

***THIS DOCUMENT IS FOR MAINTENANCE
PURPOSES ONLY AND IS NOT
RECOMMENDED FOR NEW DESIGNS***

SP8680B

575MHz ÷ 10/11

The SP8680B is an ECL variable modulus divider, with ECL and TTL compatible outputs. The circuit can operate from either ECL or TTL supplies. It divides by 10 when either of the ECL control inputs, $\overline{PE1}$ or $\overline{PE2}$, is in the high state and by 11 when both are low (or open circuit). The divider can be set asynchronously to the eleventh state by applying a high level to the master set (MS) input.

FEATURES

- Very High Speed – 650MHz (Typ.)
- ECL and TTL Compatible Inputs/Outputs
- DC or AC Clocking
- Clock Inhibit
- Asynchronous Master Set
- Equivalent to Fairchild 11C90

QUICK REFERENCE DATA

- Supply Voltage: –4.75V to –5.5V (ECL),
4.75V to 5.5V (TTL)
- Power Consumption: 420mW
- Temperature Range: –40°C to +85°C

ABSOLUTE MAXIMUM RATINGS

| | |
|-------------------------------------|-----------------|
| Supply voltage, $ V_{CC} - V_{EE} $ | 8V |
| ECL output source current | 50mA |
| Storage temperature range | –65°C to +150°C |
| Max. junction temperature | +175°C |
| TTL output sink current | 30mA |
| Max. clock input voltage | 2.5V p-p |

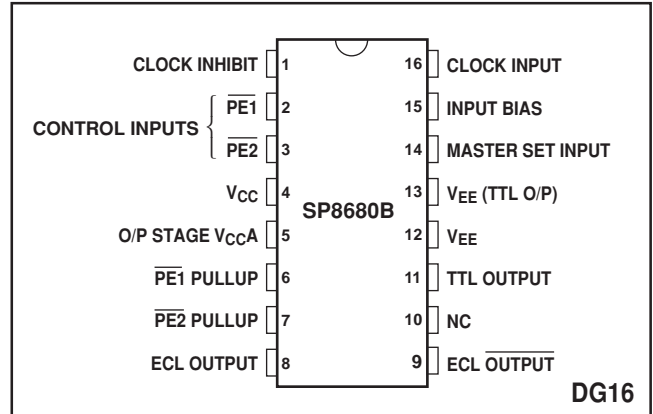


Fig. 1 Pin connections - top view

ORDERING INFORMATION

SP8680 B DG
SP8680 NA 1C

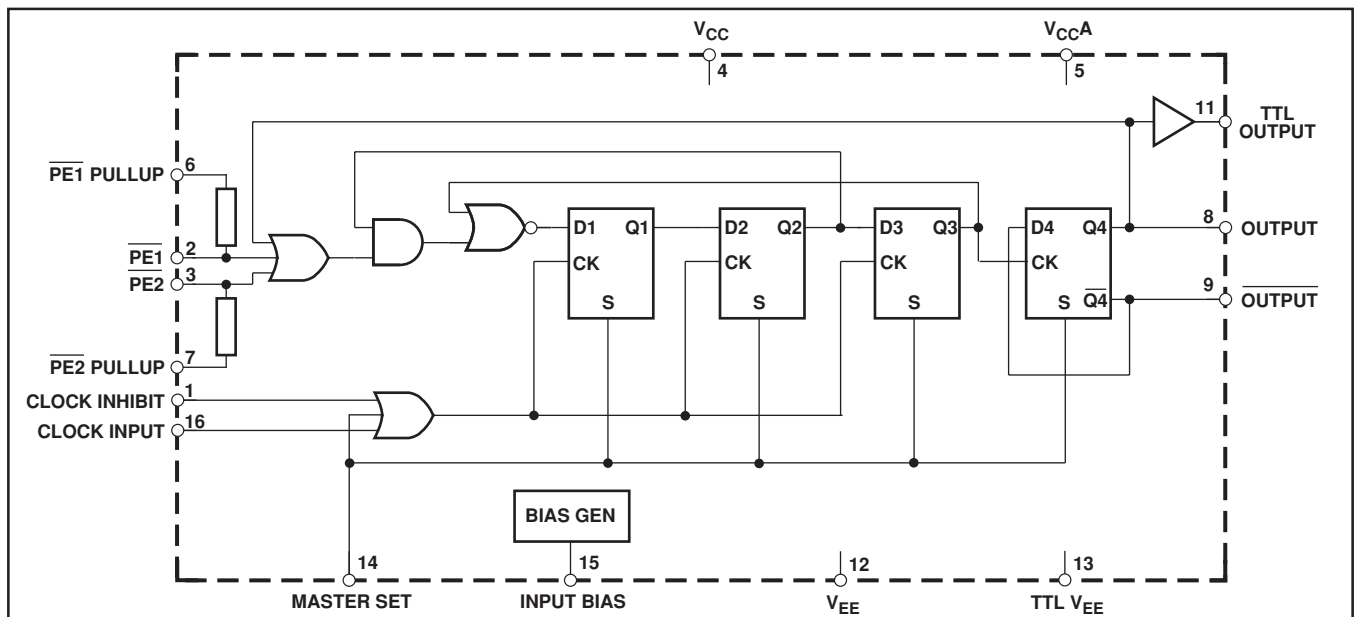


Fig. 2 Functional diagram

ELECTRICAL CHARACTERISTICS

Unless otherwise stated, the Electrical Characteristics are guaranteed over specified supply, frequency and temperature range

ECL OPERATION

Supply voltage, $V_{EE} = -4.75V$ to $-5.5V$, $V_{CC} = 0V$
 Temperature, $T_{AMB} = -40^{\circ}C$ to $+85^{\circ}C$

| Characteristic | Symbol | Value | | Units | Conditions | Notes |
|-------------------------------------|-----------|--------|--------|---------|---|-------|
| | | Min. | Max. | | | |
| Maximum frequency (sinewave input) | f_{MAX} | 575 | | MHz | AC coupled clock = 350mV p-p | 5 |
| Minimum frequency (sinewave input) | f_{MIN} | | 10 | MHz | AC coupled clock = 600mV p-p | |
| Power supply current | I_{EE} | | 105 | mA | $V_{EE} = -5.5V$, pins 6, 7, 13 o/c | |
| ECL output high voltage | V_{OH} | -0.93 | -0.78 | V | $V_{EE} = -5.2V$ (25°C), $R_L = 100\Omega$ to $-2V$ | |
| ECL output low voltage | V_{OL} | -1.85 | -1.62 | V | $V_{EE} = -5.2V$ (25°C), $R_L = 100\Omega$ to $-2V$ | |
| Input high voltage | V_{INH} | -0.095 | -0.81 | V | $V_{EE} = -5.2V$ (25°C) | |
| Input low voltage | V_{INL} | -1.85 | -1.475 | V | $V_{EE} = -5.2V$ (25°C) | |
| Input low currents | I_{IL} | 0.5 | | μA | 25°C | |
| Input high current, clock and MS | I_H | | 400 | μA | $V_{IN} = -1.85V$ (25°C) | |
| Input high current, PE1 and PE2 | I_H | | 400 | μA | $V_{IN} = -0.8V$ (25°C) | |
| Propagation delay, clock to Q4 high | t_{pLH} | | 3 | ns | $R_L = 100\Omega$ to $-2V$ (25°C) | 5 |
| Propagation delay, MS to Q4 high | t_{pLH} | | 6 | ns | 25°C | 5 |
| Modulus control set-up time | t_s | 4 | | ns | 25°C | 3, 5 |
| Modulus control release time | t_r | 4 | | ns | 25°C | 4, 5 |
| ECL output rise time (20% - 80%) | t_{ELH} | | 2 | ns | 25°C | 5 |
| ECL output fall time (80% - 20%) | t_{EHL} | | 2 | ns | 25°C | 5 |

TTL OPERATION

Supply voltage, $V_{CC} = V_{CCA} = 4.75V$ to $5.5V$, $V_{EE} = 0V$
 Temperature, $T_{AMB} = -40^{\circ}C$ to $+85^{\circ}C$

| Characteristic | Symbol | Value | | Units | Conditions | Notes |
|--------------------------------------|-----------|-------|------|-------|---|-------|
| | | Min. | Max. | | | |
| Maximum frequency (sinewave input) | f_{MAX} | 575 | | MHz | AC coupled clock = 350mV p-p | 5 |
| Minimum frequency (sinewave input) | f_{MIN} | | 10 | MHz | AC coupled clock = 600mV p-p | |
| Power supply current | I_{CC} | | 111 | mA | $V_{CC} = 5.5V$, pins 6, 7 o/c, pin 13 to pin 12 | |
| TTL output high voltage | V_{OH} | 2.3 | | V | $V_{CC} = 4.75V$, $I_{OH} = -640\mu A$ | |
| TTL output low voltage | V_{OL} | | 0.5 | V | $V_{CC} = 5.5V$, $I_{OL} = -20\mu A$ | |
| Input high voltage, PE1 and PE2 | V_{INH} | 3.9 | | V | $V_{CC} = 5.0V$ (25°C) | |
| Input low voltage, PE1 and PE2 | V_{INL} | | 3.5 | V | $V_{CC} = 5.0V$ (25°C) | |
| Input low current, PE1 and PE2 | I_{IL} | -4 | | mA | $V_{CC} = 5.5V$ (25°C), pins 6, 7 = V_{CC} , $V_{IN} = 0.4V$ | |
| Propagation delay, clock to TTL low | t_{pHL} | 6 | 14 | ns | $V_{CC} = 5.0V$ (25°C) | 5 |
| Propagation delay, clock to TTL high | t_{pLH} | 6 | 14 | ns | $V_{CC} = 5.0V$ (25°C) | 5 |
| Propagation delay, MS to TTL high | t_p | | 17 | ns | $V_{CC} = 5.0V$ (25°C) | 5 |
| Modulus control set-up time | t_s | 4 | | ns | $V_{CC} = 5.0V$ (25°C) | 3, 5 |
| Modulus control release time | t_r | 4 | | ns | $V_{CC} = 5.0V$ (25°C) | 4, 5 |
| TTL output rise time (20% - 80%) | t_{TLH} | | 5 | ns | $V_{CC} = 5.0V$ (25°C) | 5 |
| TTL output fall time (80% - 20%) | t_{THL} | | 5 | ns | $V_{CC} = 5.0V$ (25°C) | 5 |

NOTES

1. The temperature coefficients of $V_{OH} = +1.2mV/^{\circ}C$, $V_{OL} = +0.25mV/^{\circ}C$ and of $V_{IN} = +0.8mV/^{\circ}C$.
2. The test configuration for dynamic testing is shown in Fig.6.
3. The set-up time t_s is defined as the minimum time that can elapse between L→H transition of control input and the next L→H clock pulse transition to ensure that the ÷10 mode is obtained.
4. The release time t_r is defined as the minimum time that can elapse between H→L transition of control input and the next L→H clock pulse transition to ensure that the ÷11 mode is obtained.
5. Guaranteed but not tested.

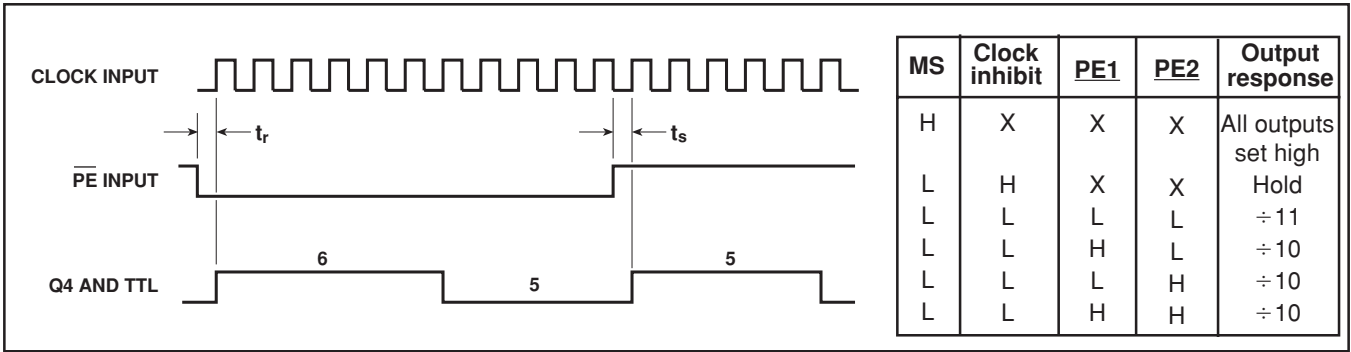


Fig. 3 Truth table and timing diagram

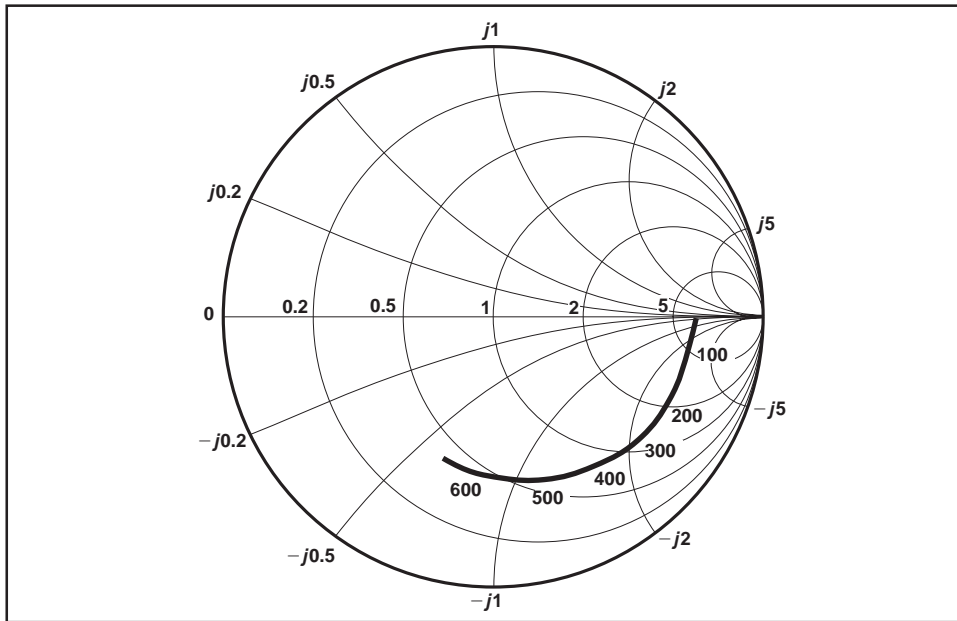


Fig. 4 Typical input impedance. Test conditions: Supply Voltage = 5V, Ambient Temperature = 25°C. Frequencies in MHz, impedances normalised to 50Ω.

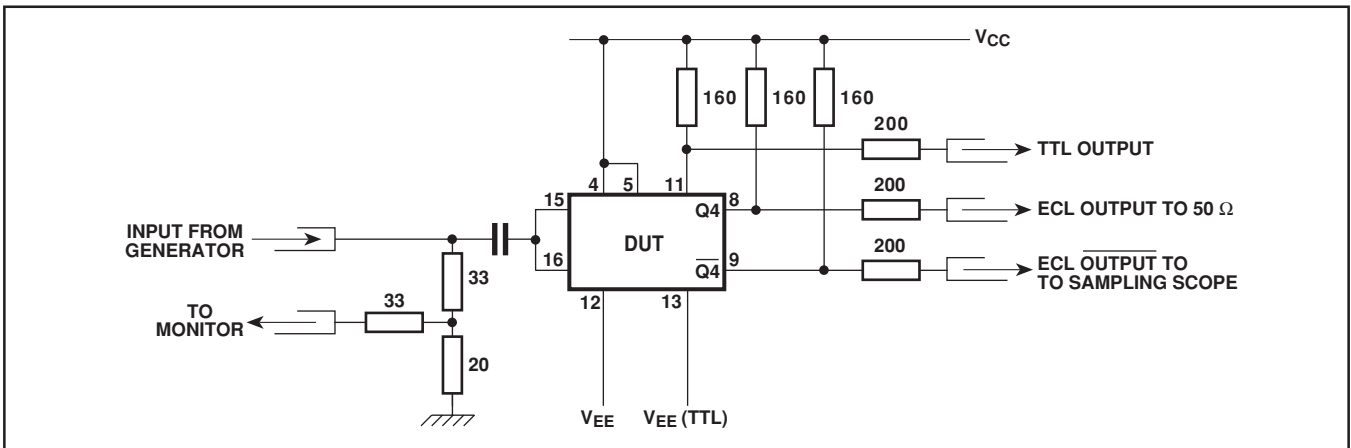


Fig. 5 Test circuit

OPERATING NOTES

1. The clock input, which is ECL10K compatible throughout the temperature range, can also be coupled to TTL as shown in Fig. 8. The clock can also be capacitively coupled to the signal source (see Fig. 6). Connecting the internally-generated bias voltage to the clock input i.e., pin 15 to pin 16, centres the clock input about the switching threshold (see Fig.7).

2. The two complementary outputs are ECL10K compatible but internal pulldown resistors are not included and therefore external pulldown resistors to V_{EE} are required. The outputs are capable of driving a 50Ω load to $-2V$ over the temperature range $-40^{\circ}C$ to $+85^{\circ}C$. The output high level will typically

be reduced by 50mV.

3. The TTL totem pole output operates with the same supply and is powered up by connecting V_{EE} (pin 12) to TTL V_{EE} (pin 13). If the TTL output is not required then the TTL V_{EE} pin should be left open circuit, reducing the power consumption by 20mW, typically.

4. Both control inputs (PE1 and PE2) are ECL10K compatible throughout the temperature range. Each control input is provided with pullup resistor, the remote ends of which are connected to pins 6 and 7, respectively. This allows the pullup resistors to be unused if so desired or to be used to interface from TTL (see Fig. 9). If interfacing to ECL is required then pins 6 and 7 should be left open circuit; alternatively, they can be connected to V_{EE} to act as pulldown resistors. When high, the master set input sets the divider to the eleventh state, is asynchronous and overrides the clock input.

5. All the inputs have internal 50kΩ pulldown resistors.

6. The circuit will operate down to DC but inputslew rate must be better than 20V/μs.

7. Input impedance is a function of frequency. See Fig. 5.

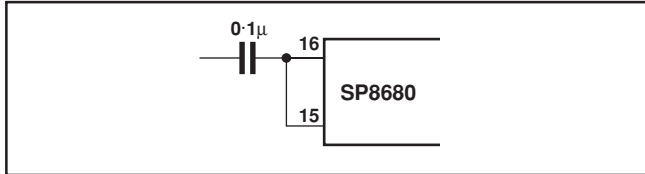


Fig. 6 AC coupled input

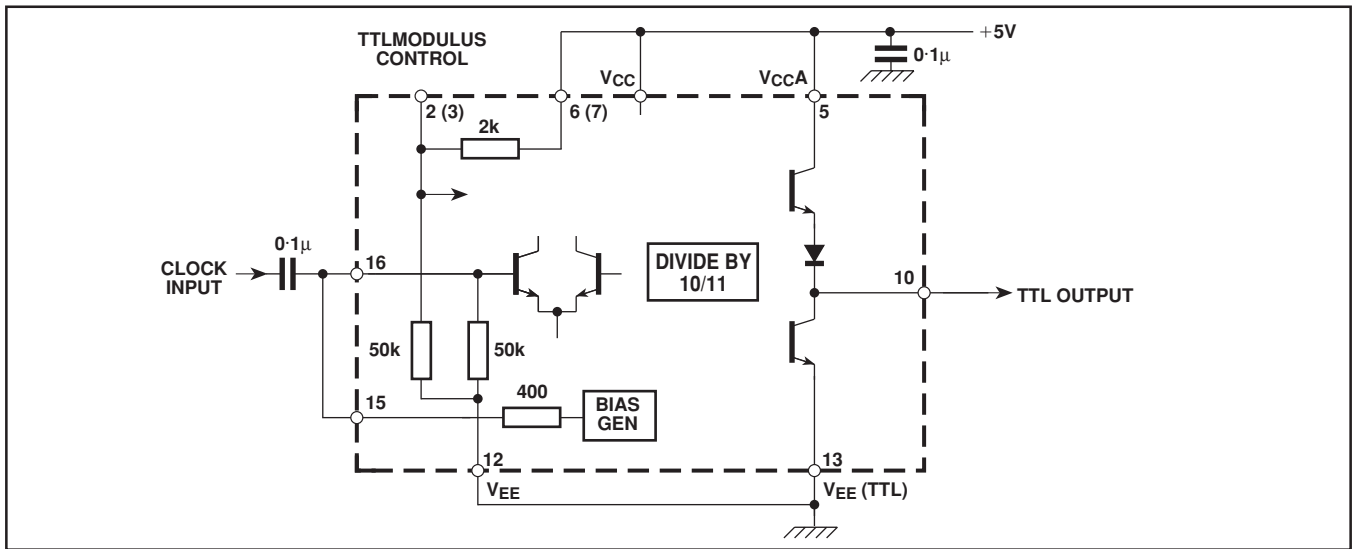


Fig. 7 Typical application showing TTL interfacing.

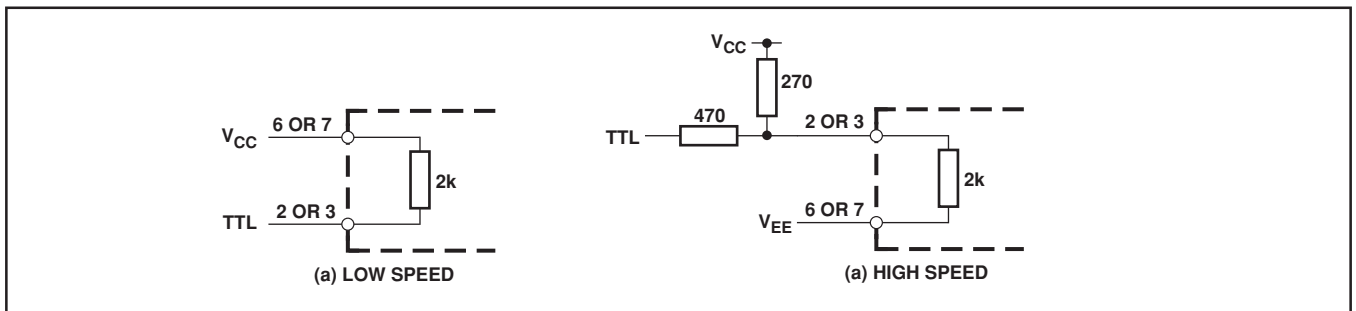
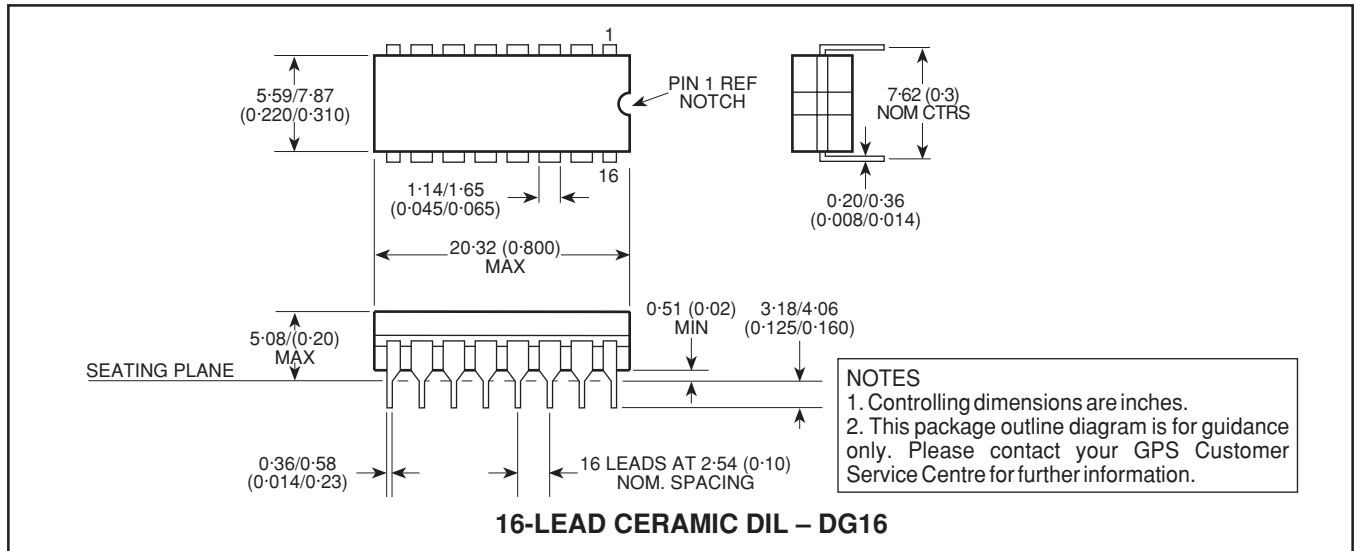


Fig. 8 TTL interface to PE1 and PE2

NOTES

PACKAGE DETAILS

Dimensions are shown thus: mm (in).



HEADQUARTERS OPERATIONS
GEC PLESSEY SEMICONDUCTORS
 Cheney Manor, Swindon,
 Wiltshire SN2 2QW, United Kingdom.
 Tel: (0793) 518000
 Fax: (0793) 518411

GEC PLESSEY SEMICONDUCTORS
 P.O. Box 660017
 1500 Green Hills Road,
 Scotts Valley, CA95067-0017
 United States of America.
 Tel (408) 438 2900
 Fax: (408) 438 5576

CUSTOMER SERVICE CENTRES

- **FRANCE & BENELUX** Les Ulis Cedex Tel: (1) 64 46 23 45 Fax : (1) 64 46 06 07
- **GERMANY** Munich Tel: (089) 3609 06-0 Fax : (089) 3609 06-55
- **ITALY** Milan Tel: (02) 66040867 Fax: (02) 66040993
- **JAPAN** Tokyo Tel: (3) 5276-5501 Fax: (3) 5276-5510
- **NORTH AMERICA** Scotts Valley, USA Tel: (408) 438 2900 Fax: (408) 438 7023.
- **SOUTH EAST ASIA** Singapore Tel: (65) 3827708 Fax: (65) 3828872
- **SWEDEN** Stockholm Tel: 46 8 702 97 70 Fax: 46 8 640 47 36
- **UK, EIRE, DENMARK, FINLAND & NORWAY**
 Swindon Tel: (0793) 518510 Fax : (0793) 518582

These are supported by Agents and Distributors in major countries world-wide.

© GEC Plessey Semiconductors 1994 Publication No. DS3645 Issue No. 1.2 March 1994

This publication is issued to provide information only which (unless agreed by the Company in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. The Company reserves the right to alter without prior knowledge the specification, design or price of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to the Company's conditions of sale, which are available on request.



**For more information about all Zarlink products
visit our Web Site at
www.zarlink.com**

Information relating to products and services furnished herein by Zarlink Semiconductor Inc. or its subsidiaries (collectively "Zarlink") is believed to be reliable. However, Zarlink assumes no liability for errors that may appear in this publication, or for liability otherwise arising from the application or use of any such information, product or service or for any infringement of patents or other intellectual property rights owned by third parties which may result from such application or use. Neither the supply of such information or purchase of product or service conveys any license, either express or implied, under patents or other intellectual property rights owned by Zarlink or licensed from third parties by Zarlink, whatsoever. Purchasers of products are also hereby notified that the use of product in certain ways or in combination with Zarlink, or non-Zarlink furnished goods or services may infringe patents or other intellectual property rights owned by Zarlink.

This publication is issued to provide information only and (unless agreed by Zarlink in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. The products, their specifications, services and other information appearing in this publication are subject to change by Zarlink without notice. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. Manufacturing does not necessarily include testing of all functions or parameters. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to Zarlink's conditions of sale which are available on request.

Purchase of Zarlink's I²C components conveys a licence under the Philips I²C Patent rights to use these components in and I²C System, provided that the system conforms to the I²C Standard Specification as defined by Philips.

Zarlink, ZL and the Zarlink Semiconductor logo are trademarks of Zarlink Semiconductor Inc.

Copyright Zarlink Semiconductor Inc. All Rights Reserved.

TECHNICAL DOCUMENTATION - NOT FOR RESALE
