presented in numerical order of the device number.

The following information is given for each device:

Pad location diagram. The bonding pads are identified in the same number sequence as that used for the pinning of the equivalent packaged integrated circuit. When one or more of the package pins are not used, the unused numbers are omitted from the pad numbering sequence. When the die has pads which are not to be connected, this fact is stated on the diagram. The location of the die number is included to aid identification and orientation of the die.

Functional diagram and list of pad functions. Together these items provide a summary of the functional aspects of the integrated circuit. For full technical data, reference should be made to data handbook Digital Integrated Circuits – CMOS HE4000B Family.

Information block. This gives the commercial number of the device, the catalogue number for ordering, the die number for identification and the size of the die in millimetres (all dies have a nominal thickness of 380 μm).

QUALITY SPECIFICATION

Uncased integrated circuits of the HE4000U series are subjected to a quality assurance procedure which embraces visual inspection, electrical testing and physical checking. The specifications applied are MIL-STD 883 C, method 2010.2(B) for the visual inspection and MIL-STD 105 D for the sampling system. All fabrication and packing is performed in a temperature and contamination-controlled environment.

Visual inspection

A sampling inspection at 100 x magnification is performed at the wafer stage of manufacture. The acceptable quality level (AQL) is 4% rejection.

Electrical testing

All dies are 100% circuit probed at the wafer stage in an environmental temperature of 25 °C. Functional test vectors are adapted for CMOS and the d.c. parameter testing meets criteria specified over the full operating temperature range.

Although the a.c. parameters of the dies are not tested, our batch-release procedure using process-control modules gives products that well meet the published limit values for speed.

Incoming inspection guarantees are summarized as follows:

inoperatives (full temperature range)	AQL = 0,25%
d.c. rejects (full temperature range)	AQL = 1,0%
a.c. rejects (at 25 °C)	AQL = 0,65%

Physical characteristics

Glass passivation	all dies are surface coated with a silicon-nitride layer
Bonding pads	minimum dimension of exposed metallization is 90 x 90 μm
Metallization	aluminium with 1% silicon additive
Die thickness	380 μm nominal
Die size	see individual data sheets
Die backing	silicon oxide as diffused; needs no extra bonding wire to the V_{DD} pad

Traceability

Each batch is delivered with a batch identification number on the packaging. With this number the manufacturing data concerning the particular batch can be traced.

HANDLING UNCASED MOS DEVICES

Assembly considerations

The dies are processed and packed in an environment that is temperature and contimination controlled. It is recommended that unpacking and assembly be performed in similarly controlled conditions. Any contamination from environment or assembly process may adversely affect reliability and should therefore be avoided.

Dies are non-gold backed and the recommended method of mounting is by use of an epoxide adhesive. Suitable adhesives are Dupont conductive silver paste number 6838, 5504A or equivalent. These adhesives should be cured at temperatures between 185 and 200 ^{o}C for a minimum of 75 minutes. In any case, the manufacturers' recommendations for storage and use of the adhesive should be followed.

Eutectic die bonding techniques may be used and for this gold pellets are recommended. It is advisable not to exceed a peak temperature of 420 ^{o}C.

Electrostatic discharge

Precautions should be taken to avoid damage through electrostatic discharge. This is particularly important during assembly and when handling assembled equipment. Additional safety can be obtained by bonding the V_{DD} pad first, the remaining pads may then be bonded to their external connections in any order.

ORDERING INFORMATION

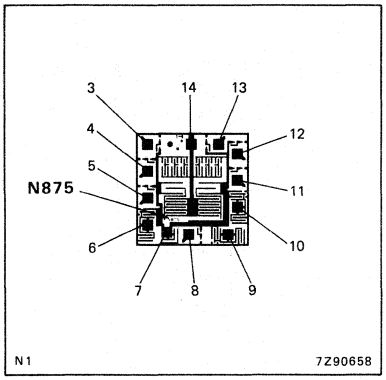
Each device data sheet in this publication contains a twelve-number catalogue reference. When ordering, quote this catalogue number and the quantity required.

type number	catalogue number	type number	catalogue number
HEF4000BU	9333 735 20000	HEF4047BU	9333 738 50000
HEF4001BU	9333 735 30000	HEF4049BU	9333 738 60000
HEF4001UBU	9336 229 30000	HEF4050BU	9333 738 70000
HEF4002BU	9333 735 40000	HEF4051BU	9333 738 80000
HEF4006BU	9333 735 50000	HEF4052BU	9333 738 90000
HEF4007UBU	9333 735 60000	HEF4053BU	9333 739 00000
HEF4008BU	9333 735 70000	HEF4059BU	9336 229 50000
HEF4011BU	9333 735 80000	HEF4060BU	9336 229 60000
HEF4011UBU	9336 229 40000	HEF4066BU	9333 739 10000
HEF4012BU	9333 735 90000	HEF4067BU	9333 739 20000
HEF4013BU	9333 736 00000	HEF4068BU	9333 739 30000
HEF4014BU	9333 736 10000	HEF4069UBU	9333 739 40000
HEF4015BU	9333 736 20000	HEF4070BU	9333 739 50000
HEF4016BU	9333 736 30000	HEF4071BU	9333 739 60000
HEF4017BU	9333 736 40000	HEF4072BU	9333 739 70000
HEF4018BU	9333 736 50000	HEF4073BU	9333 739 80000
HEF4019BU	9333 736 60000	HEF4075BU	9333 739 90000
HEF4020BU	9333 736 70000	HEF4076BU	9333 740 00000
HEF4021BU	9333 736 80000	HEF4077BU	9333 740 10000
HEF4022BU	9333 736 90000	HEF4078BU	9333 740 20000
HEF4023BU	9333 737 00000	HEF4081BU	9333 740 30000
HEF4024BU	9333 737 10000	HEF4082BU	9333 740 40000
HEF4025BU	9333 737 20000	HEF4085BU	9333 740 50000
HEF4027BU	9333 737 30000	HEF4086BU	9333 740 60000
HEF4028BU	9333 737 40000	HEF4093BU	9333 740 70000
HEF4029BU	9333 737 50000	HEF4094BU	9334 066 70000
HEF4030BU	9333 737 60000	HEF4104BU	9333 740 80000
HEF4031BU	9333 737 70000	HEF4502BU	9333 716 20000
HEF4035BU	9333 737 80000	HEF4505BU	9333 716 30000
HEF4040BU	9333 737 90000	HEF4508BU	9334 067 00000
HEF4041BU	9333 738 00000	HEF4510BU	9333 716 40000
HEF4042BU	9333 738 10000	HEF4511BU	9333 716 50000
HEF4043BU	9333 738 20000	HEF4512BU	9333 716 60000
HEF4044BU	9333 738 30000	HEF4514BU	9333 716 70000
HEF4046BU	9333 738 40000	HEF4515BU	9333 716 80000

ORDERING INFORMATION (continued)

type number	catalogue number	type number	catalogue number
HEF4516BU	9333 716 90000	HEF4750VU	9336 171 70000
HEF4517BU	9334 067 40000	HEF4751VU	9336 171 80000
HEF4518BU	9333 717 00000	HEF4753VU	9336 230 40000
HEF4519BU	9333 717 10000	HEF4754VU	9336 230 50000
HEF4520BU	9333 717 20000	HEF4755VU	9336 230 60000
HEF4521BU	9334 067 80000	HEF40097BU	9333 789 60000
HEF4522BU	9334 068 20000	HEF40098BU	9333 789 70000
HEF4526BU	9334 068 60000	HEF40106BU	9334 069 70000
HEF4527BU	9336 229 70000	HEF40160BU	9333 789 80000
HEF4528BU	9333 717 30000	HEF40161BU	9333 789 90000
HEF4531BU	9333 714 40000	HEF40162BU	9333 790 00000
HEF4532BU	9333 788 40000	HEF40163BU	9333 790 10000
HEF4534BU	9334 068 90000	HEF40174BU	9333 790 20000
HEF4538BU	9336 207 30000	HEF40175BU	9333 790 30000
HEF4539BU	9333 788 50000	HEF40192BU	9333 790 40000
HEF4541BU	9336 229 80000	HEF40193BU	9333 790 50000
HEF4543BU	9333 788 60000	HEF40194BU	9333 790 60000
HEF4555BU	9333 788 70000	HEF40195BU	9333 790 70000
HEF4556BU	9333 788 80000	HEF40240BU	9337 275 00000
HEF4557BU	9333 788 90000	HEF40244BU	9336 612 60000
HEF4585BU	9333 789 00000	HEF40245BU	9337 275 10000
HEF4720VU	9336 230 70000	HEF40373BU	9337 275 20000
HEF4724BU	9333 789 30000	HEF40374BU	9336 612 70000
HEF4731VU	9336 229 90000		
HEF4737VU	9336 230 00000		

DUAL 3-INPUT NOR GATE AND INVERTER



(numbers 1 and 2 are not used)

Fig. 1 Pad location diagram.

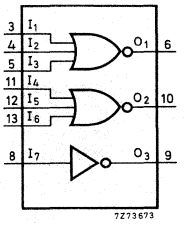


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4000BU
catalogue number	9333 735 20000
die number	N875
die size (mm)	1,14 x 1,12

QUADRUPLE 2-INPUT NOR GATE

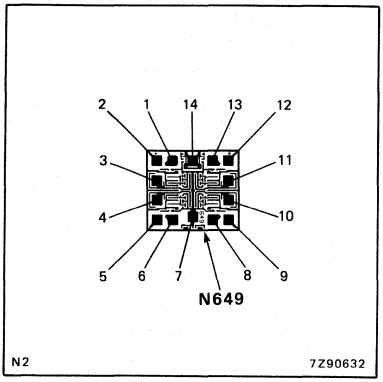


Fig. 1 Pad location diagram.

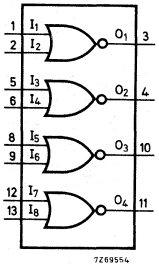


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4001BU
catalogue number	9333 735 30000
die number	N649
die size (mm)	0,86 x 0,98

QUADRUPLE 2-INPUT NOR GATE; UNBUFFERED

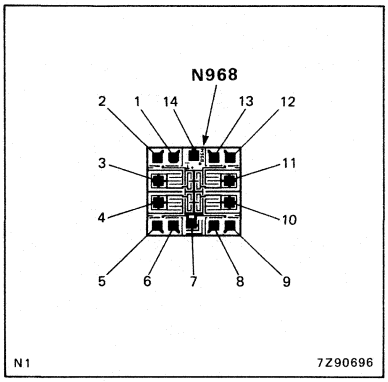


Fig. 1 Pad location diagram.

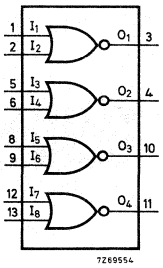


Fig. 2 Functional diagram.

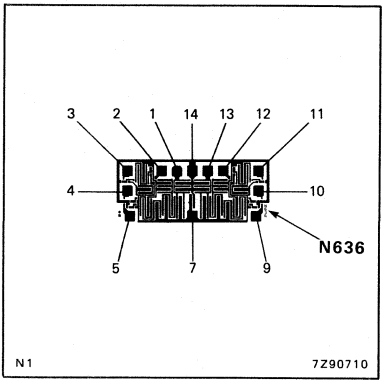
Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4001UBU
catalogue number	9336 229 30000
die number	N968
die size (mm)	0,95 x 0,98

DUAL 4-INPUT NOR GATE



(numbers 6 and 8 are not used)

Fig. 1 Pad location diagram.

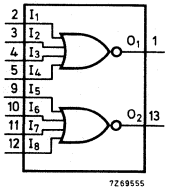


Fig. 2 Functional diagram.

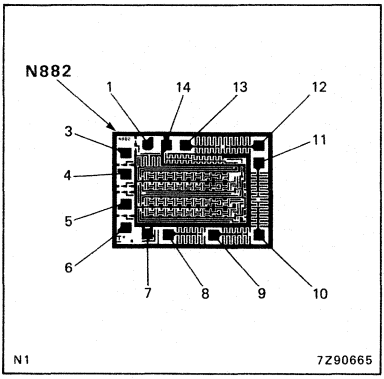
Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4002BU
catalogue number	9333 735 40000
die number	N636
die size (mm)	1,60 x 0,74

18-STAGE STATIC SHIFT REGISTER



(number 2 is not used)

Fig. 1 Pad location diagram.

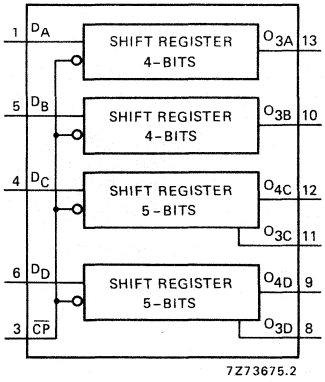


Fig. 2 Functional diagram.

Pad functions

D_A to D_D	data inputs
$\overline{CP}$	clock input (HIGH to LOW; edge-triggered)
O_{3A} to O_{3D}; O_{4C}; O_{4D}	data outputs
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

commercial number	HEF4006BU
catalogue number	9333 735 50000
die number	N882
die size (mm)	1,58 x 1,20

DUAL COMPLEMENTARY PAIR AND INVERTER

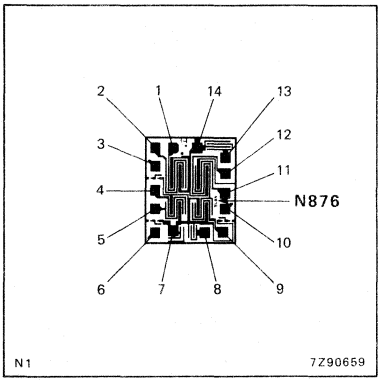


Fig. 1 Pad location diagram.

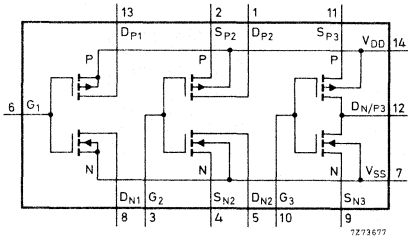


Fig. 2 Functional diagram.

Pad functions

S_{P2}, S_{P3}	source connections to the 2nd and 3rd p-channel transistors
D_{P1}, D_{P2}	drain connections from the 1st and 2nd p-channel transistors
D_{N1}, D_{N2}	drain connections from the 1st and 2nd n-channel transistors
S_{N2}, S_{N3}	source connections to the 2nd and 3rd n-channel transistors
$D_{N/P3}$	common connection to the 3rd p-channel and n-channel transistor drains
G_1 to G_3	gate connections to n-channel and p-channel of the three transistor pairs
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

commercial number	HEF4007UBU
catalogue number	9333 735 60000
die number	N876
die size (mm)	1,10 x 0,97

4-BIT BINARY FULL ADDER

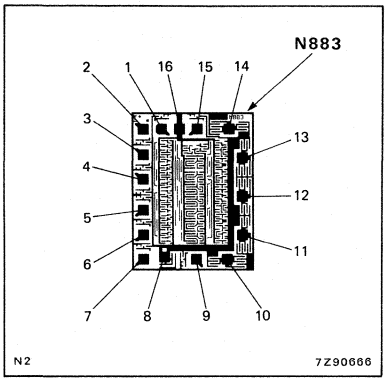


Fig. 1 Pad location diagram.

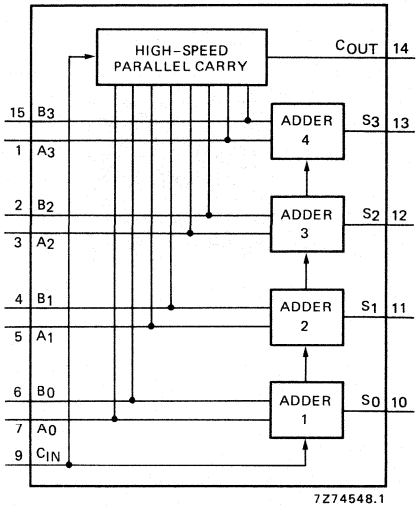


Fig. 2 Functional diagram.

Pad functions

A_0 to A_3	data inputs
B_0 to B_3	data inputs
S_0 to S_3	sum outputs
C_{IN}	carry input
C_{OUT}	carry output
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercail number	HEF4008BU
catalogue number	9333 735 70000
die number	N883
die size (mm)	1,57 x 1,20

QUADRUPLE 2-INPUT NAND GATE

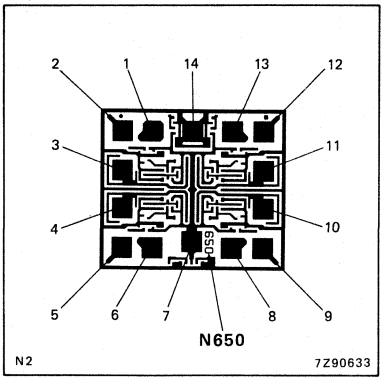


Fig. 1 Pad location diagram.

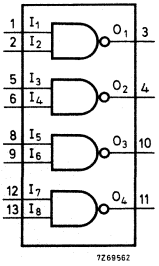


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4011BU
catalogue number	9333 735 80000
die number	N650
die size (mm)	0,86 x 0,98

QUADRUPLE 2-INPUT NAND GATE; UNBUFFERED

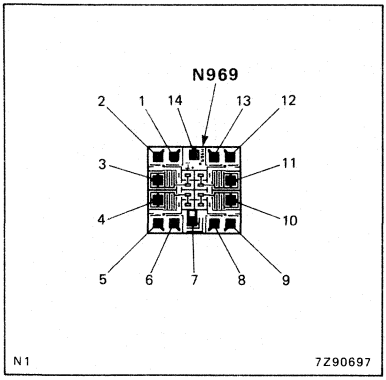


Fig. 1 Pad location diagram.

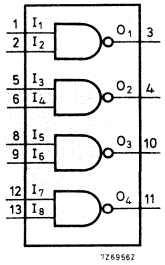


Fig. 2 Functional diagram.

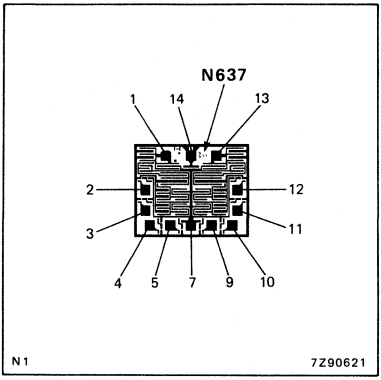
Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4011UBU
catalogue number	9336 229 40000
die number	N969
die size (mm)	0,94 x 0,98

DUAL 4-INPUT NAND GATE



(numbers 6 and 8 are not used)

Fig. 1 Pad location diagram.

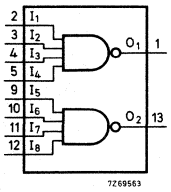


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4012BU
catalogue number	9333 735 90000
die number	N637
die size (mm)	1,21 x 1,00

DUAL D-TYPE FLIP-FLOP

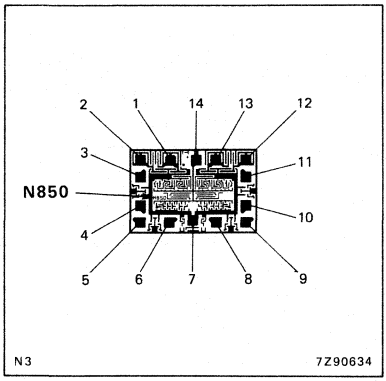


Fig. 1 Pad location diagram.

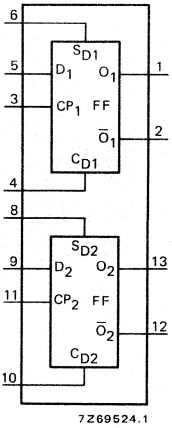


Fig. 2 Functional diagram.

Pad functions

D	data inputs
CP	clock input (L to H edge-triggered)
S_D	asynchronous set-direct input (active HIGH)
C_D	asynchronous clear-direct input (active HIGH)
O	true output
$\overline{O}$	complement output
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

commercial number	HEF4013BU
catalogue number	9333 736 00000
die number	N850
die size (mm)	0,89 x 1,28

8-BIT STATIC SHIFT REGISTER

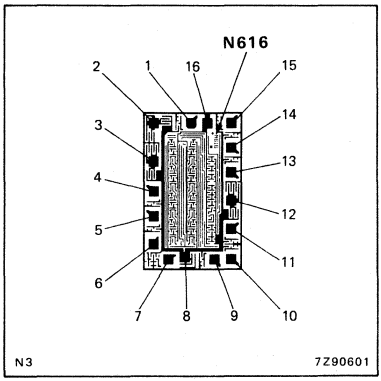


Fig. 1 Pad location diagram.

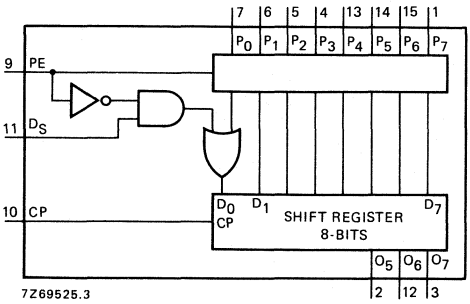


Fig. 2 Functional diagram.

Pad functions

PE	parallel enable input
P_0 to P_7	parallel data inputs
D_S	serial data input
CP	clock input (LOW to HIGH edge-triggered)
O_5 to O_7	buffered parallel outputs from the last three stages
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4014BU
catalogue number	9333 736 10000
die number	N616
die size (mm)	1,60 x 1,05

DUAL 4-BIT STATIC SHIFT REGISTER

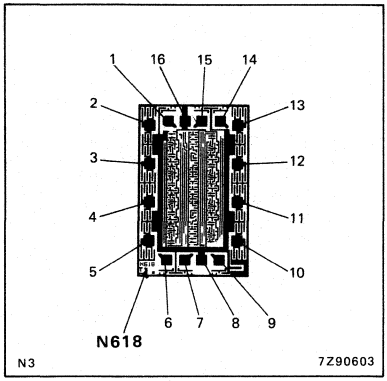


Fig. 1 Pad location diagram.

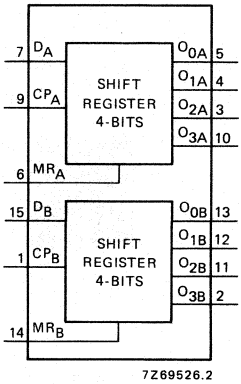


Fig. 2 Functional diagram.

Pad functions

D_A, D_B	serial data input
MR_A, MR_B	master reset input (active HIGH)
CP_A, CP_B	clock input (LOW-to-HIGH edge-triggered)
O_{0A}, O_{1A}, O_{2A}, O_{3A}	parallel outputs
O_{0B}, O_{1B}, O_{2B}, O_{3B}	parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4015BU
catalogue number	9333 736 20000
die number	N618
die size (mm)	1,70 x 1,10

QUADRUPLE BILATERAL SWITCHES

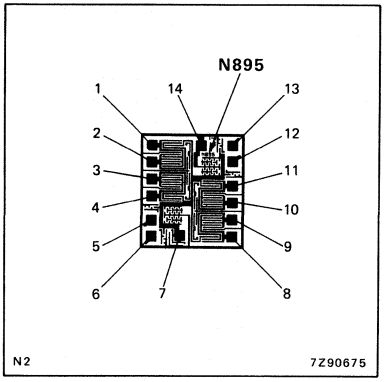


Fig. 1 Pad location diagram.

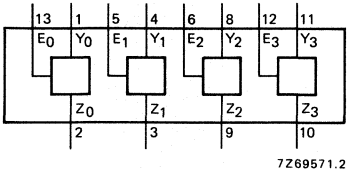


Fig. 2 Functional diagram.

Pad functions

E_0 to E_3	enable inputs
Y_0 to Y_3	input/output terminals
Z_0 to Z_3	input/output terminals
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

commercial number	HEF4016BU
catalogue number	9333 736 30000
die number	N895
die size (mm)	1,18 x 1,08

5-STAGE JOHNSON COUNTER

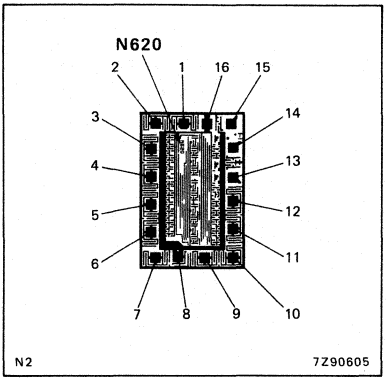


Fig. 1 Pad location diagram.

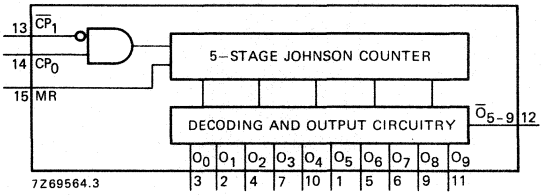


Fig. 2 Functional diagram.

Pad functions

CP_0	clock input (LOW to HIGH triggered)
$\overline{CP}_1$	clock input (HIGH to LOW triggered)
MR	master reset input
O_0 to O_9	decoded outputs
$\overline{O}_{5-9}$	carry output (active LOW)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4017BU
catalogue number	9333 736 40000
die number	N620
die size (mm)	1,62 x 1,10

PRESETTABLE DIVIDE-BY-N COUNTER

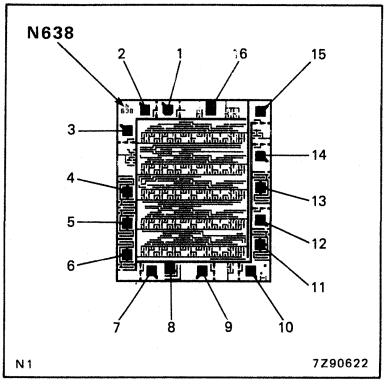


Fig. 1 Pad location diagram.

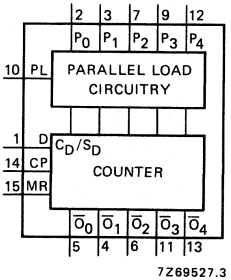


Fig. 2 Functional diagram.

Pad functions

PL	parallel load input
P_0 to P_4	parallel inputs
D	data input
CP	clock input (LOW to HIGH edge triggered)
MR	master reset input
$\overline{O}_0$ to $\overline{O}_4$	buffered output (active LOW)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4018BU
catalogue number	9333 736 50000
die number	N638
die size (mm)	1,84 x 1,58

QUADRUPLE 2-INPUT MULTIPLEXER

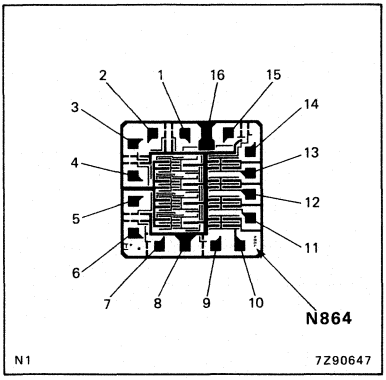


Fig. 1 Pad location diagram.

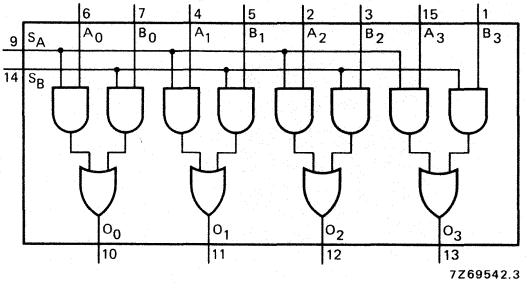


Fig. 2 Functional diagram.

Pad functions

S_A, S_B	select inputs (active HIGH)
A_0 to A_3	multiplexer inputs
B_0 to B_3	multiplexer inputs
O_0 to O_3	multiplexer outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4019BU
catalogue number	9333 736 60000
die number	N864
die size (mm)	1,42 x 1,40

14-STAGE BINARY COUNTER

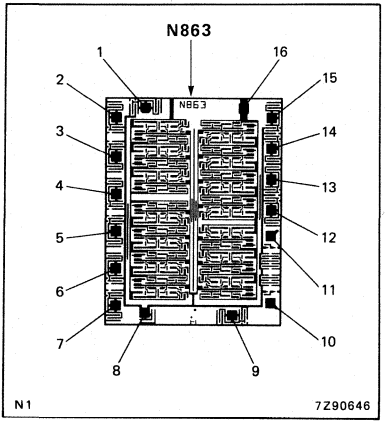


Fig. 1 Pad location diagram.

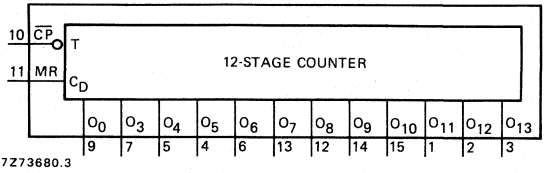


Fig. 2 Functional diagram.

Pad functions

$\overline{CP}$	clock input (HIGH to LOW edge triggered)
MR	master reset input (active HIGH)
O_0, O_3 to O_{13}	parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4020BU
catalogue number	9333 736 70000
die number	N863
die size (mm)	2,30 x 1,80

8-BIT STATIC SHIFT REGISTER

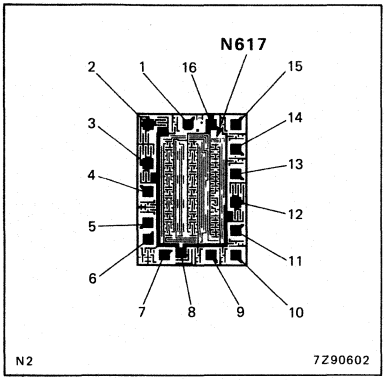


Fig. 1 Pad location diagram.

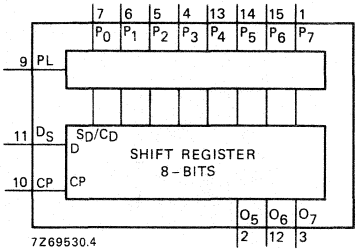


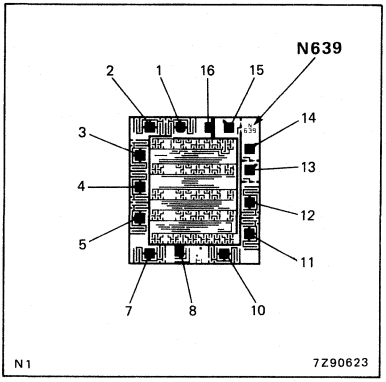
Fig. 2 Functional diagram.

Pad functions

PL	parallel load input
P_0 to P_7	parallel data inputs
D_S	serial data input
CP	clock input (LOW to HIGH edge-triggered)
O_5 to O_7	buffered parallel outputs from the last three stages
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4021BU
catalogue number	9333 736 80000
die number	N617
die size (mm)	1,52 x 1,10

4-STAGE DIVIDE-BY-8 JOHNSON COUNTER



(numbers 6 and 9 are not used)

Fig. 1 Pad location diagram.

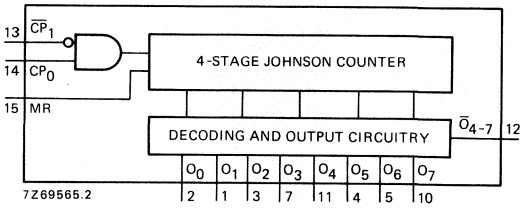


Fig. 2 Functional diagram.

Pad functions

CP_0	clock input (LOW to HIGH; edge-triggered)
$\overline{CP}_1$	clock input (HIGH to LOW; edge-triggered)
MR	master reset input
O_0 to O_7	decoded outputs
$\overline{O}_{4-7}$	carry output (active LOW)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4022BU
catalogue number	9333 736 90000
die number	N639
die size (mm)	1,52 x 1,36

TRIPLE 3-INPUT NAND GATE

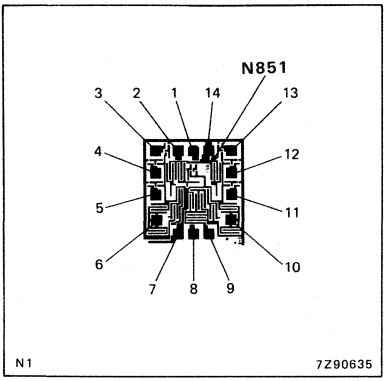


Fig. 1 Pad location diagram.

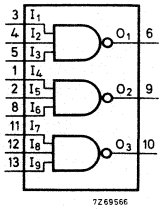


Fig. 2 Functional diagram.

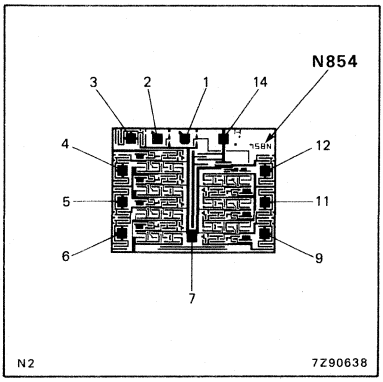
Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4023BU
catalogue number	9333 737 00000
die number	N851
die size (mm)	1,10 x 1,02

7-STAGE BINARY COUNTER



(numbers 8, 10 and 13 are not used)

Fig. 1 Pad location diagram.

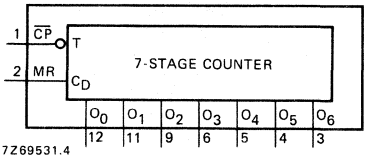


Fig. 2 Functional diagram.

Pad functions

$\overline{CP}$	clock input (HIGH to LOW triggered)
MR	master reset input
O_0 to O_6	buffered parallel outputs
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

commercial number	HEF4024BU
catalogue number	9333 737 10000
die number	N854
die size (mm)	1,66 x 1,28

TRIPLE 3-INPUT NOR GATE

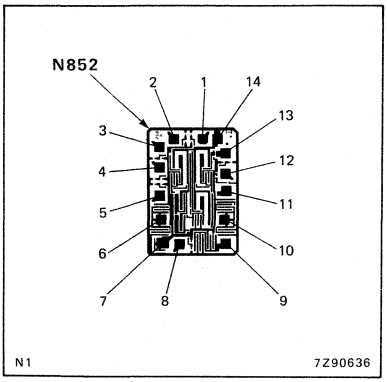


Fig. 1 Pad location diagram.

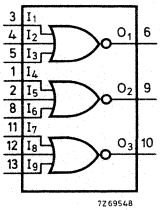


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4025BU
catalogue number	9333 737 20000
die number	N852
die size (mm)	1,36 x 0,98

DUAL JK FLIP-FLOP

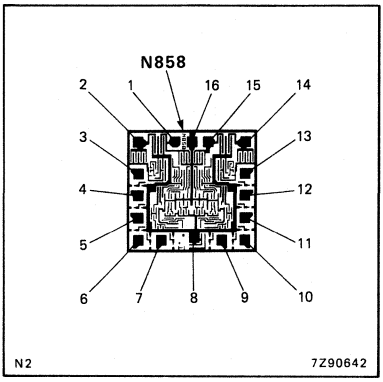


Fig. 1 Pad location diagram.

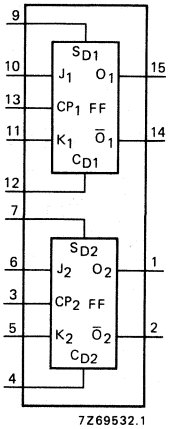


Fig. 2 Functional diagram.

Pad functions

J, K	synchronous inputs
CP	clock input (LOW to HIGH edge-triggered)
S_D	asynchronous set-direct input (active HIGH)
C_D	asynchronous clear-direct input (active HIGH)
O	true output
$\overline{O}$	complement output
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4027BU
catalogue number	9333 737 30000
die number	N858
die size (mm)	1,34 x 1,26

1-OF-10 DECODER

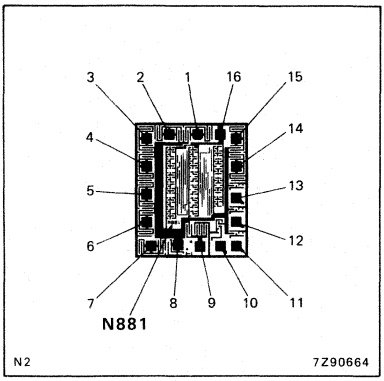


Fig. 1 Pad location diagram.

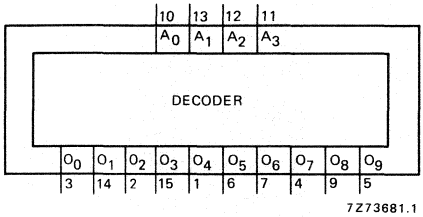


Fig. 2 Functional diagram.

Pad functions

A_0 to A_3	address inputs, 1-2-4-8 BCD
O_0 to O_9	outputs (active HIGH)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4028BU
catalogue number	9333 737 40000
die number	N881
die size (mm)	1,40 x 1,17

SYNCHRONOUS UP/DOWN, BINARY/DECADE COUNTER

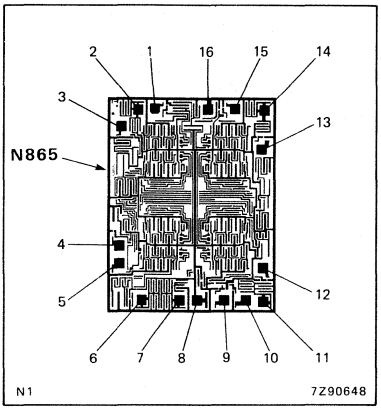


Fig. 1 Pad location diagram.

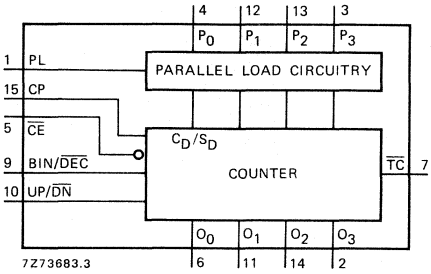


Fig. 2 Functional diagram.

Pad functions

PL	parallel load input
P_0 to P_3	parallel data inputs
BIN/$\overline{DEC}$	binary/decade control input
UP/$\overline{DN}$	up/down control input
$\overline{CE}$	count enable input (active LOW)
CP	clock input (LOW to HIGH, edge triggered)
O_0 to O_3	buffered parallel outputs
$\overline{TC}$	terminal count output (active LOW)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4029BU
catalogue number	9333 737 50000
die number	N865
die size (mm)	2,18 x 1,74

QUADRUPLE EXCLUSIVE-OR GATE

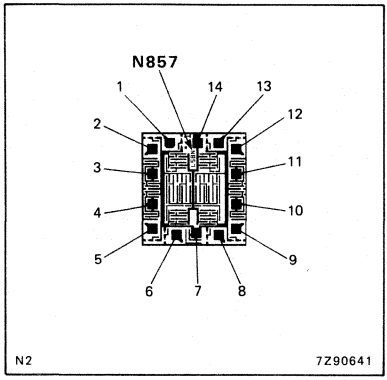


Fig. 1 Pad location diagram.

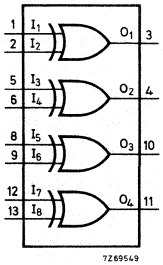


Fig. 2 Functional diagram.

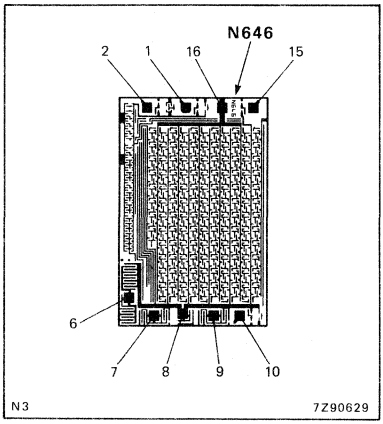
Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4030BU
catalogue number	9333 737 60000
die number	N857
die size (mm)	1,20 x 1,10

64-STAGE STATIC SHIFT REGISTER



(numbers 3, 4, 5, 11, 12, 13 and 14 are not used)

Fig. 1 Pad location diagram.

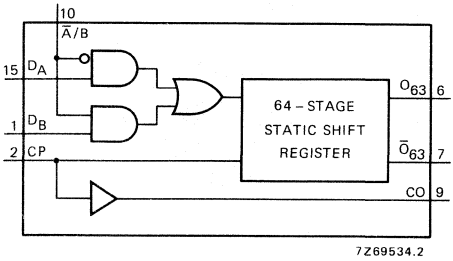


Fig. 2 Functional diagram.

Pad functions

D_A, D_B	data inputs
$\overline{A}/B$	data select input
CP	clock input (LOW to HIGH edge-triggered)
CO	buffered clock output
O_{63}	buffered output from the 64th stage
$\overline{O}_{63}$	complementary buffered output from the 64th stage
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4031BU
catalogue number	9333 737 70000
die number	N646
die size (mm)	2,30 x 1,54

4-BIT UNIVERSAL SHIFT REGISTER

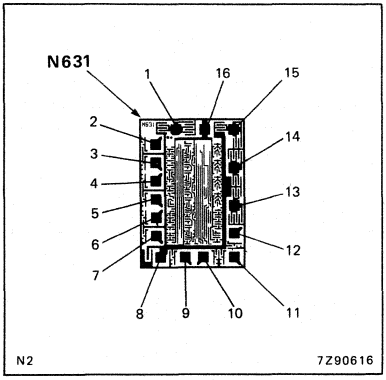


Fig. 1 Pad location diagram.

Pad functions

PE	parallel enable input
P_0 to P_3	parallel data inputs
J	first stage J-input (active HIGH)
$\overline{K}$	first stage K-input (active LOW)
CP	clock input (LOW to HIGH edge-triggered)
$T/\overline{C}$	true/complement input
MR	master reset input
O_0 to O_3	buffered parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

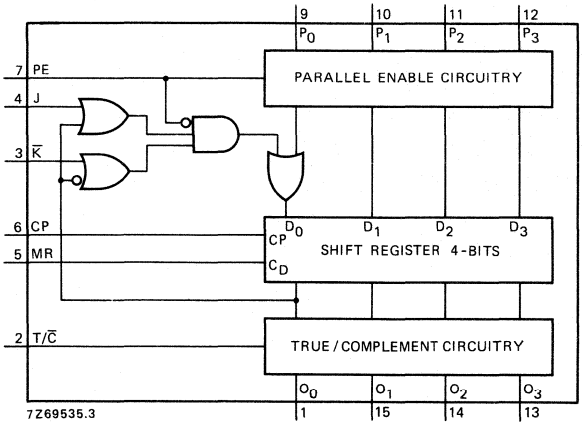


Fig. 2 Functional diagram.

commercial number	HEF4035BU
catalogue number	9333 737 80000
die number	N631
die size (mm)	1,52 x 1,08

12-STAGE BINARY COUNTER

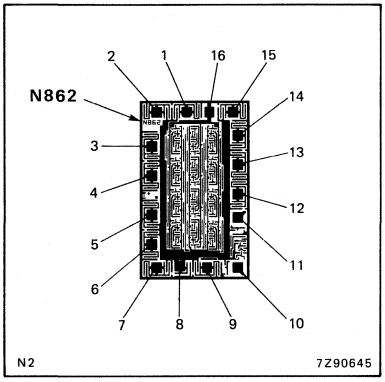


Fig. 1 Pad location diagram.

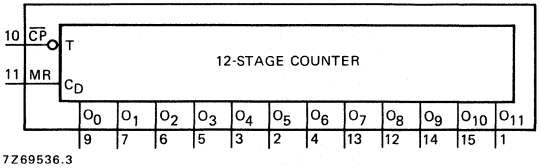


Fig. 2 Functional diagram.

Pad functions

$\overline{CP}$	clock input (HIGH to LOW edge-triggered)
MR	master reset input (active HIGH)
O_0 to O_{11}	parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4040BU
catalogue number	9333 737 90000
die number	N862
die size (mm)	1,80 x 1,14

QUADRUPLE TRUE/COMPLEMENT BUFFER

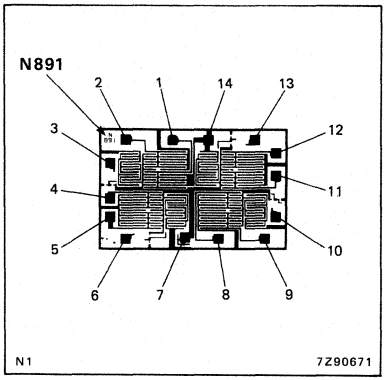


Fig. 1 Pad location diagram.

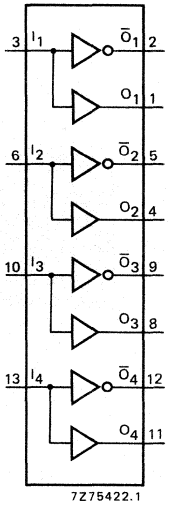


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4041BU
catalogue number	9333 738 00000
die number	N891
die size (mm)	1,93 x 1,32

QUADRUPLE D-LATCH

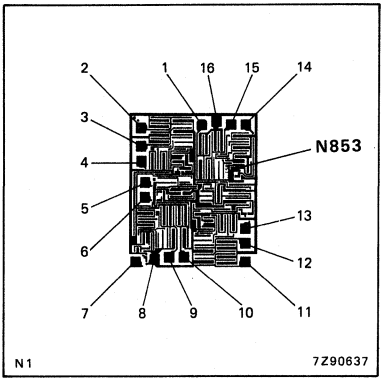


Fig. 1 Pad location diagram.

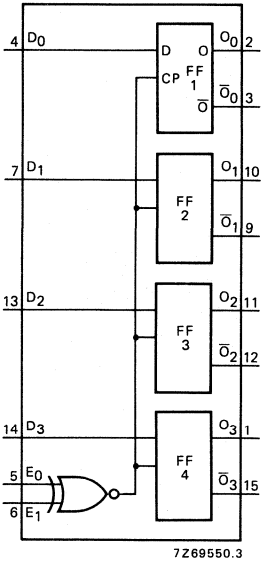


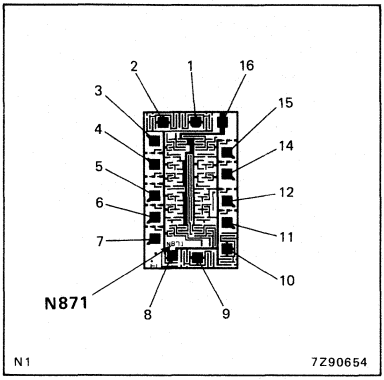
Fig. 2 Functional diagram.

Pad functions

D_0 to D_3	data inputs
E_0 and E_1	enable inputs
O_0 to O_3	parallel latch outputs
$\overline{O}_0$ to $\overline{O}_3$	complementary parallel latch outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4042BU
catalogue number	9333 738 10000
die number	N853
die size (mm)	1,60 x 1,34

QUADRUPLE R/S LATCH WITH 3-STATE OUTPUTS



(number 13 is not used)

Fig. 1 Pad location diagram.

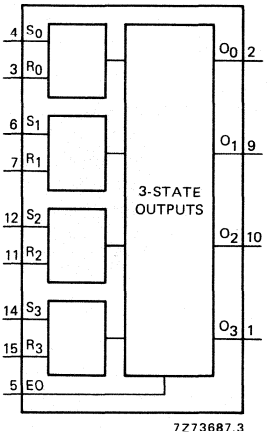


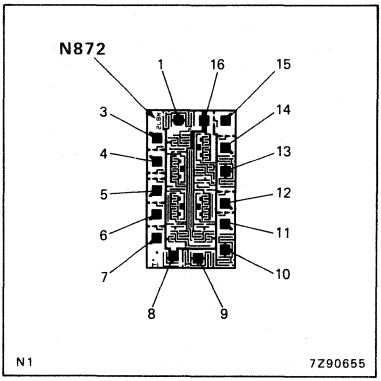
Fig. 2 Functional diagram.

Pad functions

EO	common output enable input
S_0 to S_3	set inputs (active HIGH)
R_0 to R_3	reset inputs (active HIGH)
O_0 to O_3	3-state buffered latch outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4043BU
catalogue number	9333 738 20000
die number	N871
die size (mm)	1,56 x 0,96

QUADRUPLE R/S LATCH WITH 3-STATE OUTPUTS



(number 2 is not used)

Fig. 1 Pad location diagram.

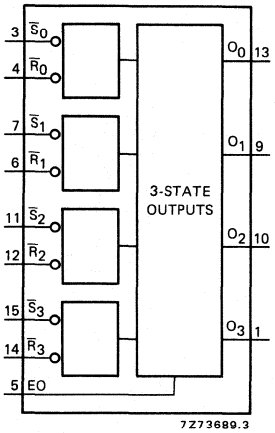


Fig. 2 Functional diagram.

Pad functions

EO	common output enable input
$\overline{S}_0$ to $\overline{S}_3$	set inputs (active LOW)
$\overline{R}_0$ to $\overline{R}_3$	reset inputs (active LOW)
O_0 to O_3	3-state buffered latch outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4044BU
catalogue number	9333 738 30000
die number	N872
die size (mm)	1,62 x 0,96

PHASE-LOCKED LOOP

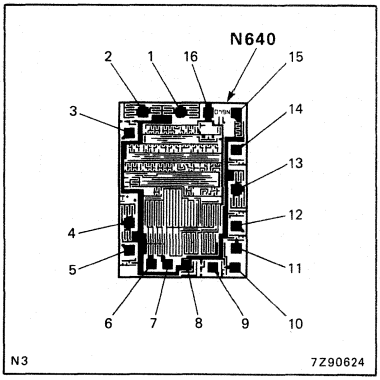


Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4046BU
catalogue number	9333 738 40000
die number	N640
die size (mm)	1,79 x 1,32

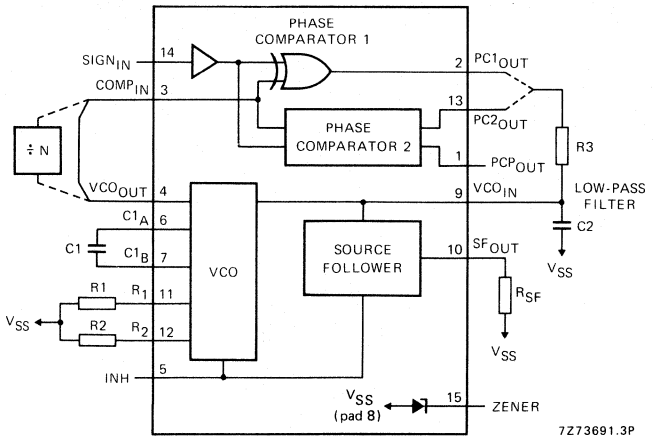


Fig. 2 Functional diagram.

Pad functions

$SIGN_{IN}$	signal input
$COMP_{IN}$	comparator input
INH	inhibit input
VCO_{IN}	VCO input
VCO_{OUT}	VCO output
$PC1_{OUT}$	phase comparator 1 output
$PC2_{OUT}$	phase comparator 2 output
PCP_{OUT}	phase comparator pulse output
SF_{OUT}	source follower output
$C1_A$	capacitor C1 connection
$C1_B$	capacitor C1 connection
R_1	resistor R1 connection
R_2	resistor R2 connection
ZENER	zener diode input for regulated supply
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

MONOSTABLE/ASTABLE MULTIVIBRATOR

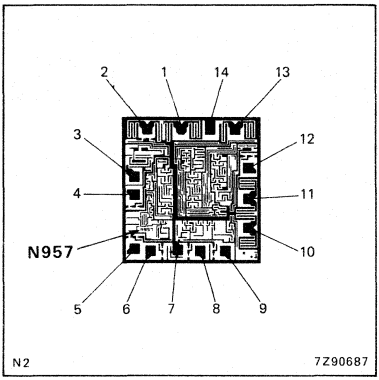


Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4047BU
catalogue number	9333 738 50000
die number	N957
die size (mm)	1,44 x 1,55

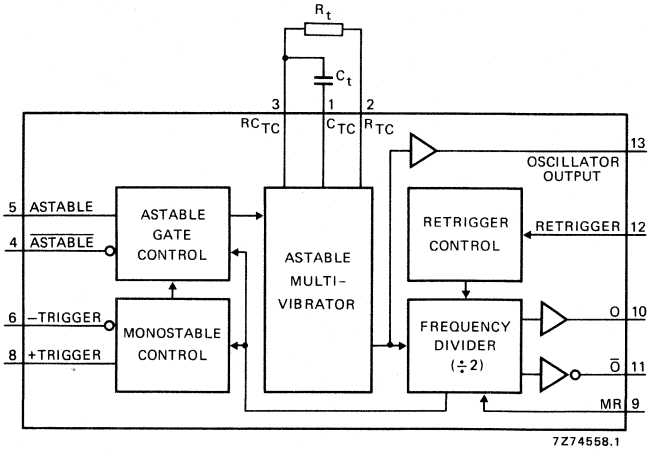
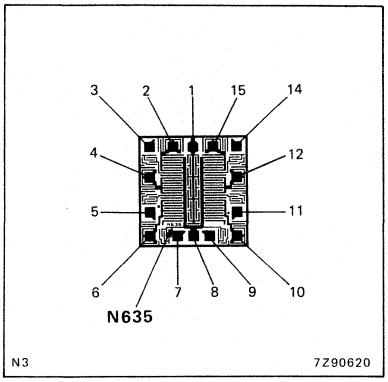


Fig. 2 Functional diagram.

Pad functions

ASTABLE	astable control input (true)
$\overline{\text{ASTABLE}}$	astable control input (complement)
−TRIGGER	negative-edge triggering input
+TRIGGER	positive-edge triggering input
RETRIGGER	retriggering input
MR	master reset input
OSCILLATOR OUTPUT	buffered oscillator output
Q	buffered ½ frequency output (true)
$\overline{Q}$	buffered ½ frequency output (complement)
RC_{TC}	common connection to time constant circuit
C_{TC}	connection to time constant capacitor
R_{TC}	connection to time constant resistor
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

HEX INVERTING BUFFER



(numbers 13 and 16 are not used)

Fig. 1 Pad location diagram.

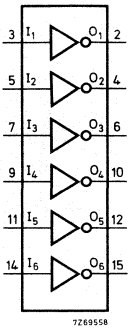


Fig. 2 Functional diagram.

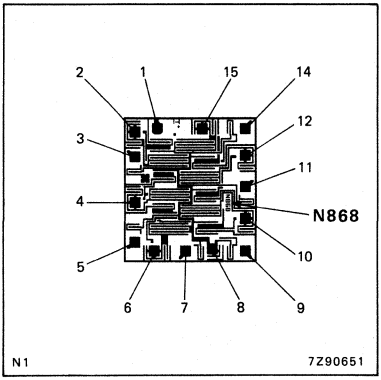
Pad functions

V_{DD} positive supply (pad 1)

V_{SS} negative supply (pad 8)

commercial number	HEF4049BU
catalogue number	9333 738 60000
die number	N635
die size (mm)	1,15 x 1,11

HEX NON-INVERTING BUFFERS



(numbers 13 and 16 are not used)

Fig. 1 Pad location diagram.

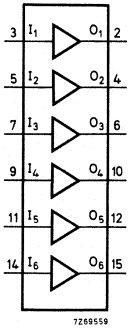


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 1)

V_{SS} negative supply (pad 8)

commercial number	HEF4050BU
catalogue number	9333 738 70000
die number	N868
die size (mm)	1,44 x 1,33

8-CHANNEL ANALOGUE MULTIPLEXER/DEMULTIPLEXER

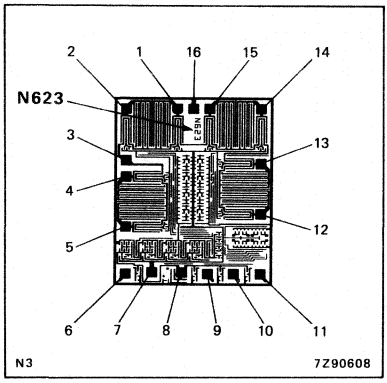


Fig. 1 Pad location diagram.

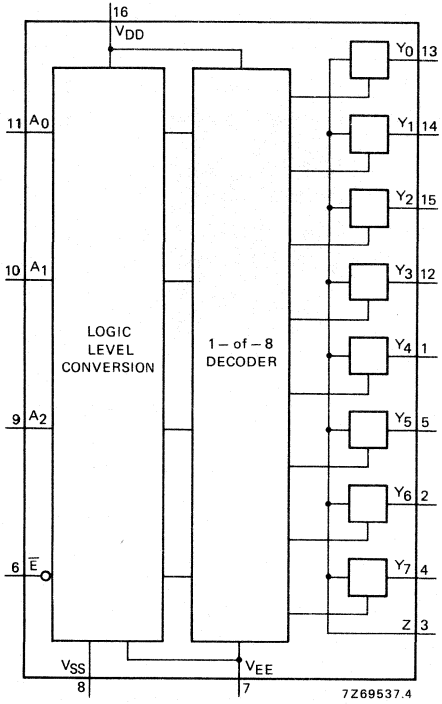


Fig. 2 Functional diagram.

Pad functions

Y_0 to Y_7	independent inputs/outputs
A_0 to A_2	address inputs
$\overline{E}$	enable input (active LOW)
Z	common input/output
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)
V_{EE}	negative supply (pad 7)

commercial number	HEF4051BU
catalogue number	9333 738 80000
die number	N623
die size (mm)	1,90 x 1,58

DUAL 4-CHANNEL ANALOGUE MULTIPLEXER/DEMULTIPLEXER

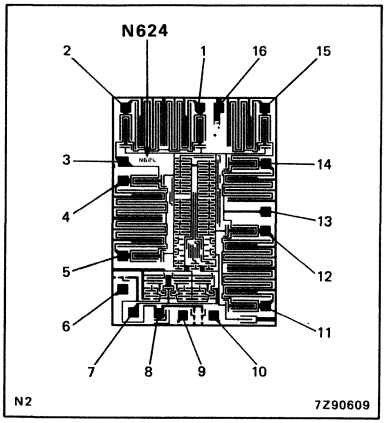


Fig. 1 Pad location diagram.

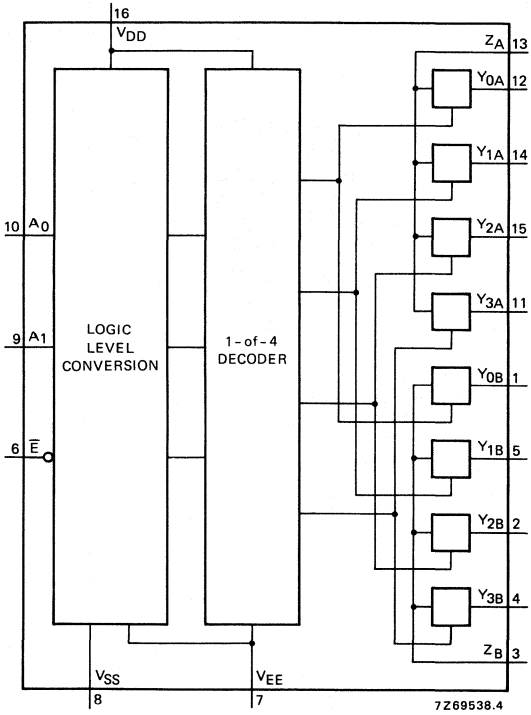


Fig. 2 Functional diagram.

Pad functions

Y_{0A} to Y_{3A}	independent inputs/outputs
Y_{0B} to Y_{3B}	independent inputs/outputs
A_0, A_1	address inputs
$\overline{E}$	enable input (active LOW)
Z_A, Z_B	common inputs/outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)
V_{EE}	negative supply (pad 7)

commercial number	HEF4052BU
catalogue number	9333 738 90000
die number	N624
die size (mm)	2,30 x 1,68

TRIPLE 2-CHANNEL ANALOGUE MULTIPLEXER/DEMULTIPLEXER

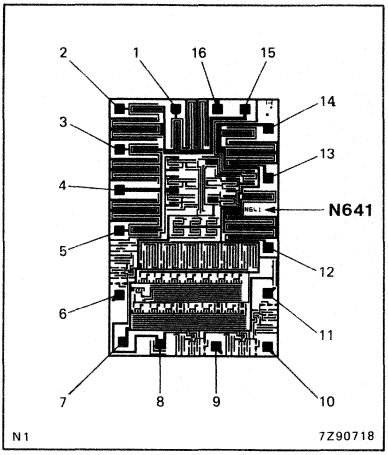


Fig. 1 Pad location diagram.

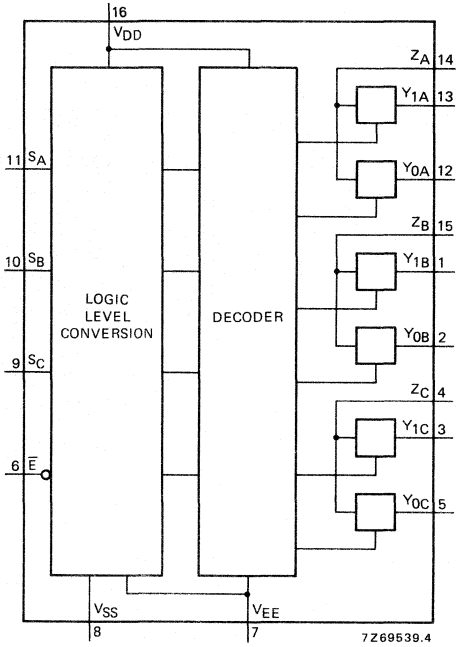


Fig. 2 Functional diagram.

Pad functions

Y_{0A} to Y_{0C}	independent inputs/outputs
Y_{1A} to Y_{1C}	independent inputs/outputs
S_A to S_C	select inputs
$\overline{E}$	enable input (active LOW)
Z_A to Z_C	common inputs/outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)
V_{EE}	negative supply (pad 7)

commercial number	HEF4053BU
catalogue number	9333 739 00000
die number	N641
die size (mm)	2,62 x 1,72

PROGRAMMABLE DIVIDE-BY-N COUNTER

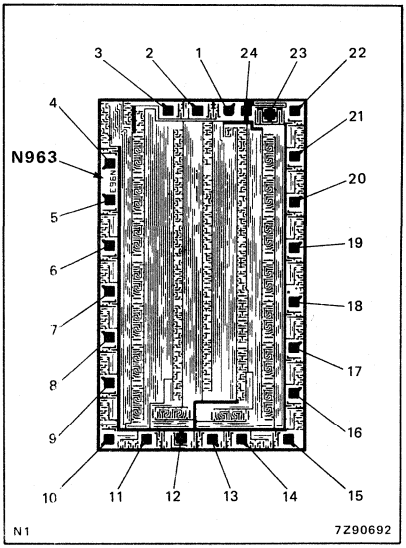


Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4059BU
catalogue number	9336 229 50000
die number	N963
die size (mm)	3,50 x 2,07

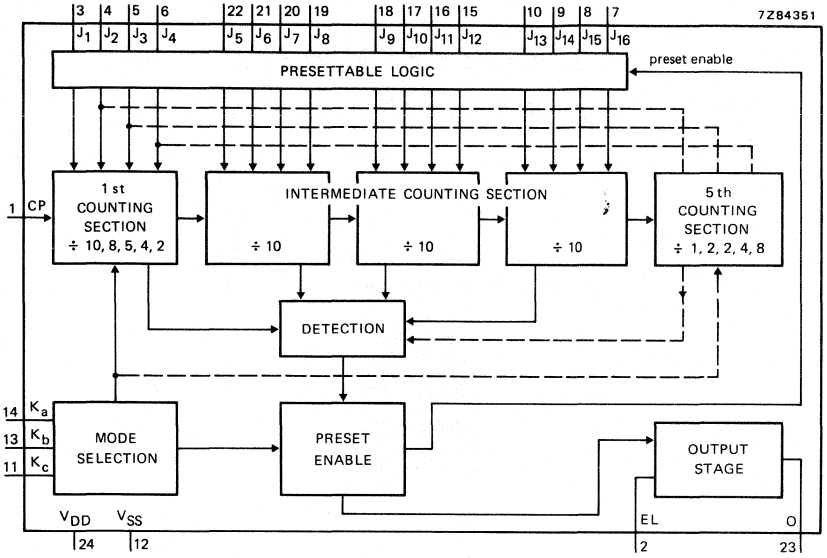


Fig. 2 Functional diagram.

Pad functions

CP	clock input
K_a, K_b, K_c	mode select inputs
J_1 to J_{16}	programmable jam inputs (BCD)
EL	latch enable input
O	divide-by-n output
V_{DD}	positive supply (pad 24)
V_{SS}	negative supply (pad 12)

14-STAGE RIPPLE-CARRY BINARY COUNTER/DIVIDER AND OSCILLATOR

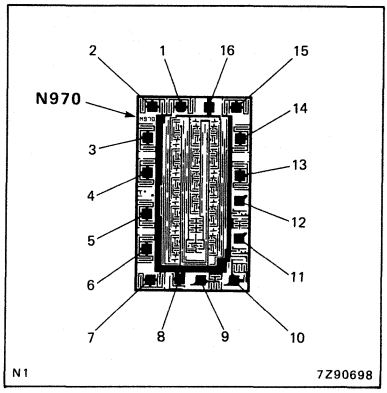


Fig. 1 Pad location diagram.

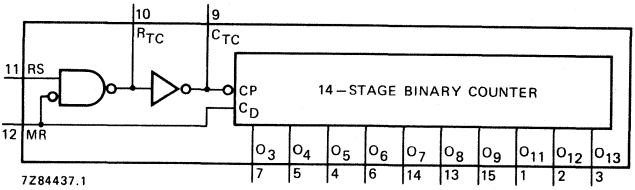


Fig. 2 Functional diagram.

Pad functions

MR	master reset
RS	clock input/oscillator pad
R_{TC}	oscillator pad
C_{TC}	external capacitor connection
O_3 to O_9 O_{11} to O_{13}	counter outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4060BU
catalogue number	9336 229 60000
die number	N970
die size (mm)	2,00 x 1,20

QUADRUPLE BILATERAL SWITCHES

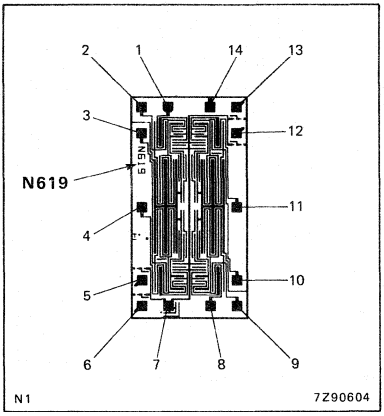


Fig. 1 Pad location diagram.

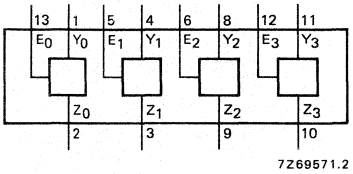


Fig. 2 Functional diagram.

Pad functions

E_0 to E_3	enable inputs
Y_0 to Y_3	input/output terminals
Z_0 to Z_3	input/output terminals
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

commercial number	HEF4066BU
catalogue number	9333 739 10000
die number	N619
die size (mm)	1,20 x 2,24

16-CHANNEL ANALOGUE MULTIPLEXER/DEMULTIPLEXER

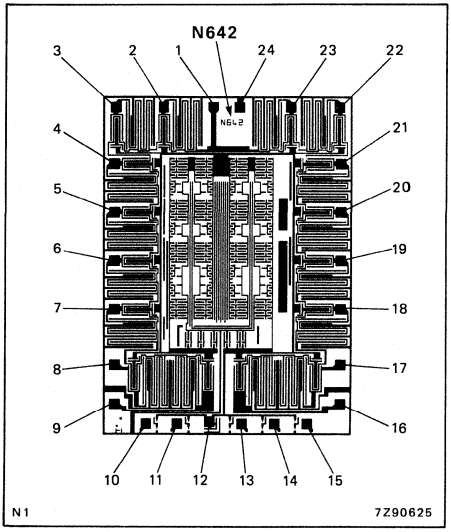


Fig. 1 Pad location diagram.

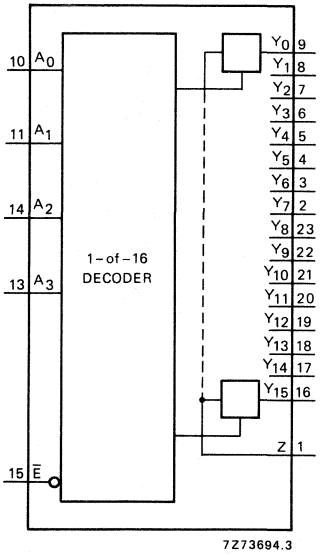


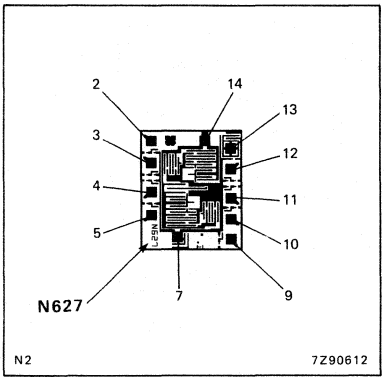
Fig. 2 Functional diagram.

Pad functions

Y_0 to Y_{15}	independent inputs/outputs
A_0 to A_3	address inputs
$\overline{E}$	enable input (active LOW)
Z	common input/output
V_{DD}	positive supply (pad 24)
V_{SS}	negative supply (pad 12)

commercial number	HEF4067BU
catalogue number	9333 739 20000
die number	N642
die size (mm)	3,32 x 2,46

8-INPUT NAND GATE



The pad between bonding pads 2 and 14 is not connected and numbers 1, 6 and 8 are not used.

Fig. 1 Pad location diagram.

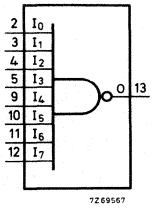


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4068BU
catalogue number	9333 739 30000
die number	N627
die size (mm)	1,24 x 1,04

HEX INVERTER

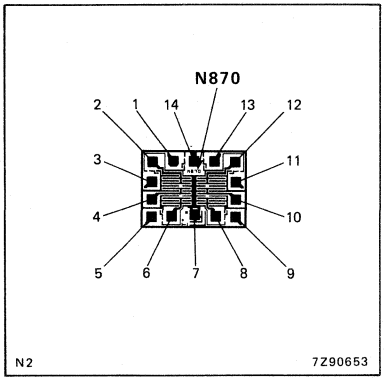


Fig. 1 Pad location diagram.

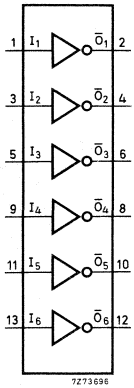


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4069UBU
catalogue number	9333 739 40000
die number	N870
die size (mm)	1,10 x 0,83

QUADRUPLE EXCLUSIVE-OR GATE

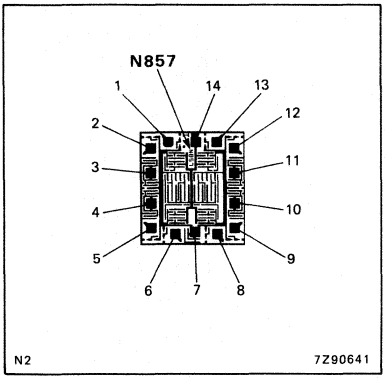


Fig. 1 Pad location diagram.

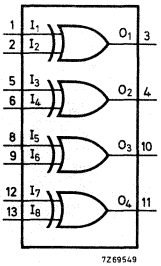


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4070BU
catalogue number	9333 739 50000
die number	N857
die size (mm)	1,20 x 1,10

QUADRUPLE 2-INPUT OR GATE

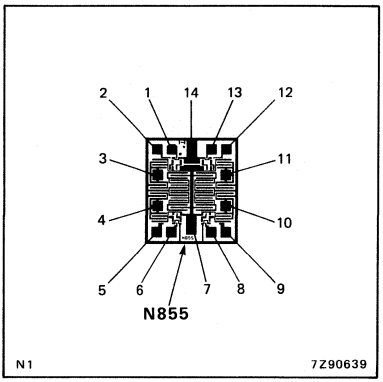


Fig. 1 Pad location diagram.

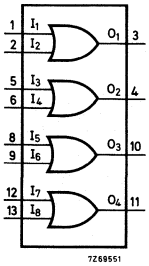


Fig. 2 Functional diagram.

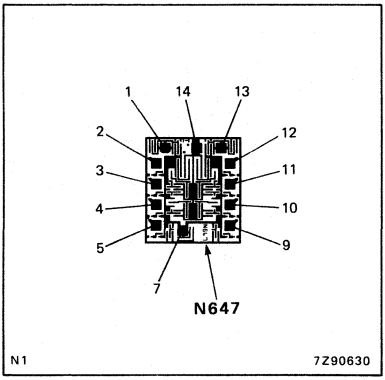
Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4071BU
catalogue number	9333 739 60000
die number	N855
die size (mm)	1,00 x 1,12

DUAL 4-INPUT OR GATE



(numbers 6 and 8 are not used)

Fig. 1 Pad location diagram.

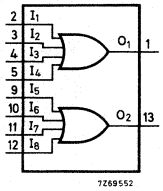


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4072BU
catalogue number	9333 739 70000
die number	N647
die size (mm)	1,12 x 1,00

TRIPLE 3-INPUT AND GATE

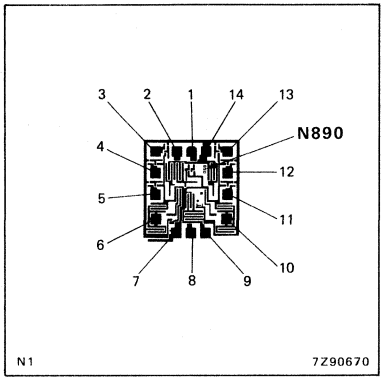


Fig. 1 Pad location diagram.

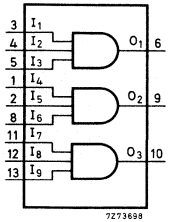


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4073BU
catalogue number	9333 739 80000
die number	N890
die size (mm)	1,10 x 1,02

TRIPLE 3-INPUT OR GATE

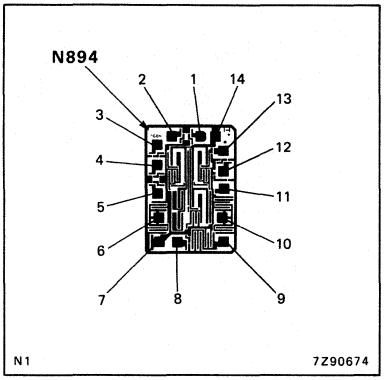


Fig. 1 Pad location diagram.

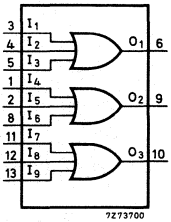


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4075BU
catalogue number	9333 739 90000
die number	N894
die size (mm)	1,37 x 0,99

QUADRUPLE D-TYPE REGISTER WITH 3-STATE OUTPUTS

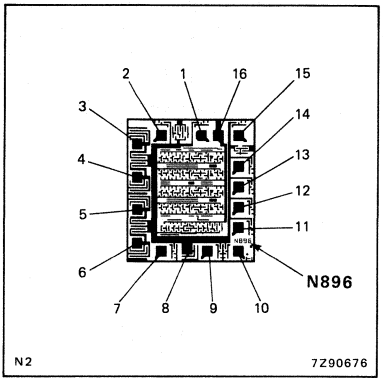


Fig. 1 Pad location diagram.

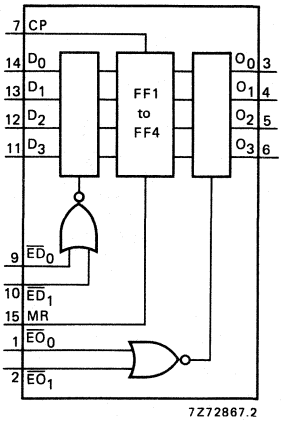


Fig. 2 Functional diagram.

Pad functions

D_0 to D_3	data inputs
$\overline{ED}_0$, $\overline{ED}_1$	data enable inputs (active LOW)
$\overline{EO}_0$, $\overline{EO}_1$	output enable inputs (active LOW)
CP	clock input (LOW to HIGH, edge-triggered)
MR	master reset input
O_0 to O_3	data outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4076BU
catalogue number	9333 740 00000
die number	N896
die size (mm)	1,43 x 1,30

QUADRUPLE EXCLUSIVE-NOR GATE

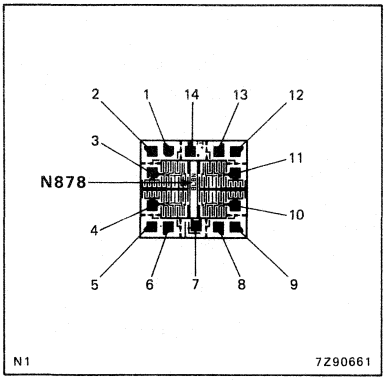


Fig. 1 Pad location diagram.

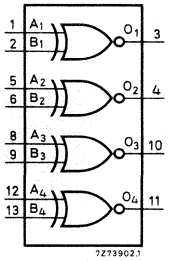


Fig. 2 Functional diagram.

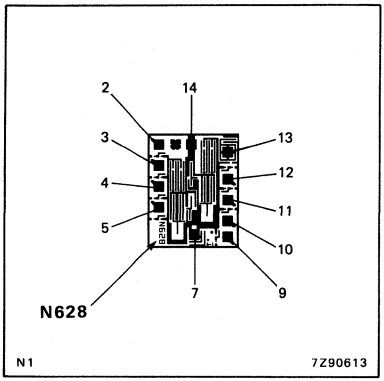
Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4077BU
catalogue number	9333 740 10000
die number	N878
die size (mm)	1,08 x 1,02

8-INPUT NOR GATE



The pad between bonding pads 2 and 14 is not connected and numbers 1, 6 and 8 are not used.

Fig. 1 Pad location diagram.

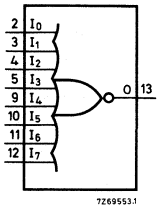


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4078BU
catalogue number	9333 740 20000
die number	N628
die size (mm)	1,18 x 0,96

QUADRUPLE 2-INPUT AND GATE

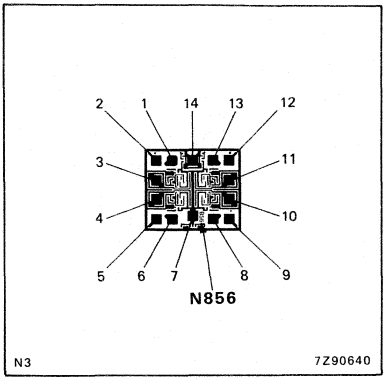


Fig. 1 Pad location diagram.

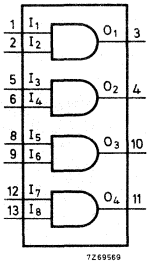


Fig. 2 Functional diagram.

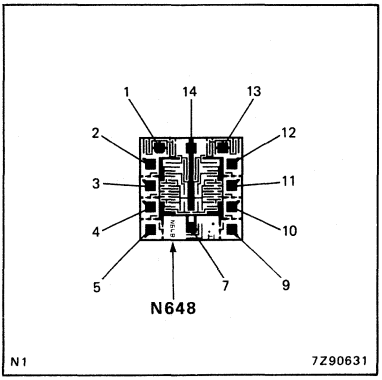
Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4081BU
catalogue number	9333 740 30000
die number	N856
die size (mm)	1,00 x 0,88

DUAL 4-INPUT AND GATE



(numbers 6 and 8 are not used)

Fig. 1 Pad location diagram.

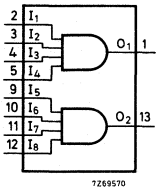


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4082BU
catalogue number	9333 740 40000
die number	N648
die size (mm)	1,06 x 1,06

DUAL 2-WIDE 2-INPUT AND-OR-INVERT GATE

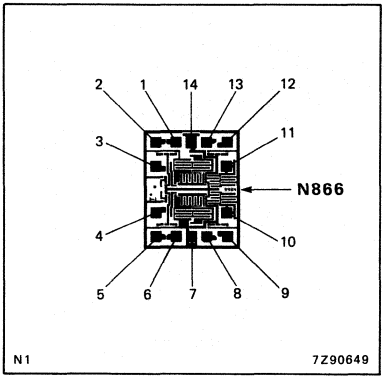


Fig. 1 Pad location diagram.

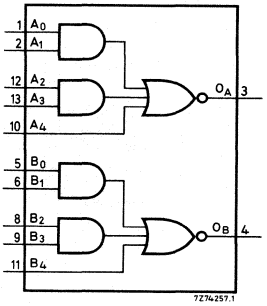


Fig. 2 Functional diagram.

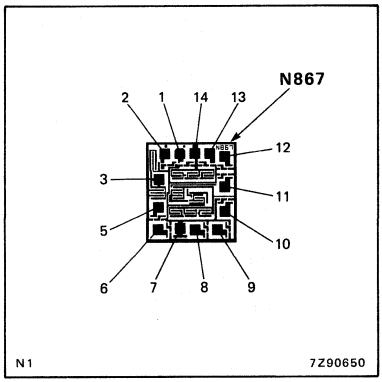
Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4085BU
catalogue number	9333 740 50000
die number	N866
die size (mm)	1,26 x 1,02

4-WIDE 2-INPUT AND-OR-INVERT GATE



(number 4 is not used)

Fig. 1 Pad location diagram.

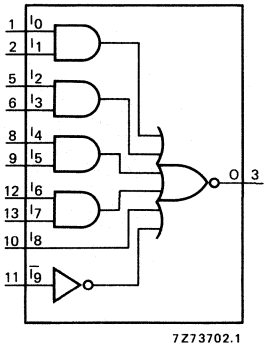


Fig. 2 Functional diagram.

Pad functions

I_0 to I_8	gate inputs
$\bar{I}_9$	gate input (active LOW)
O	output (active LOW)
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

commercial number	HEF4086BU
catalogue number	9333 740 60000
die number	N867
die size (mm)	1,05 x 0,96

QUADRUPLE 2-INPUT NAND SCHMITT TRIGGER

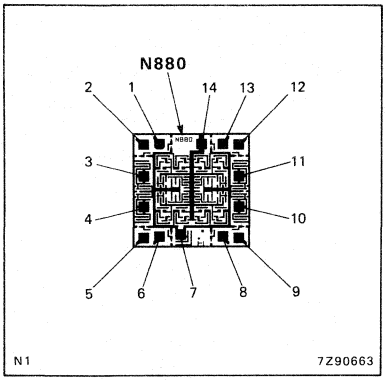


Fig. 1 Pad location diagram.

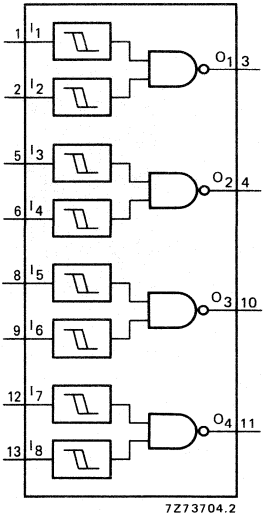


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF4093BU
catalogue number	9333 740 70000
die number	N880
die size (mm)	1,20 x 1,20

8-STAGE SHIFT-AND-STORE BUS REGISTER

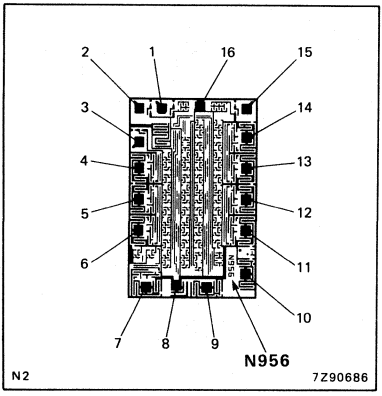


Fig. 1 Pad location diagram.

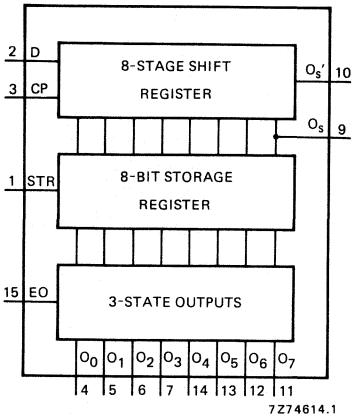


Fig. 2 Functional diagram.

Pad functions

D	data input
CP	clock input
STR	strobe input
EO	output enable input
O_S, O_S'	serial outputs
O_0 to O_7	parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4094BU
catalogue number	9334 066 70000
die number	N956
die size (mm)	2,01 x 1,33

QUADRUPLE LOW-TO-HIGH VOLTAGE TRANSLATOR WITH 3-STATE OUTPUTS

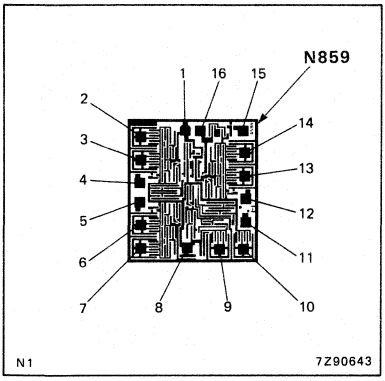


Fig. 1 Pad location diagram.

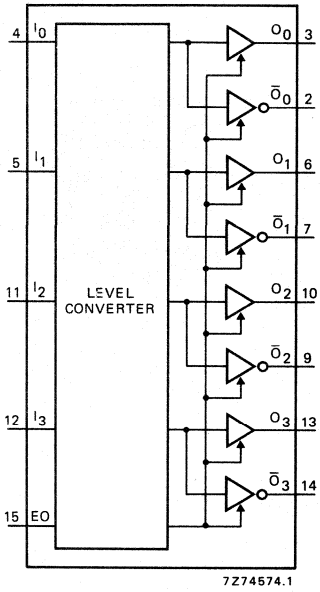


Fig. 2 Functional diagram.

Pad functions

I_0 to I_3	data inputs
EO	output enable input
O_0 to O_3	data outputs
$\overline{O}_0$ to $\overline{O}_3$	complementary data outputs
V_{DDI}	positive supply for inputs (pad 16)
V_{DDO}	positive supply for outputs (pad 1)
V_{SS}	common negative supply (pad 8)

commercial number	HEF4104BU
catalogue number	9333 740 80000
die number	N859
die size (mm)	1,47 x 1,32

STROBED HEX INVERTER/BUFFER

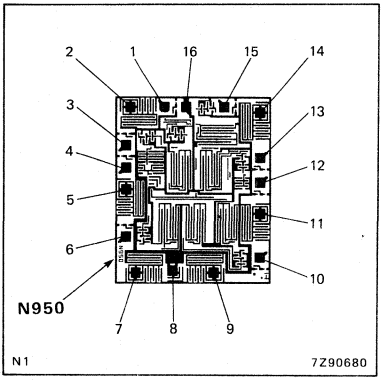


Fig. 1 Pad location diagram.

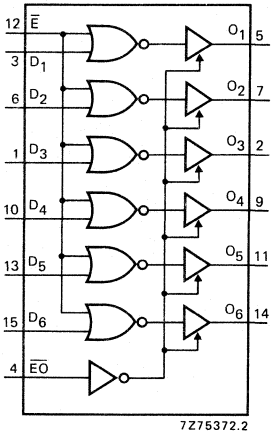


Fig. 2 Functional diagram.

Pad functions

D_1 to D_6	data inputs
$\overline{E}$	enable input
$\overline{EO}$	output enable input
O_1 to O_6	3-state outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4502BU
catalogue number	9333 716 20000
die number	N950
die size (mm)	1,91 x 1,61

64-BIT, 1-BIT PER WORD RANDOM ACCESS READ/WRITE MEMORY

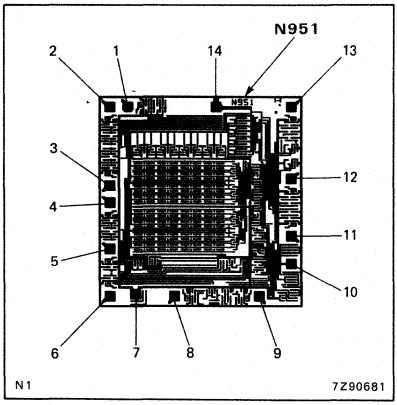


Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4505BU
catalogue number	9333 716 30000
die number	N951
die size (mm)	2,13 x 2,04

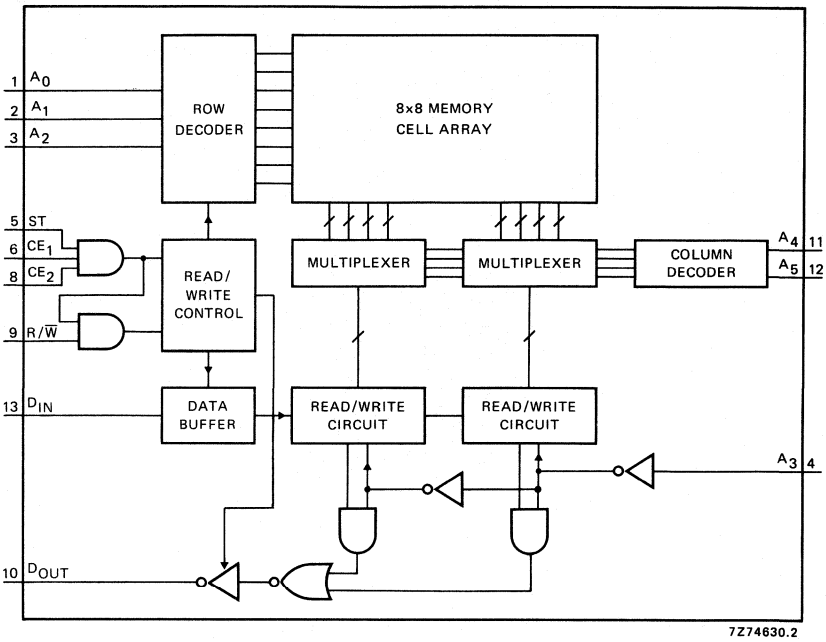


Fig. 2 Functional diagram.

Pad functions

A_0 to A_5	address inputs
CE_1, CE_2	chip enable inputs
$R/\overline{W}$	read/write input
ST	strobe input
D_{IN}	data input
D_{OUT}	data output
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

DUAL 4-BIT LATCH

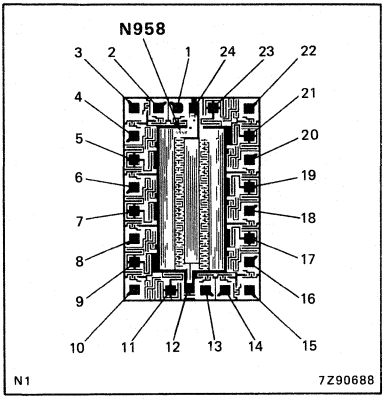


Fig. 1 Pad location diagram.

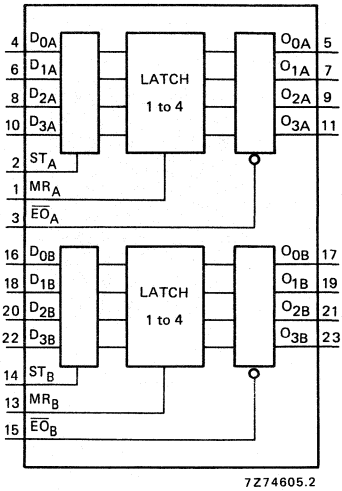


Fig. 2 Functional diagram.

Pad functions

D_{0A} to D_{3A}, D_{0B} to D_{3B}	data inputs
ST_A, ST_B	strobe inputs
MR_A, MR_B	master reset inputs
$\overline{EO}_A$, $\overline{EO}_B$	output enable inputs
O_{0A} to O_{3A}, O_{0B} to O_{3B}	3-state outputs
V_{DD}	positive supply (pad 24)
V_{SS}	negative supply (pad 12)

commercial number	HEF4508BU
catalogue number	9334 067 00000
die number	N958
die size (mm)	2,07 x 1,38

BCD UP/DOWN COUNTER

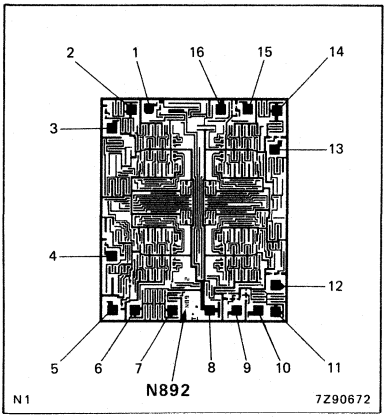


Fig. 1 Pad location diagram.

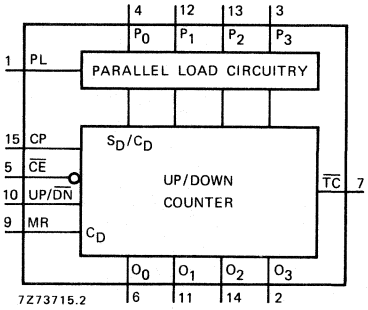


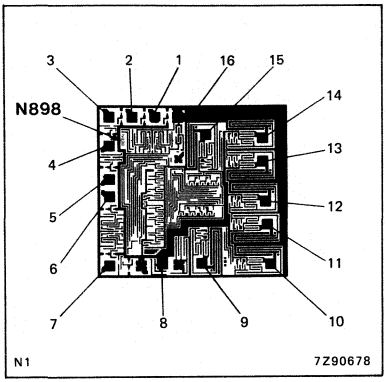
Fig. 2 Functional diagram.

Pad functions

PL	parallel load input (active HIGH)
P_0 to P_3	parallel inputs
$\overline{CE}$	count enable input (active LOW)
CP	clock pulse input (LOW to HIGH, edge triggered)
UP/$\overline{DN}$	up/down count control input
$\overline{MR}$	master reset input
$\overline{TC}$	terminal count output (active LOW)
O_0 to O_3	parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4510BU
catalogue number	9333 716 40000
die number	N892
die size (mm)	2,27 x 1,94

BCD TO 7-SEGMENT LATCH/DECODER/DRIVER



Die contains two pads which are not connected; one between pads 7 and 8, and one between pads 8 and 9.

Fig. 1 Pad location diagram.

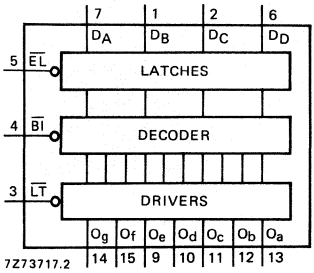


Fig. 2 Functional diagram.

Pad functions

D_A to D_D	address (data) inputs
$\overline{EL}$	latch enable input (active LOW)
$\overline{BI}$	ripple blanking input (active LOW)
$\overline{LT}$	lamp test input (active LOW)
O_a to O_g	segment outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4511BU
catalogue number	9333 716 50000
die number	N898
die size (mm)	1,82 x 1,70

8-INPUT MULTIPLEXER WITH 3-STATE OUTPUT

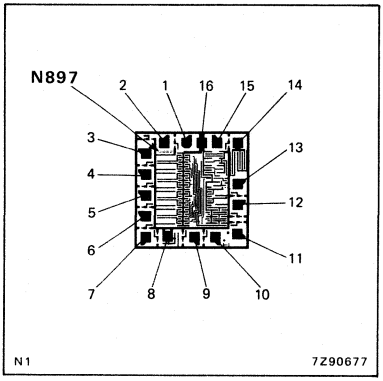


Fig. 1 Pad location diagram.

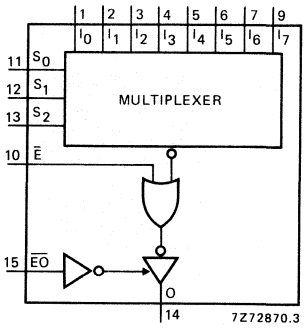


Fig. 2 Functional diagram.

Pad functions

S_0, S_1, S_2	select inputs
$\overline{EO}$	output enable (active LOW)
$\overline{E}$	enable (active LOW)
I_0 to I_7	multiplexer inputs
O	multiplexer output
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4512BU
catalogue number	9333 716 60000
die number	N897
die size (mm)	1,26 x 1,24

1-OF-16 DECODER/DEMULTIPLEXER WITH INPUT LATCHES

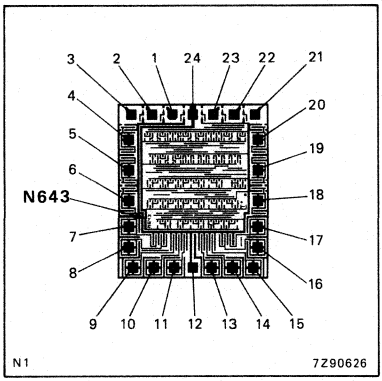


Fig. 1 Pad location diagram.

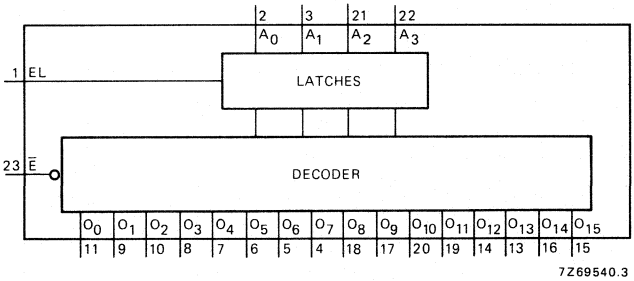


Fig. 2 Functional diagram.

Pad functions

A_0 to A_3	address inputs	V_{DD}	positive supply (pad 24)
$\overline{E}$	enable input (active LOW)	V_{SS}	negative supply (pad 12)
EL	latch enable input		
O_0 to O_{15}	outputs (active HIGH)		

commercial number	HEF4514BU
catalogue number	9333 716 70000
die number	N643
die size (mm)	1,55 x 1,80

1-OF-16 DECODER/DEMULTIPLEXER WITH INPUT LATCHES

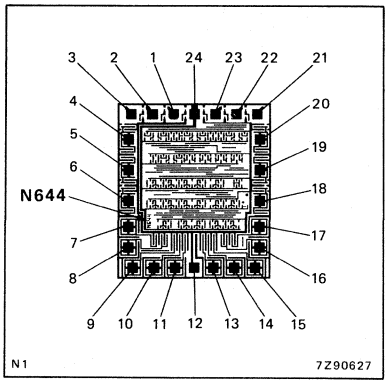


Fig. 1 Pad location diagram.

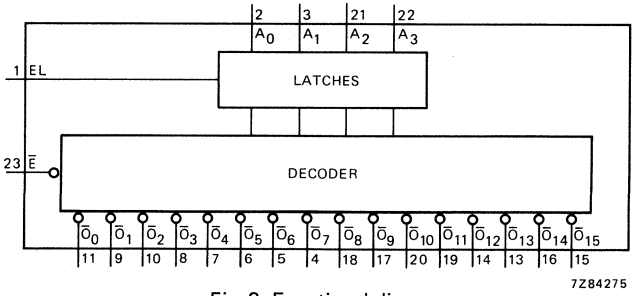


Fig. 2 Functional diagram.

Pad functions

A_0 to A_3	address inputs	V_{DD}	positive supply (pad 24)
$\overline{E}$	enable input (active LOW)	V_{SS}	negative supply (pad 12)
EL	latch enable input		
$\overline{O}_0$ to $\overline{O}_{15}$	outputs (active LOW)		

commercial number	HEF4515BU
catalogue number	9333 716 80000
die number	N644
die size (mm)	1,55 x 1,80

BINARY UP/DOWN COUNTER

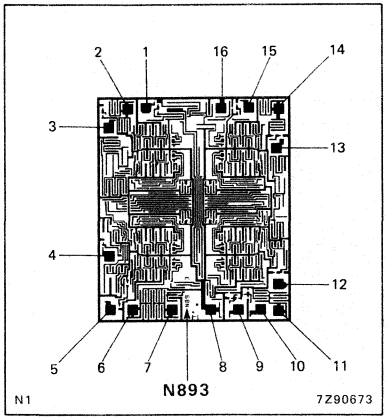


Fig. 1 Pad location diagram.

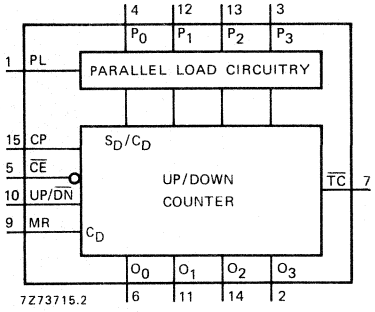


Fig. 2 Functional diagram.

Pad functions

PL	parallel load input (active HIGH)
P_0 to P_3	parallel inputs
$\overline{CE}$	count enable input (active LOW)
CP	clock pulse input (LOW to HIGH, edge triggered)
UP/$\overline{DN}$	up/down count control input
MR	master reset input
$\overline{TC}$	terminal count output (active LOW)
O_0 to O_3	parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4516BU
catalogue number	9333 716 90000
die number	N893
die size (mm)	2,27 x 1,94

DUAL 64-BIT STATIC SHIFT REGISTER

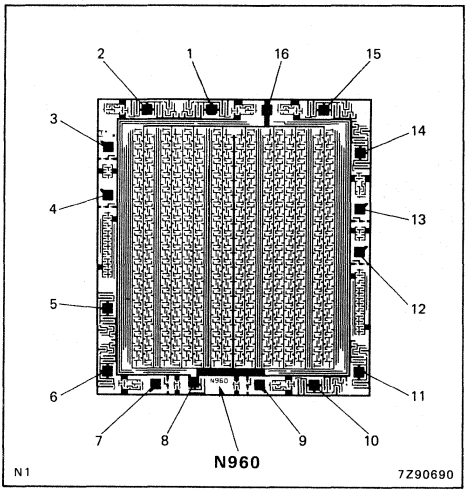


Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4517BU
catalogue number	9334 067 40000
die number	N960
die size (mm)	2,87 x 2,61

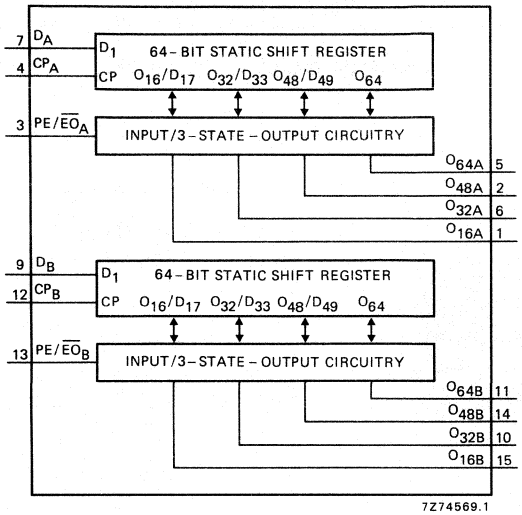


Fig. 2 Functional diagram.

Pad functions

CP_A, CP_B	clock inputs
$PE/\overline{EO}_A$, $PE/\overline{EO}_B$	parallel input-enable/output-enable inputs
D_A, D_B	data inputs
O_{16A}, O_{32A}, O_{48A}	3-state outputs/inputs
O_{16B}, O_{32B}, O_{48B}	3-state outputs/inputs
O_{64A}, O_{64B}	3-state outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

DUAL BCD COUNTER

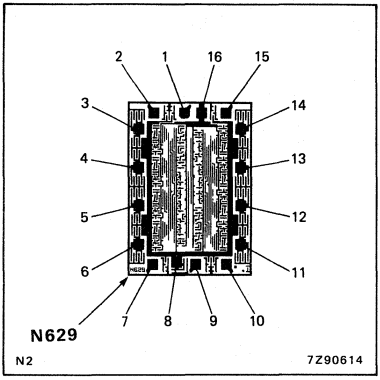


Fig. 1 Pad location diagram.

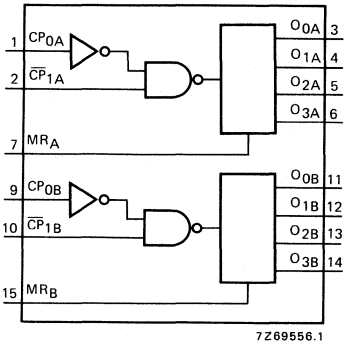


Fig. 2 Functional diagram.

Pad functions

CP_{0A}, CP_{0B}	clock inputs (LOW to HIGH triggered)
$\overline{CP}_{1A}$, $\overline{CP}_{1B}$	clock inputs (HIGH to LOW triggered)
MR_A, MR_B	master reset inputs
O_{0A} to O_{3A}	outputs
O_{0B} to O_{3B}	outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4518BU
catalogue number	9333 717 00000
die number	N629
die size (mm)	1,72 x 1,26

QUADRUPLE 2-INPUT MULTIPLEXER

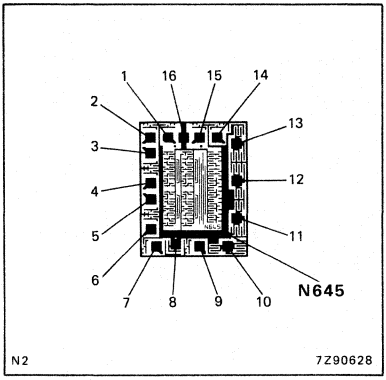


Fig. 1 Pad location diagram.

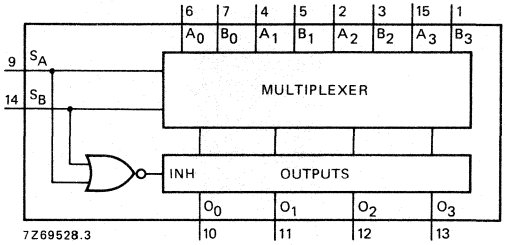


Fig. 2 Functional diagram.

Pad functions

S_A, S_B	select inputs (active HIGH)
A_0 to A_3	multiplexer inputs
B_0 to B_3	multiplexer inputs
O_0 to O_3	multiplexer outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4519BU
catalogue number	9333 717 10000
die number	N645
die size (mm)	1,40 x 1,11

DUAL BINARY COUNTER

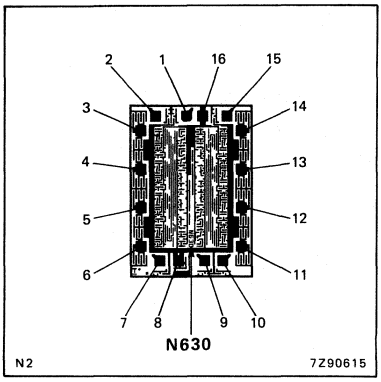


Fig. 1 Pad location diagram.

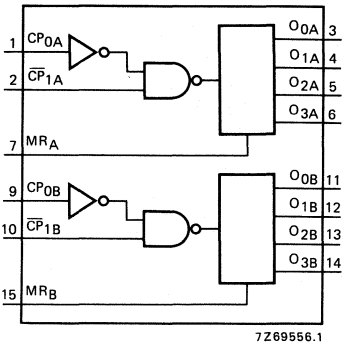


Fig. 2 Functional diagram.

Pad functions

CP_{0A}, CP_{0B}	clock inputs (LOW to HIGH triggered)
$\overline{CP}_{1A}$, $\overline{CP}_{1B}$	clock inputs (HIGH to LOW triggered)
MR_A, MR_B	master reset inputs
O_{0A} to O_{3A}	outputs
O_{0B} to O_{3B}	outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4520BU
catalogue number	9333 717 20000
die number	N630
die size (mm)	1,70 x 1,24

24-STAGE FREQUENCY DIVIDER

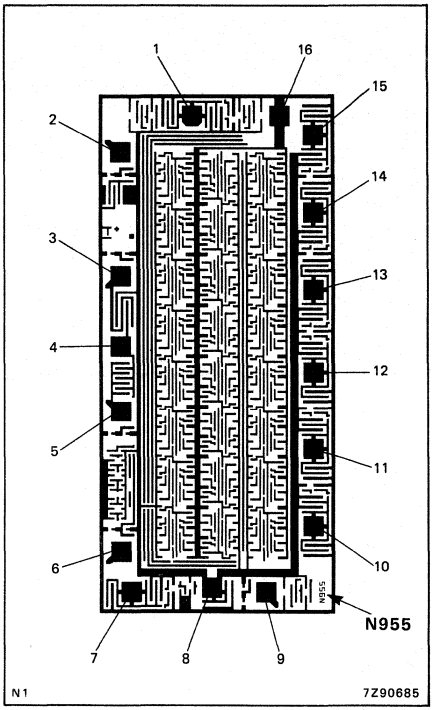


Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4521BU
catalogue number	9334 067 80000
die number	N955
die size (mm)	2,67 x 1,25

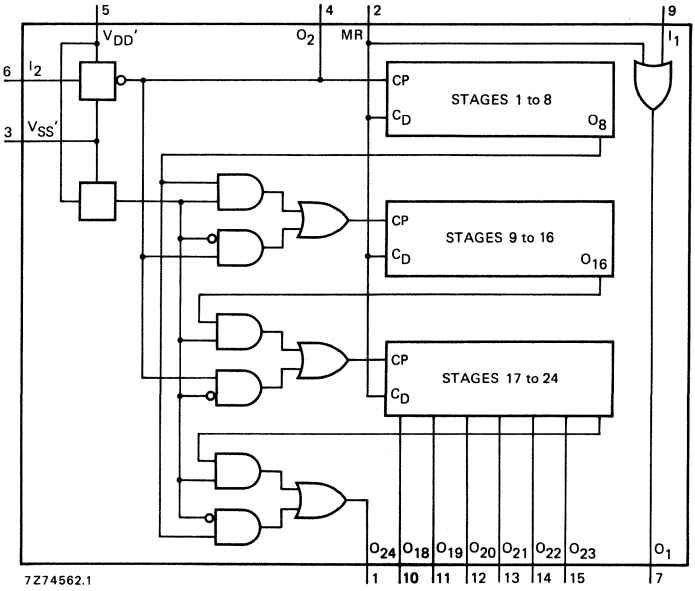


Fig. 2 Functional diagram.

Count capacity

output	count capacity
O_{18}	2^{18} = 262 144
O_{19}	2^{19} = 524 288
O_{20}	2^{20} = 1 048 576
O_{21}	2^{21} = 2 097 152
O_{22}	2^{22} = 4 194 304
O_{23}	2^{23} = 8 388 608
O_{24}	2^{24} = 16 777 215

Pad functions

V_{DD} positive supply (pad 16)

V_{SS} negative supply (pad 8)

PROGRAMMABLE 4-BIT BCD DOWN COUNTER

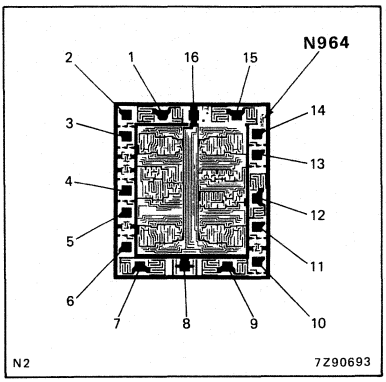


Fig. 1 Pad location diagram.

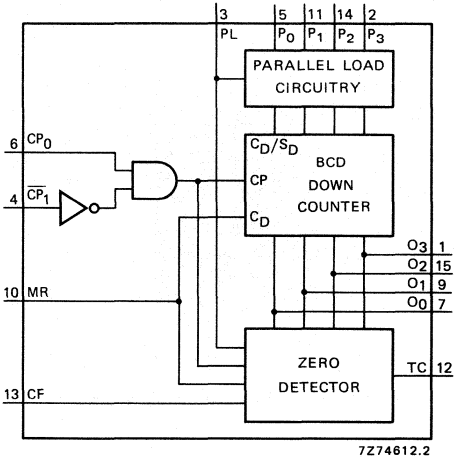


Fig. 2 Functional diagram.

Pad functions

PL	parallel load input
P_0 to P_3	parallel inputs
CF	cascade feedback input
CP_0	clock input (LOW to HIGH, triggered)
$\overline{CP}_1$	clock input (HIGH to LOW, triggered)
MR	asynchronous master reset input
TC	terminal count output
O_0 to O_3	buffered parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4522BU
catalogue number	9334 068 20000
die number	N964
die size (mm)	1,84 x 1,62

PROGRAMMABLE 4-BIT BINARY DOWN COUNTER

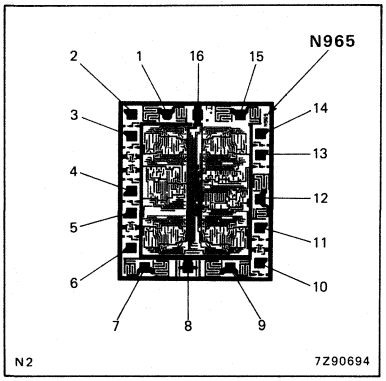


Fig. 1 Pad location diagram.

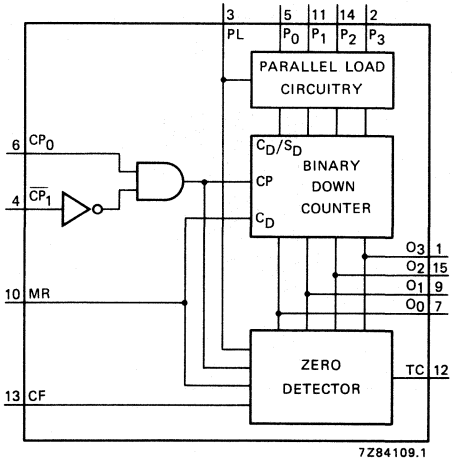


Fig. 2 Functional diagram.

Pad functions

PL	parallel load input
P_0 to P_3	parallel inputs
CF	cascade feedback input
CP_0	clock input (LOW to HIGH, triggered)
$\overline{CP}_1$	clock input (HIGH to LOW, triggered)
MR	asynchronous master reset input
TC	terminal count output
O_0 to O_3	buffered parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4526BU
catalogue number	9334 068 60000
die number	N965
die size (mm)	1,84 x 1,62

BCD RATE MULTIPLIER

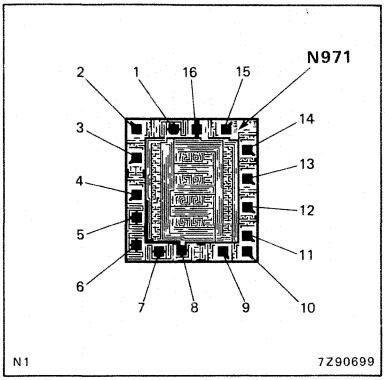


Fig. 1 Pad location diagram.

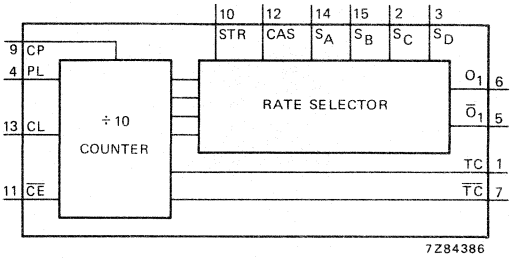


Fig. 2 Functional diagram.

Pad functions

CP	clock input
PL	preset to '9' input
CL	counter clear input
$\overline{CE}$	count enable input (active LOW)
STR	strobe input
CAS	cascade input
S_A to S_D	rate select inputs
O_1, $\overline{O}_1$	rate outputs
TC	terminal count output (active HIGH)
$\overline{TC}$	terminal count output (active LOW)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4527BU
catalogue number	9336 229 70000
die number	N971
die size (mm)	1,51 x 1,38

DUAL MONOSTABLE MULTIVIBRATOR

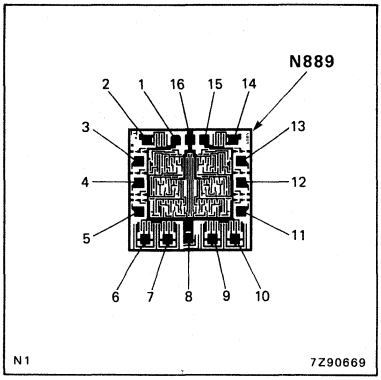


Fig. 1 Pad location diagram.

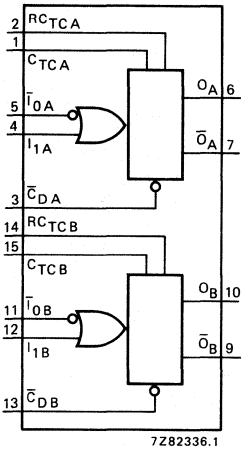


Fig. 2 Functional diagram.

Pad functions

$\overline{I}_{0A}$, $\overline{I}_{0B}$	input (HIGH to LOW triggered)
I_{1A}, I_{1B}	input (LOW to HIGH triggered)
$\overline{C}_{DA}$, $\overline{C}_{DB}$	clear direct input (active LOW)
O_A, O_B	output
$\overline{O}_A$, $\overline{O}_B$	complementary output (active LOW)
$C_{TC\ A}$, $C_{TC\ B}$	external capacitor connections
$RC_{TC\ A}$, $RC_{TC\ B}$	external capacitor/resistor connections
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4528BU
catalogue number	9333 717 30000
die number	N889
die size (mm)	1,32 x 1,30

13-INPUT PARITY CHECKER/GENERATOR

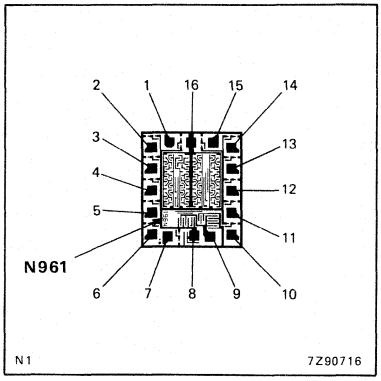


Fig. 1 Pad location diagram.

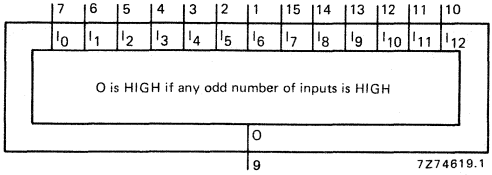


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 16)

V_{SS} negative supply (pad 8)

commercial number	HEF4531BU
catalogue number	9333 714 40000
die number	N961
die size (mm)	1,27 x 1,12

8-INPUT PRIORITY ENCODER

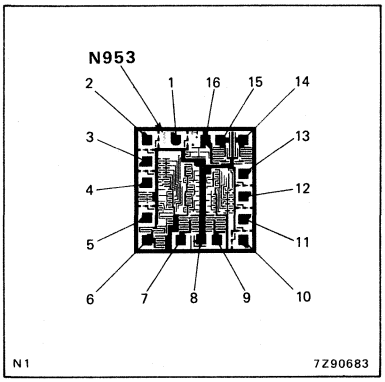


Fig. 1 Pad location diagram.

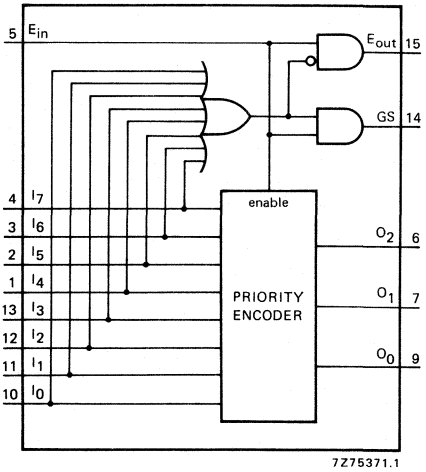


Fig. 2 Functional diagram.

Pad functions

I_0 to I_7	priority inputs
E_{in}	enable input
E_{out}	enable output
GS	group select output
O_0 to O_2	outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4532BU
catalogue number	9333 788 40000
die number	N953
die size (mm)	1,36 x 1,33

REAL TIME 5-DECADE COUNTER

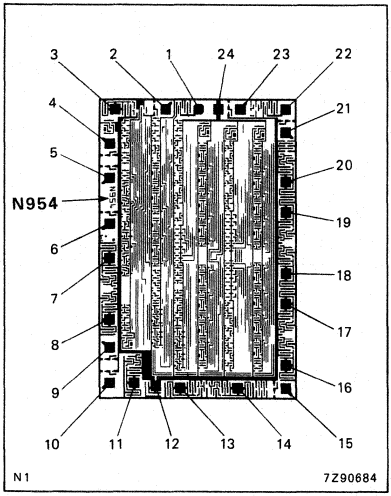


Fig. 1 Pad location diagram.

Pad functions

CPA	decade clock input	O_1 to O_3	BCD outputs
CPA	scanner clock input	OS_0 to OS_3	digit select outputs
$\overline{CPE}$	error detector clock input	OER	error output
S_A, S_B	mode select inputs	TC	carry out
MR	master reset input	V_{DD}	positive supply (pad 24)
MR_{SC}	scanner reset input	V_{SS}	negative supply (pad 12)

Functional diagram: see next page.

commercial number	HEF4534BU
catalogue number	9334 068 90000
die number	N954
die size (mm)	2,98 x 1,98

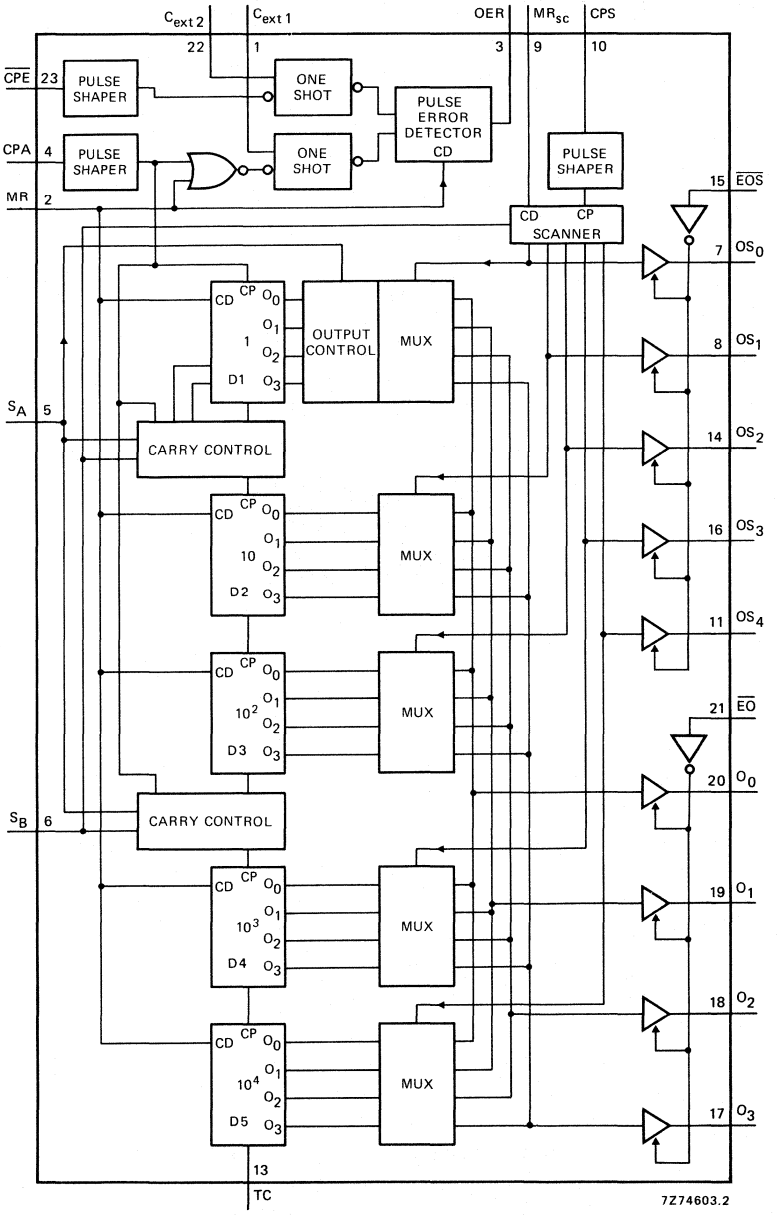


Fig. 2 Functional diagram.

DUAL PRECISION MONOSTABLE MULTIVIBRATOR

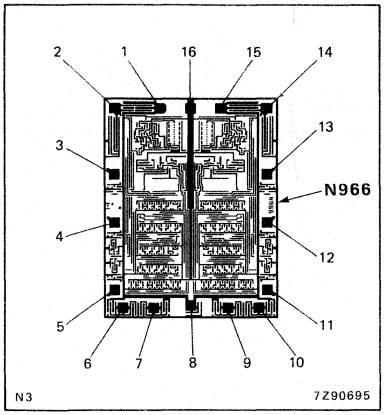


Fig. 1 Pad location diagram.

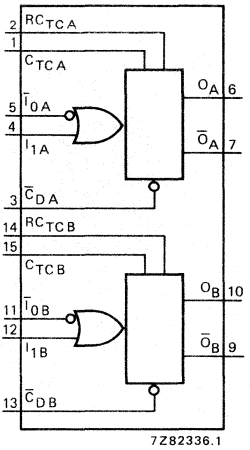


Fig. 2 Functional diagram.

Pad functions

$\bar{I}_{0A}$, $\bar{I}_{0B}$	input (HIGH to LOW triggered)
I_{1A}, I_{1B}	input (LOW to HIGH triggered)
$\bar{C}_{DA}$, $\bar{C}_{DB}$	direct reset input (active LOW)
O_A, O_B	output
$\bar{O}_A$, $\bar{O}_B$	complementary output (active LOW)
$C_{TC\,A}$, $C_{TC\,B}$	external capacitor connections
$RC_{TC\,A}$, $RC_{TC\,B}$	external capacitor/resistor connections
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4538BU
catalogue number	9336 207 30000
die number	N966
die size (mm)	2,21 x 1,74

DUAL 4-INPUT MULTIPLEXER

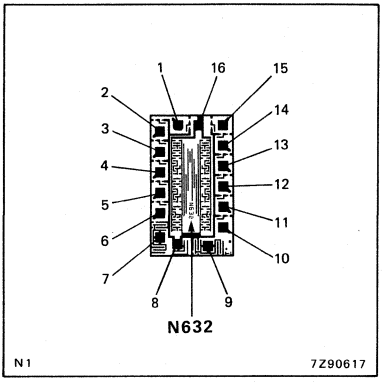


Fig. 1 Pad location diagram.

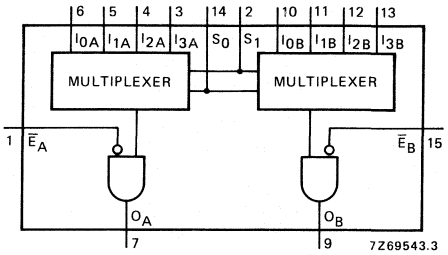


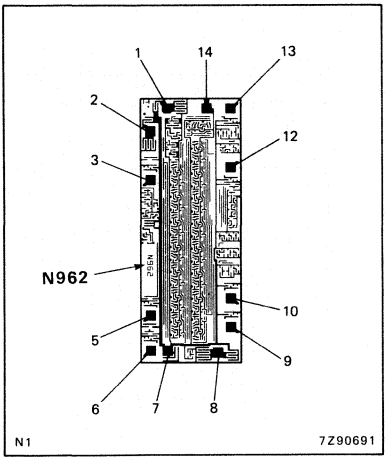
Fig. 2 Functional diagram.

Pad functions

I_{0A}, I_{1A}, I_{2A}, I_{3A}	multiplexer inputs
I_{0B}, I_{1B}, I_{2B}, I_{3B}	multiplexer inputs
S_0, S_1	select inputs
$\overline{E}_A$, $\overline{E}_B$	enable inputs (active LOW)
O_A, O_B	multiplexer outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4539BU
catalogue number	9333 788 50000
die number	N632
die size (mm)	1,48 x 0,92

PROGRAMMABLE TIMER



(numbers 4 and 11 are not used)

Fig. 1 Pad location diagram.

Pad functions

A_0, A_1	address inputs
MODE	mode select input
$\overline{AR}$	auto reset input
MR	master reset input
PH	phase input
O	timer output
R_{TC}	external resistor connection (R_t)
C_{TC}	external capacitor connection (C_t)
RS	external resistor connection (R_S) or external clock input
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

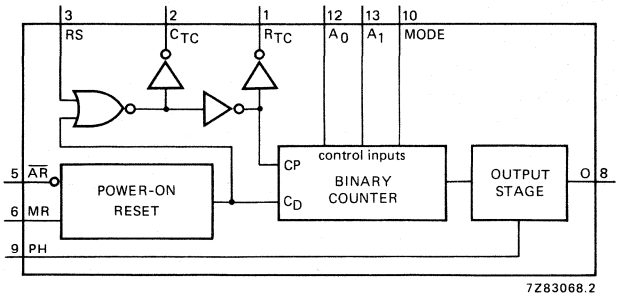


Fig. 2 Functional diagram.

commercial number	HEF4541BU
catalogue number	9336 229 80000
die number	N962
die size (mm)	2,68 x 1,06

BCD TO 7-SEGMENT LATCH/DECODER/DRIVER

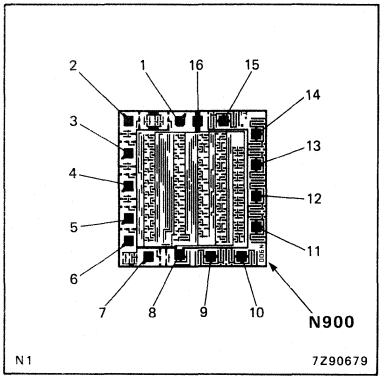


Fig. 1 Pad location diagram.

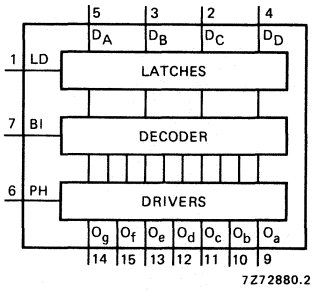


Fig. 2 Functional diagram.

Pad functions

D_A to D_D	address (data) inputs
PH	phase input (active HIGH)
BI	blanking input (active HIGH)
LD	latch disable input (active HIGH)
O_a to O_g	segment outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4543BU
catalogue number	9333 788 60000
die number	N900
die size (mm)	1,60 x 1,54

DUAL 1-OF-4 DECODER/DEMULTIPLEXER

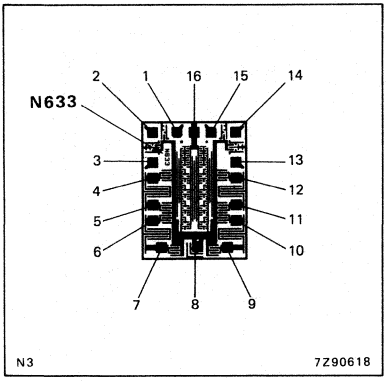


Fig. 1 Pad location diagram.

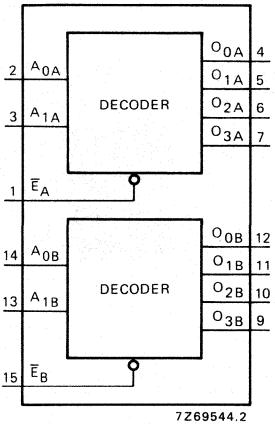


Fig. 2 Functional diagram.

Pad functions

$\overline{E}$	enable inputs (active LOW)
A_0 and A_1	address inputs
O_0 to O_3	outputs (active HIGH)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4555BU
catalogue number	9333 788 70000
die number	N633
die size (mm)	1,42 x 1,08

DUAL 1-OF-4 DECODER/DEMULTIPLEXER

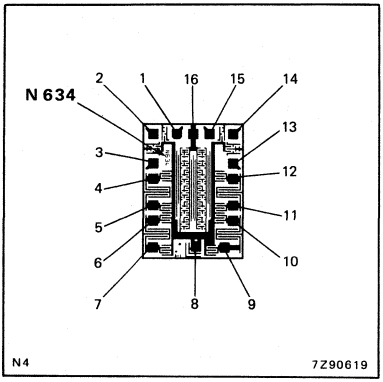


Fig. 1 Pad location diagram.

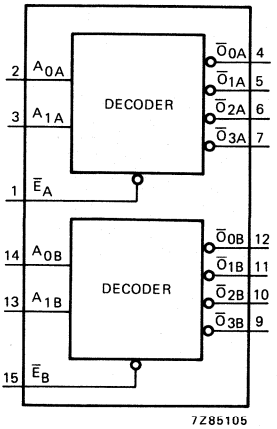


Fig. 2 Functional diagram.

Pad functions

$\overline{E}$	enable inputs (active LOW)
A_0 and A_1	address inputs
$\overline{O}_0$ to $\overline{O}_3$	outputs (active LOW)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4556BU
catalogue number	9333 788 80000
die number	N634
die size (mm)	1,42 x 1,08

1-TO-64 BIT VARIABLE LENGTH SHIFT REGISTER

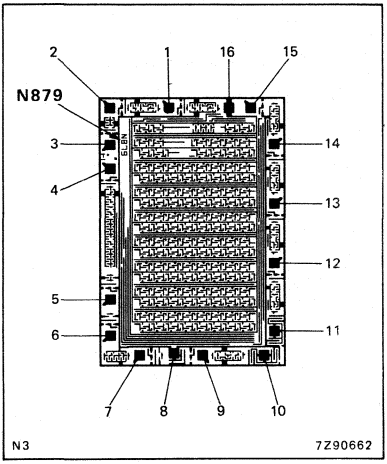


Fig. 1 Pad location diagram.

Pad functions

D_A, D_B	data inputs
$A/\overline{B}$	select data input
CP_0	clock input
$\overline{CP}_1$	clock enable input
MR	asynchronous master reset
L_1 to L_{32}	bit-length control inputs
O, $\overline{O}$	buffered outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

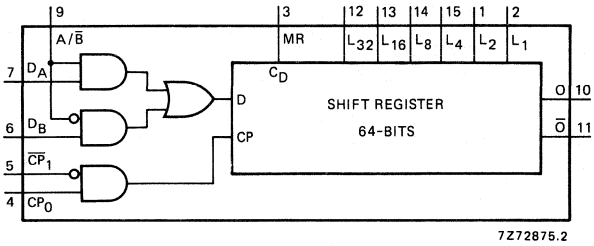


Fig. 2 Functional diagram.

commercial number	HEF4557BU
catalogue number	9333 788 90000
die number	N879
die size (mm)	2,69 x 1,85

4-BIT MAGNITUDE COMPARATOR

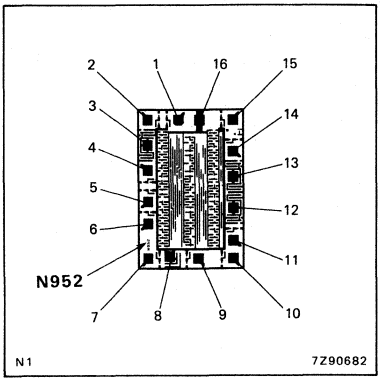


Fig. 1 Pad location diagram.

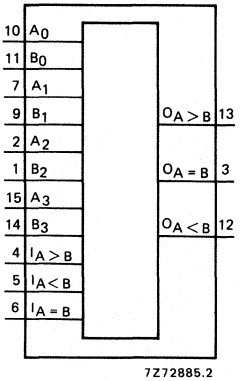


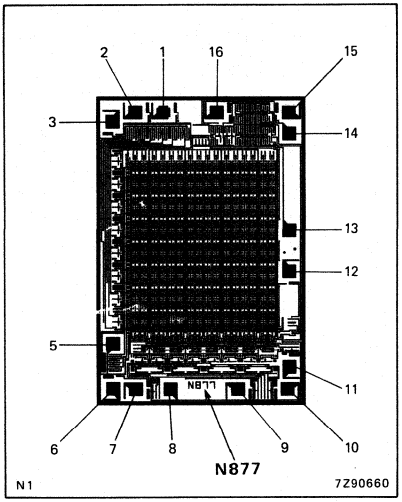
Fig. 2 Functional diagram.

Pad functions

A_0 to A_3	word A parallel inputs
B_0 to B_3	word B parallel inputs
$I_{A>B}$, $I_{A<B}$, $I_{A=B}$	expander inputs
$O_{A>B}$	A greater than B output
$O_{A<B}$	A less than B output
$O_{A=B}$	A equal to B output
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4585BU
catalogue number	9333 789 00000
die number	N952
die size (mm)	1,62 x 1,12

256-BIT, 1-BIT PER WORD RANDOM ACCESS MEMORY



(number 4 is not used)

Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4720VU
catalogue number	9336 230 70000
die number	N877
die size (mm)	3,10 x 2,10

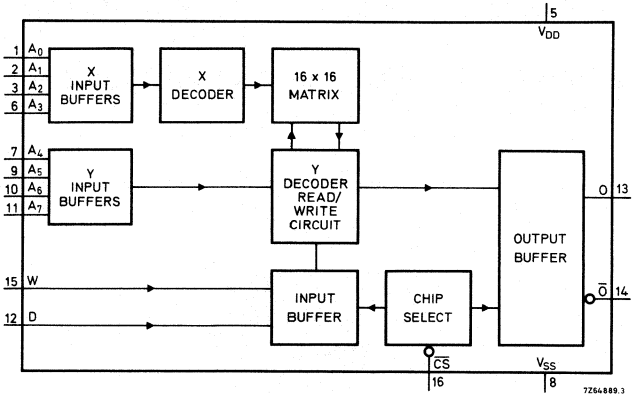


Fig. 2 Functional diagram.

Pad functions

$\overline{CS}$	chip select input (active LOW)
W	write enable input
D	data input
A_0 to A_7	address inputs
O	3-state output (active HIGH)
$\overline{O}$	3-state output (active LOW)
V_{DD}	positive supply (pad 5)
V_{SS}	negative supply (pad 8)

8-BIT ADDRESSABLE LATCH

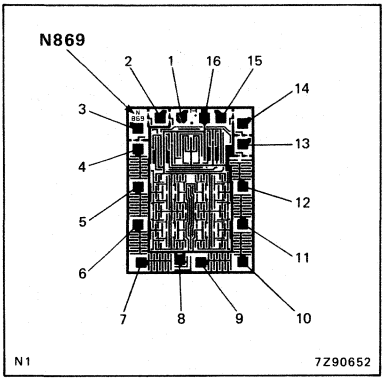


Fig. 1 Pad location diagram.

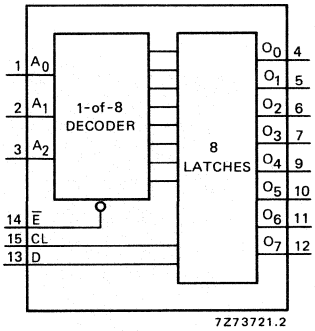


Fig. 2 Functional diagram.

Pad functions

A_0 to A_2	address inputs
D	data input
$\overline{E}$	enable input (active LOW)
CL	clear input (active HIGH)
O_0 to O_7	parallel latch outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF4724BU
catalogue number	9333 789 30000
die number	N869
die size (mm)	1,73 x 1,30

QUADRUPLE 64-BIT STATIC SHIFT REGISTER

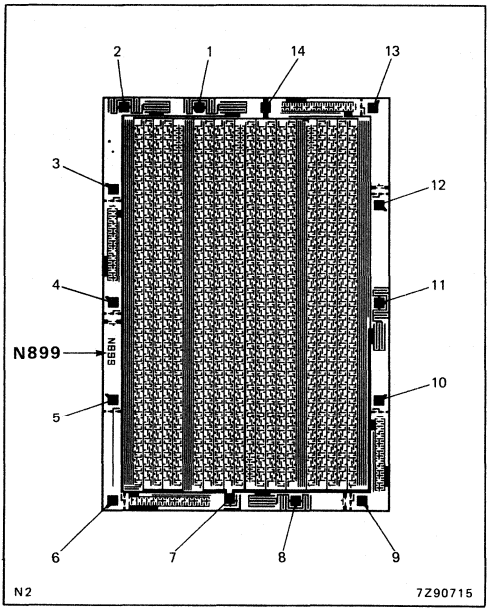


Fig. 1 Pad location diagram.

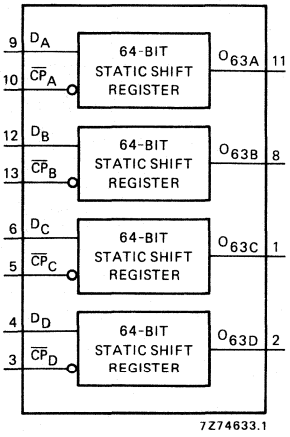


Fig. 2 Functional diagram.

Pad functions

D_A to D_D	serial data inputs
$\overline{CP}_A$ to $\overline{CP}_D$	clock inputs
O_{63A} to O_{63D}	serial data outputs from 64th register positions
V_{DD}	positive supply (pad 14)
V_{SS}	negative supply (pad 7)

commercial number	HEF4731VU
catalogue number	9336 229 90000
die number	N899
die size (mm)	4,14 x 2,91

QUADRUPLE STATIC DECADE COUNTER

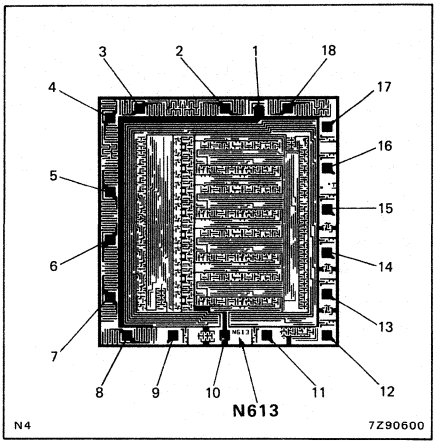


Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4737VU
catalogue number	9336 230 00000
die number	N613
die size (mm)	2,53 x 2,41

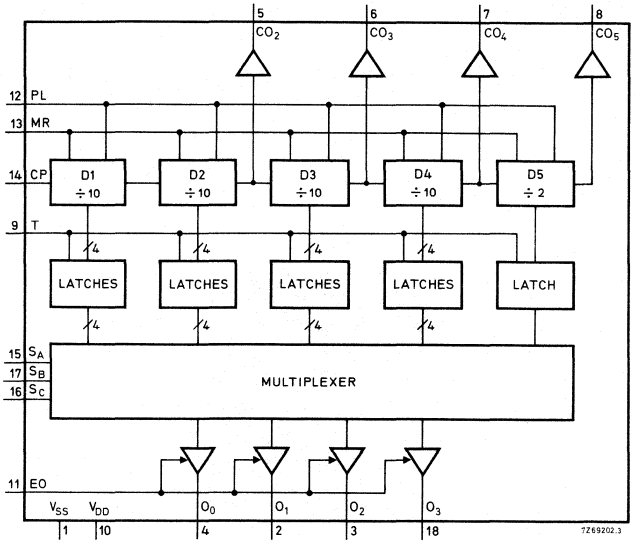
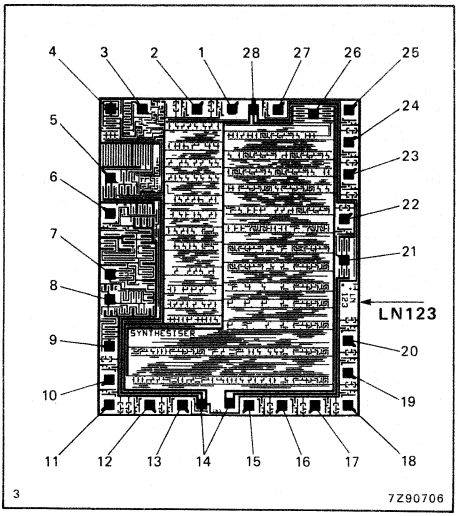


Fig. 2 Functional diagram.

Pad functions

CP	count input
MR	asynchronous reset input
PL	asynchronous preset input
T	transfer input
S_A, S_B, S_C	digit select inputs
EO	output enable input
O_0 to O_3	BCD outputs
CO_2 to CO_5	carry outputs
V_{DD}	positive supply (pad 10)
V_{SS}	negative supply (pad 1)

FREQUENCY SYNTHESIZER



Pad 14 requires two wire bonds as shown.

Fig. 1 Pad location diagram.

Functional diagram: see next page.

Pad functions

R	phase comparator input, reference
V	phase comparator input
STB	strobe input
TCA	timing capacitor C_A connection
TCB	timing capacitor C_B connection
TCC	timing capacitor C_C connection
TRA	biasing connection (resistor R_A)
PC_1	analogue phase comparator output
PC_2	digital phase comparator output
MOD	phase modulation input
OL	out-of-lock indication
OSC	reference oscillator/buffer input
XTAL	reference oscillator/buffer output
A_0 to A_9	programming inputs/programmable divider
NS_0, NS_1	programming inputs, prescaler
OUT	reference divider output
V_{DD}	positive supply (pad 28)
V_{SS}	negative supply (pad 14)

commercial number	HEF4750VU
catalogue number	9336 171 70000
die number	LN123
die size (mm)	2,56 x 3,16

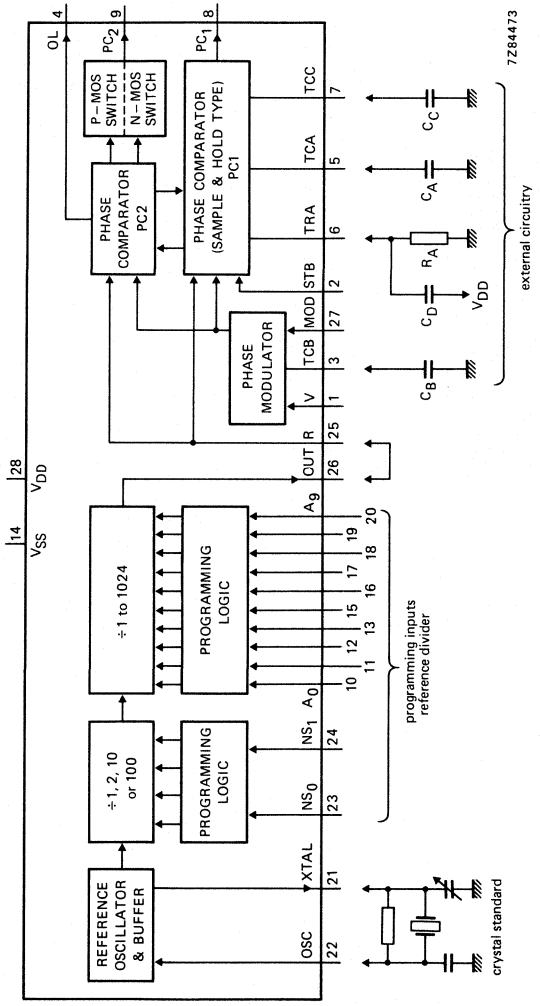


Fig. 2 Functional diagram.

UNIVERSAL DIVIDER

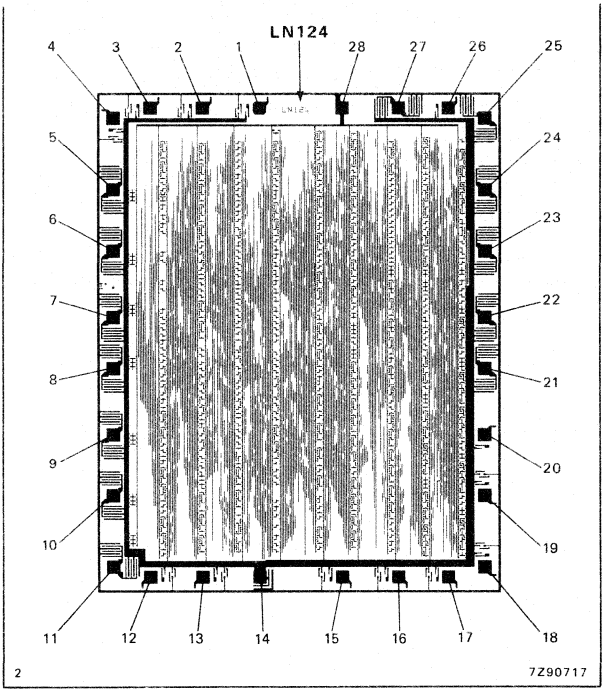


Fig. 1 Pad location diagram.

Pad functions

$\overline{A}_0$ to $\overline{A}_3$	data inputs	$\overline{OFB}_1$ to $\overline{OFB}_3$	prescaler feedback outputs
$\overline{B}_0$ to $\overline{B}_3$		$\overline{OD}_0$ to $\overline{OD}_3$	data address outputs
SI	borrow-in input	OFS	slow output signal
PC	programming process	OFF	fast output signal
PE	timing and control	V_{DD}	positive supply (pad 28)
IN	prescaler input signal	V_{SS}	negative supply (pad 14)
$\overline{RI}$	rate input		
$\overline{OSY}$	timing signal output		

Functional diagram: see next page.

commercial number	HEF4751VU
catalogue number	9336 171 80000
die number	LN124
die size (mm)	5,00 x 4,00

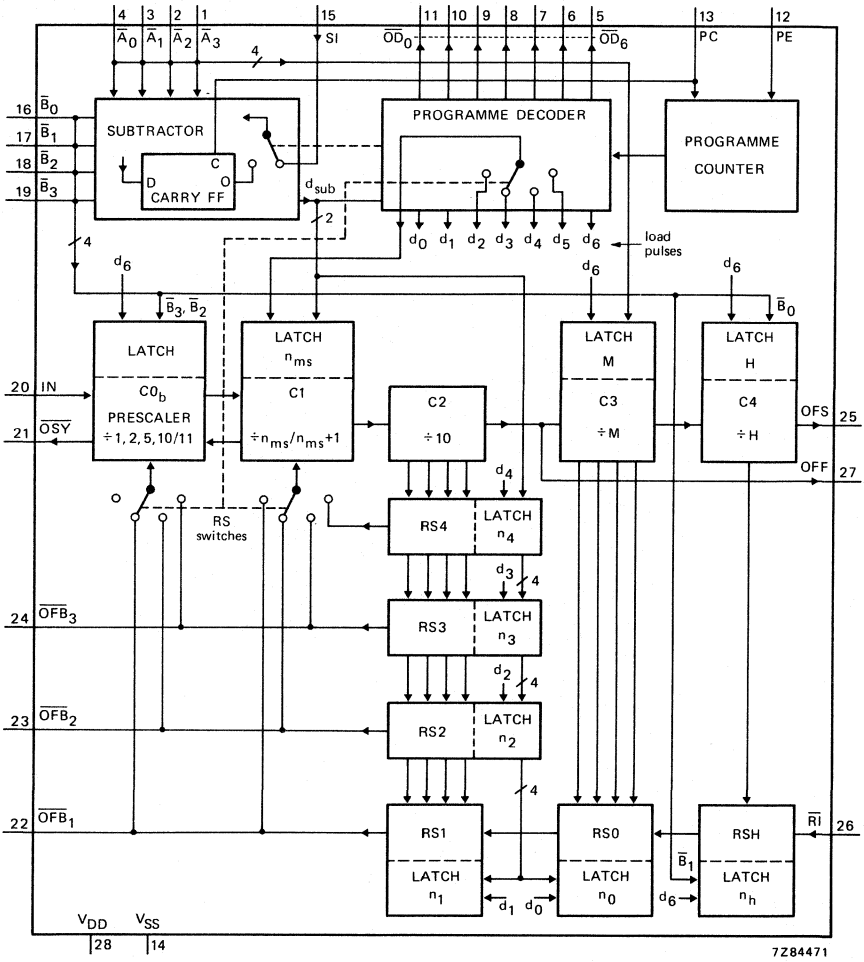


Fig. 2 Functional diagram.

UNIVERSAL TIMER MODULE

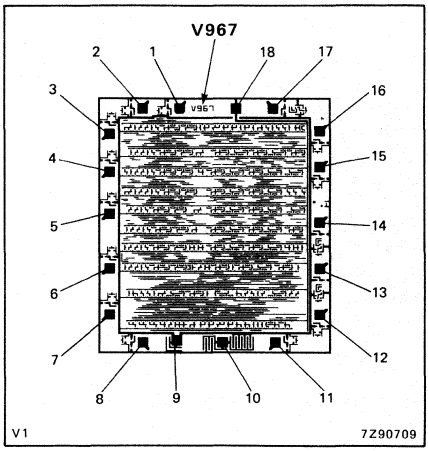


Fig. 1 Pad location diagram.

Pad functions

A to H	programmable counter address
CP	clock input
W, X	pre-divider function-select inputs
IN	input signal
LFC, Y, Z	operating mode control
OUT	output signal
V_{DD}	positive supply
V_{SS}	negative supply

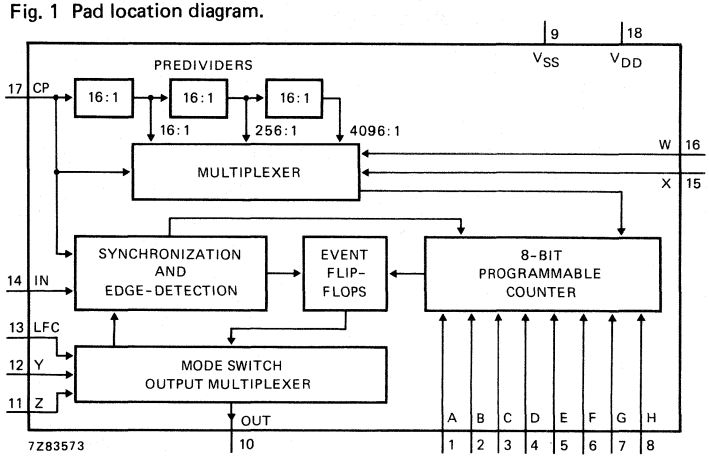


Fig. 2 Functional diagram.

commercial number	HEF4753VU
catalogue number	9336 230 40000
die number	V967
die size (mm)	2,29 x 2,58

18-ELEMENT BAR GRAPH LCD DRIVER

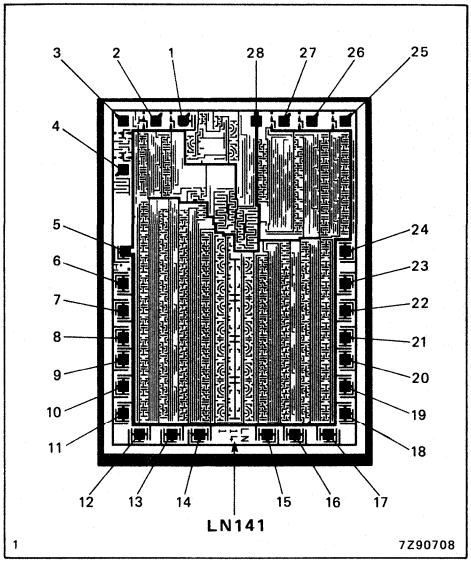


Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4754VU
catalogue number	9336 230 50000
die number	LN141
die size (mm)	2,30 x 3,20

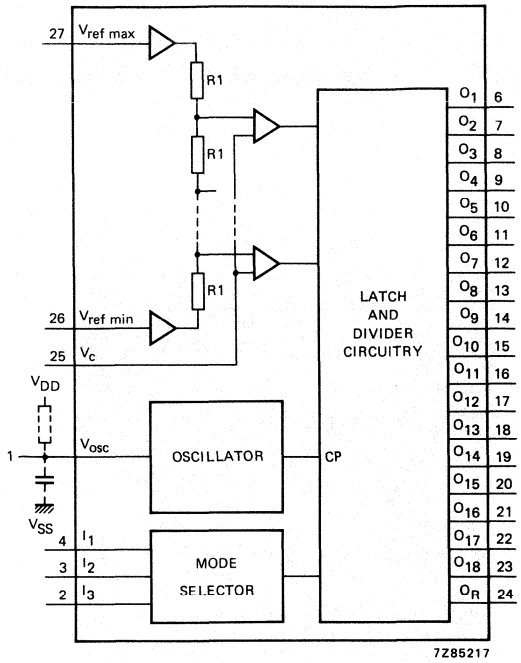


Fig. 2 Functional diagram.

Pad functions

V_{osc}	oscillator terminal
V_c	control voltage input
$V_{ref\ min}$ | $V_{ref\ max}$	reference voltage inputs
I_1	thermometer/pointer (choice select input)
I_2	peak value; reset/9 or 18 bars (choice select input)
I_3	reset; repetitively reset (choice select input)
O_1 to O_{18}	bar outputs
O_R	back plate output
V_{DD}	positive supply (pad 28)
V_{SS}	negative supply (pad 5)

TRANSCEIVER FOR SERIAL DATA COMMUNICATION

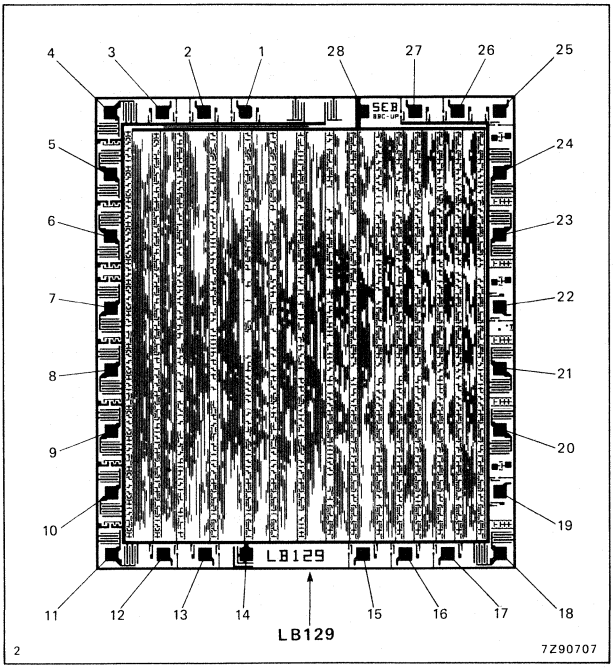
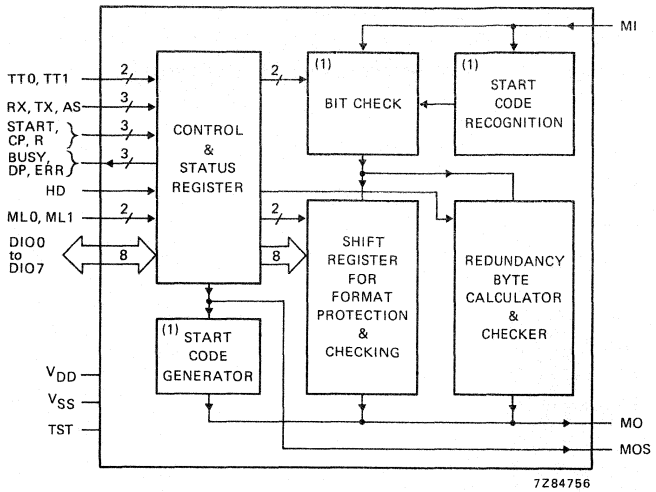


Fig. 1 Pad location diagram.

Pad functions

See next page.

commercial number	HEF4755VU
catalogue number	9336 230 60000
die number	LB129
die size (mm)	4,70 x 4,10



(1) Only used in the asynchronous mode.

Fig. 2 Functional diagram.

Pad functions

1	TST	Test pin; during normal use connected to V_{SS}. When TST is HIGH (V_{DD}), internal check points are connected to the data bus.
2 3	ML0 ML1	Input code for message length.
4 to 11	DIO0 to DIO7	Bidirectional data bus.
12	RX	Mode input: receive
13	TX	Mode input: transmit
15	AS	Mode input: asynchronous
16	R	Reset; a positive signal resets all internal registers.
17	START	Input start in transmitting mode; synchronization input (from MOS) in synchronous receiving mode.
18	BUSY	Output busy; active during receiving or transmitting a message.
19	HD	Hamming distance; determines the length of the redundancy byte: LOW = 7 bit (HD = 4) HIGH = 15 bit (HD = 6)
20	MOS	Output message synchronization used in synchronous mode.
21	MO	Message output.
22	MI	Message input.
23	DP	Output data pulse; take-over pulse for data on the data bus.
24	ERR	Output error; an active output means that at least 1 transmission error is recognized.
25	CP	Clock input; in synchronous mode equal to the transmission bit rate.
26 27	TT1 TT0	Programming of the permissible time tolerance in bit distortion.
28	V_{DD}	Positive supply voltage; 4,5 V to 12,5 V (is the logic HIGH level).
14	V_{SS}	Ground (is the logic LOW level).

3-STATE HEX NON-INVERTING BUFFER

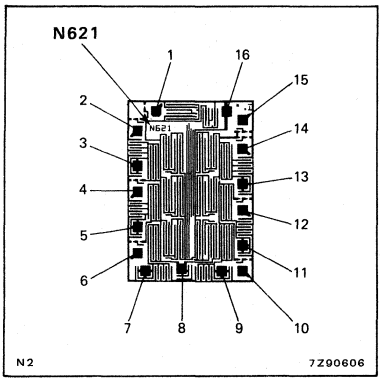


Fig. 1 Pad location diagram.

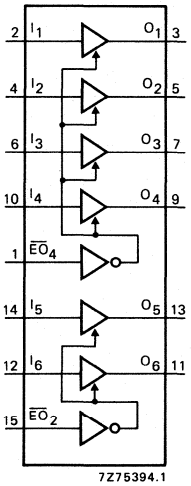


Fig. 2 Functional diagram.

Pad functions

I_1 to I_6	buffer inputs
$\overline{EO}_4$, $\overline{EO}_2$	enable inputs (active LOW)
O_1 to O_6	buffer outputs (active HIGH)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF40097BU
catalogue number	9333 789 60000
die number	N621
die size (mm)	1,84 x 1,32

3-STATE HEX INVERTING BUFFER

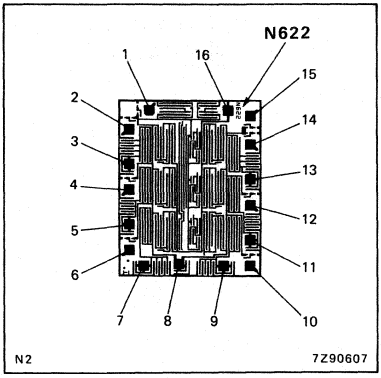


Fig. 1 Pad location diagram.

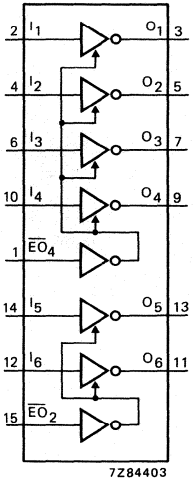


Fig. 2 Functional diagram.

Pad functions

I_1 to I_6	buffer inputs
$\overline{EO}_4$, $\overline{EO}_2$	enable inputs (active LOW)
O_1 to O_6	buffer outputs (active LOW)
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF40098BU
catalogue number	9333 789 70000
die number	N622
die size (mm)	1,82 x 1,46

HEX INVERTING SCHMITT TRIGGER

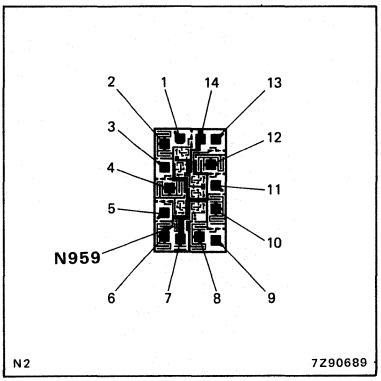


Fig. 1 Pad location diagram.

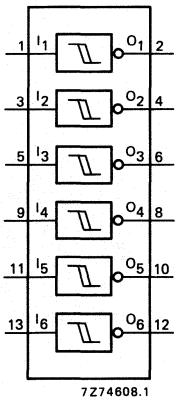


Fig. 2 Functional diagram.

Pad functions

V_{DD} positive supply (pad 14)

V_{SS} negative supply (pad 7)

commercial number	HEF40106BU
catalogue number	9334 069 70000
die number	N959
die size (mm)	1,30 x 0,80

4-BIT SYNCHRONOUS DECADE COUNTER; ASYNCHRONOUS RESET

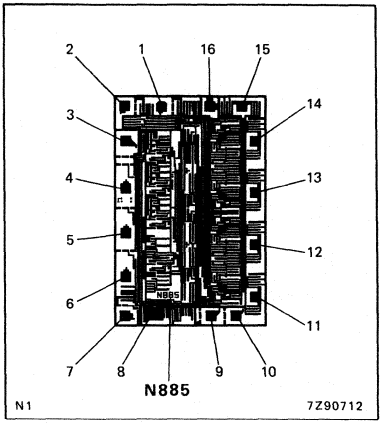


Fig. 1 Pad location diagram.

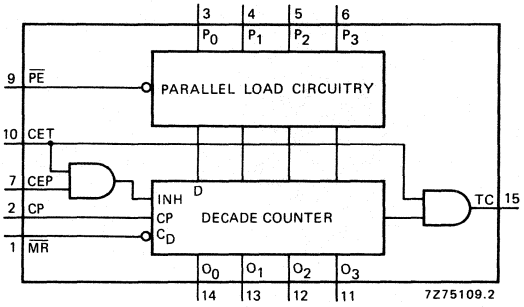


Fig. 2 Functional diagram.

Pad functions

$\overline{PE}$	parallel enable input
P_0 to P_3	parallel data inputs
CEP	count enable parallel input
CET	count enable trickle input
CP	clock input (LOW to HIGH, edge-triggered)
$\overline{MR}$	master reset input (active LOW)
O_0 to O_3	parallel outputs
TC	terminal count output
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF40160BU
catalogue number	9333 789 80000
die number	N885
die size (mm)	2,37 x 1,57

4-BIT SYNCHRONOUS BINARY COUNTER; ASYNCHRONOUS RESET

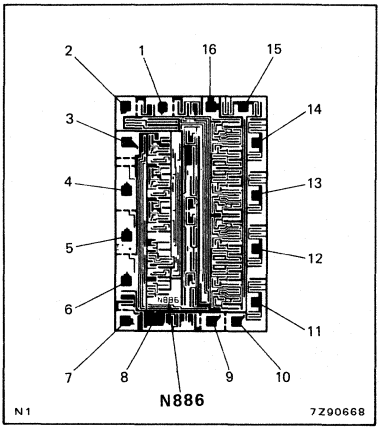


Fig. 1 Pad location diagram.

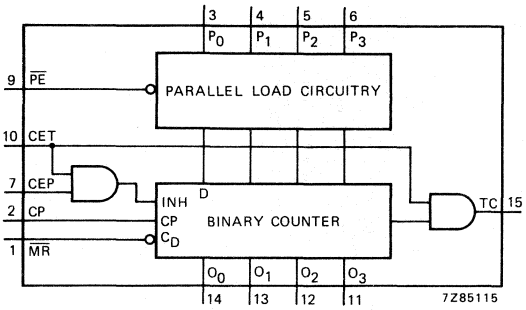


Fig. 2 Functional diagram.

Pad functions

$\overline{PE}$	parallel enable input
P_0 to P_3	parallel data inputs
CEP	count enable parallel input
CET	count enable trickle input
CP	clock input (LOW to HIGH, edge-triggered)
$\overline{MR}$	master reset input (active LOW)
O_0 to O_3	parallel outputs
TC	terminal count output
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF40161BU
catalogue number	9333 789 90000
die number	N886
die size (mm)	2,37 x 1,57

4-BIT SYNCHRONOUS DECADE COUNTER; SYNCHRONOUS RESET

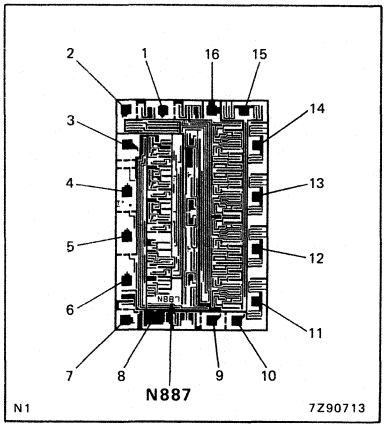


Fig. 1 Pad location diagram.

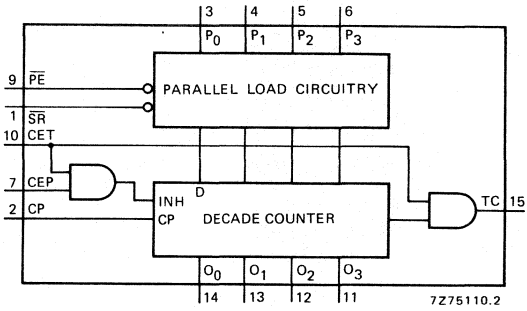


Fig. 2 Functional diagram.

Pad functions

$\overline{PE}$	parallel enable input
P_0 to P_3	parallel data inputs
CEP	count enable parallel input
CET	count enable trickle input
CP	clock input (LOW to HIGH, edge-triggered)
$\overline{SR}$	synchronous reset input (active LOW)
O_0 to O_3	parallel outputs
TC	terminal count output
V_{DD}	positive supply (pad 18)
V_{SS}	negative supply (pad 9)

commercial number	HEF40162BU
catalogue number	9333 790 00000
die number	N887
die size (mm)	2,37 x 1,57

4-BIT SYNCHRONOUS BINARY COUNTER; SYNCHRONOUS RESET

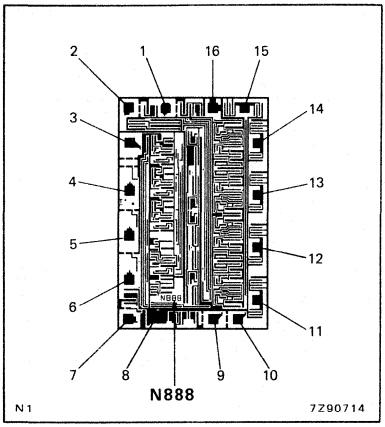


Fig. 1 Pad location diagram.

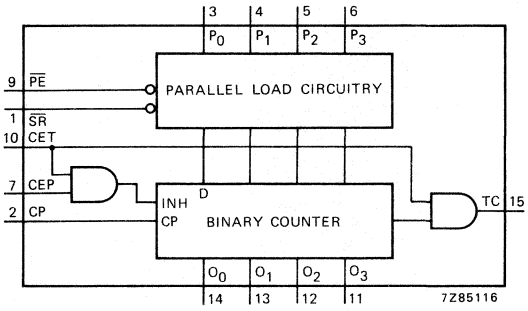


Fig. 2 Functional diagram.

Pad functions

$\overline{PE}$	parallel enable input
P_0 to P_3	parallel data inputs
CEP	count enable parallel input
CET	count enable trickle input
CP	clock input (LOW to HIGH, edge-triggered)
$\overline{SR}$	synchronous reset input (active LOW)
O_0 to O_3	parallel outputs
TC	terminal count output
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF40163BU
catalogue number	9333 790 10000
die number	N888
die size (mm)	2,37 x 1,57

HEX D-TYPE FLIP-FLOP

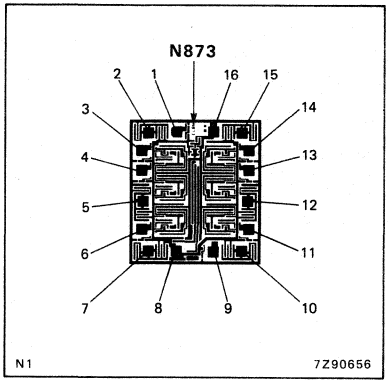


Fig. 1 Pad location diagram.

Pad functions

D_0 to D_5	data inputs
CP	clock input (LOW to HIGH; edge-triggered)
$\overline{MR}$	master reset input (active LOW)
O_0 to O_5	buffered outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

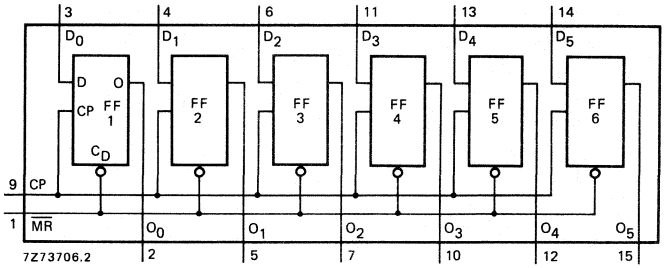


Fig. 2 Functional diagram.

commercial number	HEF40174BU
catalogue number	9333 790 20000
die number	N873
die size (mm)	1,45 x 1,30

QUADRUPLE D-TYPE FLIP-FLOP

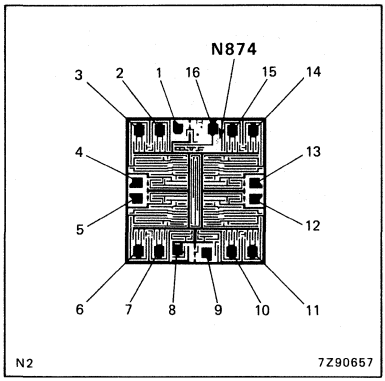


Fig. 1 Pad location diagram.

Pad functions

D_0 to D_3	data inputs
CP	clock input (LOW to HIGH; edge-triggered)
$\overline{MR}$	master reset input (active LOW)
O_0 to O_3	buffered outputs
$\overline{O}_0$ to $\overline{O}_3$	complementary buffered outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

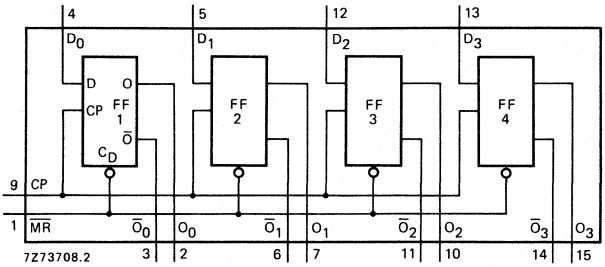


Fig. 2 Functional diagram.

commercial number	HEF40175BU
catalogue number	9333 790 30000
die number	N874
die size (mm)	1,50 x 1,45

4-BIT UP/DOWN DECADE COUNTER

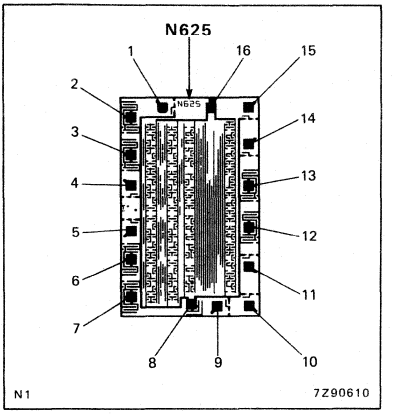


Fig. 1 Pad location diagram.

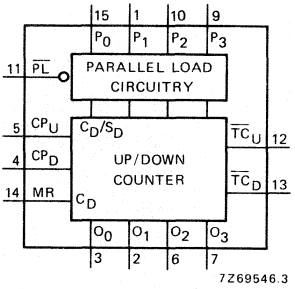


Fig. 2 Functional diagram.

Pad functions

$\overline{PL}$	parallel load input (active LOW)
P_0 to P_3	parallel data inputs
CP_U	count-up clock pulse input (LOW to HIGH, edge-triggered)
CP_D	count-down clock pulse input (LOW to HIGH, edge-triggered)
MR	master reset input (asynchronous)
$\overline{TC}_U$	buffered terminal count-up (carry) output (active LOW)
$\overline{TC}_D$	buffered terminal count-down (borrow) output (active LOW)
O_0 to O_3	buffered counter outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF40192BU
catalogue number	9333 790 40000
die number	N625
die size (mm)	2,20 x 1,40

4-BIT UP/DOWN BINARY COUNTER

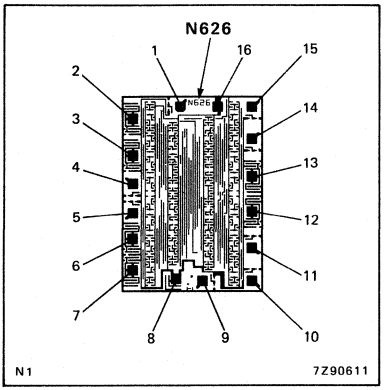


Fig. 1 Pad location diagram.

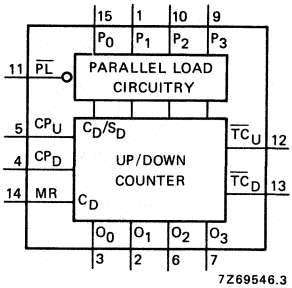


Fig. 2 Functional diagram.

Pad functions

$\overline{PL}$	parallel load input (active LOW)
P_0 to P_3	parallel data inputs
CP_U	count-up clock pulse input (LOW to HIGH, edge-triggered)
CP_D	count-down clock pulse input (LOW to HIGH, edge-triggered)
MR	master reset input (asynchronous)
$\overline{TC}_U$	buffered terminal count-up (carry) output (active LOW)
$\overline{TC}_D$	buffered terminal count-down (borrow) output (active LOW)
O_0 to O_3	buffered counter outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF40193BU
catalogue number	9333 790 50000
die number	N626
die size (mm)	1,96 x 1,44

4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTER

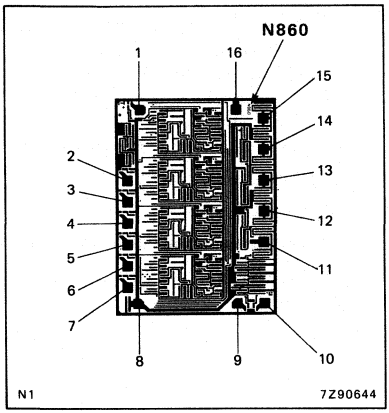


Fig. 1 Pad location diagram.

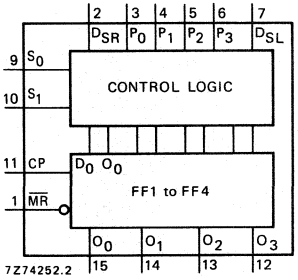


Fig. 2 Functional diagram.

Pad functions

S_0, S_1	mode control inputs
P_0 to P_3	parallel data inputs
D_{SR}	serial data shift right input
D_{SL}	serial data shift left input
CP	clock input (LOW to HIGH edge-triggered)
$\overline{MR}$	master reset input (active LOW)
O_0 to O_3	buffered parallel outputs
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

commercial number	HEF40194BU
catalogue number	9333 790 60000
die number	N860
die size (mm)	2,21 x 1,62

4-BIT UNIVERSAL SHIFT REGISTER

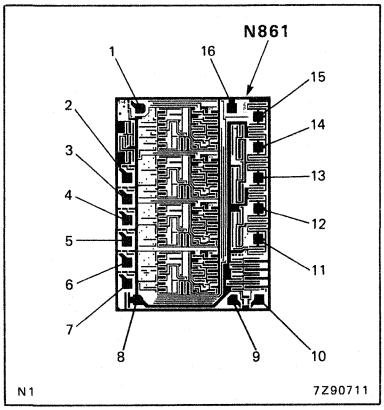


Fig. 1 Pad location diagram.

Pad functions

$\overline{PE}$	parallel enable input (active LOW)
P_0 to P_3	parallel data inputs
J	first stage J-input (active HIGH)
$\overline{K}$	first stage K-input (active LOW)
CP	clock input (LOW to HIGH edge-triggered)
$\overline{MR}$	master reset input (active LOW)
O_0 to O_3	buffered parallel outputs
$\overline{O}_3$	buffered inverted output from last stage
V_{DD}	positive supply (pad 16)
V_{SS}	negative supply (pad 8)

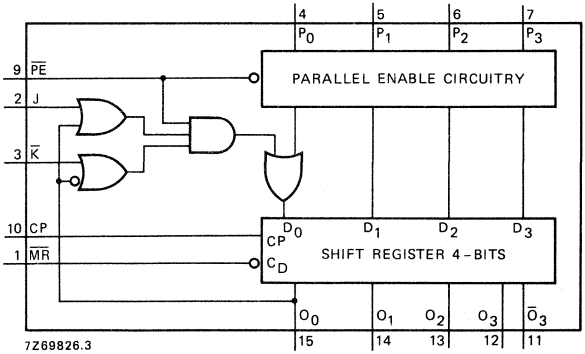


Fig. 2 Functional diagram.

commercial number	HEF40195BU
catalogue number	9333 790 70000
die number	N861
die size (mm)	2,21 x 1,62

OCTAL BUFFERS WITH 3-STATE OUTPUTS

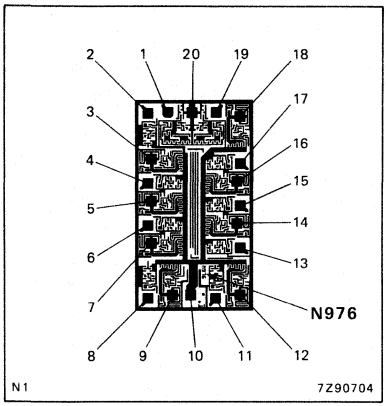


Fig. 1 Pad location diagram.

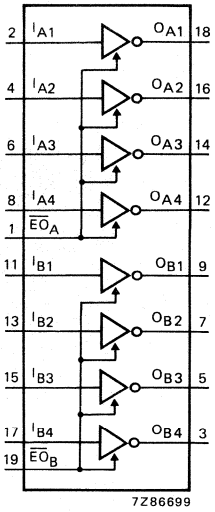


Fig. 2 Functional diagram.

Pad functions

I_{A1} to I_{A4}, I_{B1} to I_{B4}	inputs
OA_1 to OA_4, O_{B1} to O_{B4}	bus outputs
$\overline{EO}_A$, $\overline{EO}_B$	output enable inputs (active LOW)
V_{DD}	positive supply (pad 20)
V_{SS}	negative supply (pad 10)

commercial number	HEF40240BU
catalogue number	9337 275 00000
die number	N976
die size (mm)	2,12 x 1,20

OCTAL BUFFERS WITH 3-STATE OUTPUTS

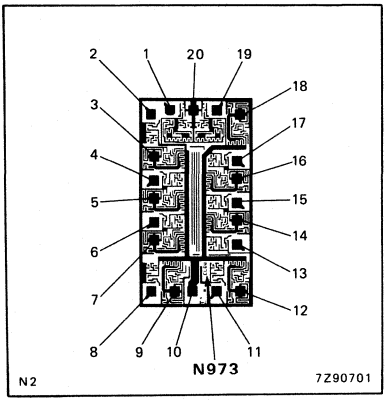


Fig. 1 Pad location diagram.

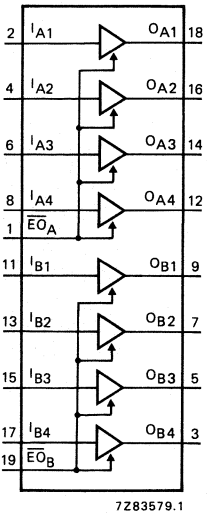


Fig. 2 Functional diagram.

Pad functions

I_{A1} to I_{A4} I_{B1} to I_{B4}	inputs
O_{A1} to O_{A4} O_{B1} to O_{B4}	bus outputs
$\overline{EO}_A$, $\overline{EO}_B$	output enable inputs (active LOW)
V_{DD}	positive supply (pad 20)
V_{SS}	negative supply (pad 10)

commercial number	HEF40244BU
catalogue number	9336 612 60000
die number	N973
die size (mm)	1,20 x 2,12

OCTAL BUS TRANSCEIVER WITH 3-STATE OUTPUTS

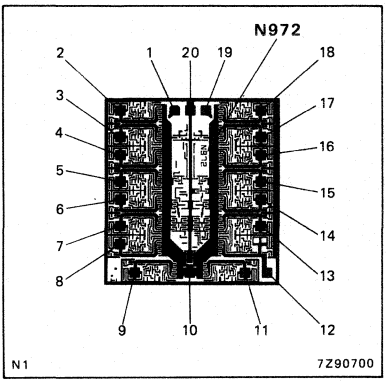


Fig. 1 Pad location diagram.

Pad functions

A_0 to A_7	data input/output
B_0 to B_7	data input/output
DR	direction input
$\overline{EO}$	output enable input (active LOW)
V_{DD}	positive supply (pad 20)
V_{SS}	negative supply (pad 10)

commercial number	HEF40245BU
catalogue number	9337 275 10000
die number	N972
die size (mm)	1,94 x 1,78

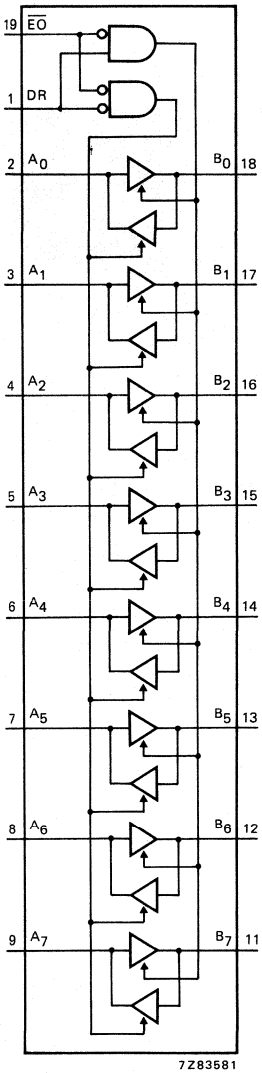


Fig. 2 Functional diagram.

OCTAL TRANSPARENT LATCH WITH 3-STATE OUTPUTS

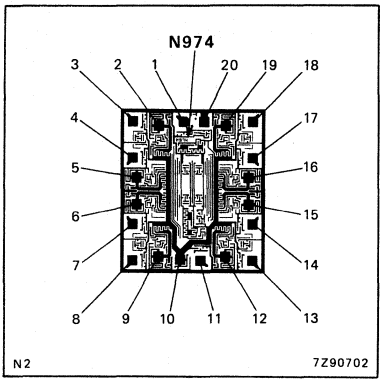


Fig. 1 Pad location diagram.

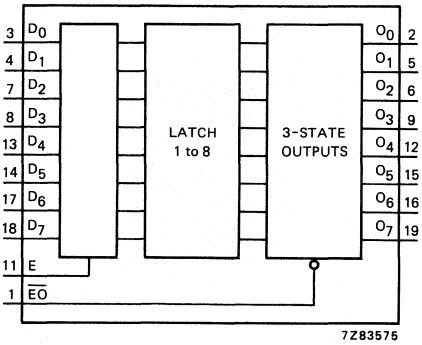


Fig. 2 Functional diagram.

Pad functions

D_0 to D_7	data inputs
E	latch enable input
$\overline{EO}$	output enable input (active LOW)
O_0 to O_7	3-state buffered outputs
V_{DD}	positive supply (pad 20)
V_{SS}	negative supply (pad 10)

commercial number	HEF40373BU
catalogue number	9337 275 20000
die number	N974
die size (mm)	1,69 x 1,52

OCTAL D-TYPE FLIP-FLOP WITH 3-STATE OUTPUTS

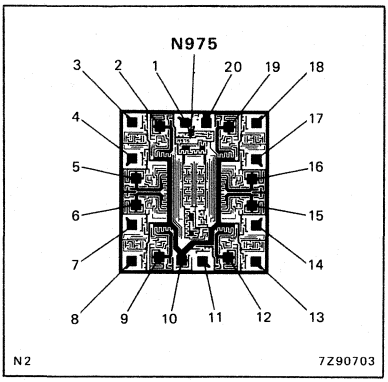


Fig. 1 Pad location diagram.

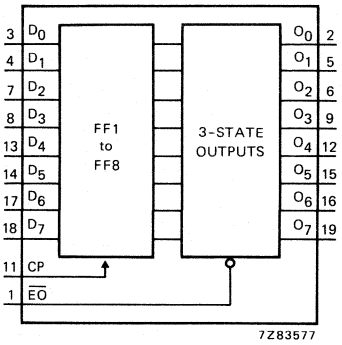


Fig. 2 Functional diagram.

Pad functions

D_0 to D_7	data inputs
CP	clock input
$\overline{EO}$	output enable input (active LOW)
O_0 to O_7	3-state buffered outputs
V_{DD}	positive supply (pad 20)
V_{SS}	negative supply (pad 10)

commercial number	HEF40374BU
catalogue number	9336 612 70000
die number	N975
die size (mm)	1,69 x 1,52

NOTES

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