



Purchase of Mitel Semiconductor I<sup>2</sup>C components conveys a licence under the Philips I<sup>2</sup>C Patent rights to use these components in an I<sup>2</sup>C System, provided that the system conforms to the I<sup>2</sup>C Standard Specification as defined by Philips.

**HEADQUARTERS OPERATIONS**

**MITEL SEMICONDUCTOR**

Cheney Manor, Swindon,  
Wiltshire SN2 2QW, United Kingdom.  
Tel: (01793) 518000  
Fax: (01793) 518411

**MITEL SEMICONDUCTOR**

1500 Green Hills Road,  
Scotts Valley, California 95066-4922  
United States of America.  
Tel (408) 438 2900  
Fax: (408) 438 5576/6231

**Internet: <http://www.gpsemi.com>**

**CUSTOMER SERVICE CENTRES**

- **FRANCE & BENELUX** Les Ulis Cedex Tel: (1) 69 18 90 00 Fax : (1) 64 46 06 07
- **GERMANY** Munich Tel: (089) 419508-20 Fax : (089) 419508-55
- **ITALY** Milan Tel: (02) 6607151 Fax: (02) 66040993
- **JAPAN** Tokyo Tel: (03) 5276-5501 Fax: (03) 5276-5510
- **KOREA** Seoul Tel: (2) 5668141 Fax: (2) 5697933
- **NORTH AMERICA** Scotts Valley, USA Tel: (408) 438 2900 Fax: (408) 438 5576/6231
- **SOUTH EAST ASIA** Singapore Tel:(65) 3827708 Fax: (65) 3828872
- **SWEDEN** Stockholm Tel: 46 8 702 97 70 Fax: 46 8 640 47 36
- **TAIWAN, ROC** Taipei Tel: 886 2 25461260 Fax: 886 2 27190260
- **UK, EIRE, DENMARK, FINLAND & NORWAY**  
Swindon Tel: (01793) 726666 Fax : (01793) 518582

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

© Mitel Corporation 1998 Publication No. DS3106 Issue No. 3.0 May 1996

TECHNICAL DOCUMENTATION – NOT FOR RESALE. PRINTED IN UNITED KINGDOM

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 notice 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.

All brand names and product names used in this publication are trademarks, registered trademarks or trade names of their respective owners.

ORDER OF DATA OUTPUT ON THE I<sup>2</sup>C BUS

Bit Order	EBU Numbering	Bit Value	VPS Equivalence
byte 1	bit 7	bit 0 - CNI b9	reserved [byte 11]
	bit 6	bit 1 - CNI b10	64 network (or programme provider)
	bit 5	bit 2 - PIL b1	16
	bit 4	bit 3 - PIL b2	8
	bit 3	byte 17 bit 0 - PIL b3	4 day
	bit 2	bit 1 - PIL b4	2
	bit 1	bit 2 - PIL b5	1
byte 2	bit 0	bit 3 - PIL b6	8
	bit 7	byte 18 bit 0 - PIL b7	4
	bit 6	bit 1 - PIL b8	2 month
	bit 5	bit 2 - PIL b9	1
	bit 4	bit 3 - PIL b10	16
	bit 3	byte 19 bit 0 - PIL b11	8
	bit 2	bit 1 - PIL b12	4 hour
byte 3	bit 1	bit 2 - PIL b13	2
	bit 0	bit 3 - PIL b14	1
	bit 7	byte 20 bit 0 - PIL b15	32
	bit 6	bit 1 - PIL b16	16
	bit 5	bit 2 - PIL b17	8
	bit 4	bit 3 - PIL b18	4 minute
	bit 3	byte 21 bit 0 - PIL b19	2
byte 4	bit 2	bit 1 - PIL b20	1
	bit 1	bit 2 - CNI b5	8
	bit 0	bit 3 - CNI b6	4
	bit 7	byte 22 bit 0 - CNI b7	2 country
	bit 6	bit 1 - CNI b8	1
	bit 5	bit 2 - CNI b11	32
	bit 4	bit 3 - CNI b12	16
byte 5	bit 3	byte 23 bit 0 - CNI b13	8 network (or programme provider)
	bit 2	bit 1 - CNI b14	4
	bit 1	bit 2 - CNI b15	2
	bit 0	bit 3 - CNI b16	1
	bit 7	byte 14 bit 0 - PCS b1	2 status (define the analog sound transmission system)
	bit 6	bit 1 - PCS b2	1
	bit 5	bit 2 - unallocated	
byte 6	bit 4	bit 3 - unallocated	
	bit 3	byte 15 bit 0 - CNI b1	128
	bit 2	bit 1 - CNI b2	64
	bit 1	bit 2 - CNI b3	32 country
	bit 0	bit 3 - CNI b4	16
	bit 7	byte 24 bit 0 - PTY b1	128
	bit 6	bit 1 - PTY b2	64
byte 7	bit 5	bit 2 - PTY b3	32
	bit 4	bit 3 - PTY b4	16 programme type
	bit 3	byte 25 bit 0 - PTY b5	8
	bit 2	bit 1 - PTY b6	4
	bit 1	bit 2 - PTY b7	2
	bit 0	bit 3 - PTY b8	1
	byte 7	bit 7	byte 13 bit 0 - LCI b1
bit 6		bit 1 - LCI b2	1 Interleave up to four PIL messages
bit 5		bit 2 - LUF	1 Label Update Flag (LUF)
bit 4		bit 3 - unallocated	
bit 3		-set to 1	
bit 2		-set to 1	
bit 1		-set to 1	
bit 0	-set to 1		

NOTE: Data is output on the I<sup>2</sup>C bus **MSB** first

# MV1820

## CRYSTAL SPECIFICATION

Parallel resonant fundamental frequency 27.750000MHz. AT cut.  
 Tolerance at -10°C to 60°C ± 50ppm.  
 Tolerance overall ± 100ppm.

Nominal load capacitance 20pF.  
 Equivalent series resistance <20Ω.

## FUNCTIONAL DESCRIPTION

The video signal is sliced to produce data and synchronising signals. Timing circuits monitor the sync signal to enable the MV1820 to lock onto the broadcast signal. A timing window, for the Vertical Blanking Interval (VBI) lines 6 - 22 and 318 - 335, is established to enable the acquisition circuit to monitor the sliced data signal for valid teletext data.

The framing code is checked for valid World System Teletext (WST) data. Magazine, packet and designation code bytes are checked and valid Broadcast Service Data Packets (BSDP) format two type only are accepted. These are known as packet 8/30. Format two is signalled by byte six, data bit two being set high and bits 3 and 4 set low. Bytes 13 to 25 inclusive are Hamming decoded (8,4) and stored in seven registers each of eight bits. If the complete message is correctly received with no uncorrectable Hamming errors, an interrupt to the microprocessor is signalled by the DAV (bar) pin going low. At the same time the data is transferred to a second bank of registers, reorganised with original numbered bytes 14, 15, 24, 25 and 13 placed after byte 23, to be read out on the I<sup>2</sup>C bus when so requested. Subsequent valid messages will continue to be transferred to the output registers overwriting any existing data. In this way the output registers always contain the latest PDC message.

The MV1820 is configured as an I<sup>2</sup>C bus slave transmitter with a selectable address. The I<sup>2</sup>C bus address is 0010 0001 (20 + 1 hex) with the address select (AS) pin set high, or 0010 0011 (22 + 1 hex) with the AS pin set low. The read bit (LSB) must always be set, it is not possible to write to the MV1820.

On recognising its address, the MV1820 will send an acknowledge and then transmit on the SDA line the first byte from the output registers (decoded byte 16 and 17) most

significant bit (MSB) first. It will then monitor the SDA line for an acknowledge from the microprocessor. If the microprocessor does NOT send an acknowledge, the MV1820 will release the data line to allow the microprocessor to send a stop condition. If the microprocessor does send an acknowledge, the following bytes of the message will be output provided each byte is acknowledged. The final data will be byte 13 followed by the four '1's.

When readout is complete, the DAV (bar) pin is reset high and the output registers are all set high. If the microprocessor continues to send clocks on the SCL line, the MV1820 will output FF bytes on the SDA line. Also, if the MV1820 is re-addressed before another PDC message is received, the MV1820 will output FF bytes on the SDA line. The microprocessor can prematurely stop the message by NOT sending an Acknowledge followed by a STOP condition after any byte has been sent by the MV1820. The registers will then be reset to FF bytes and the DAV pin will be reset high.

To prevent any corruption of the data in the output registers during I<sup>2</sup>C bus activity, valid PDC messages are held in the incoming registers until I<sup>2</sup>C bus activity ceases. Here they may be overwritten by new PDC messages until the I<sup>2</sup>C bus activity ceases and they can then be transferred to the output registers.

System clock is provided by an on - chip 27.75MHz oscillator together with an external parallel resonant fundamental frequency AT cut crystal.

Following a reset, RESET pulled low, the output I<sup>2</sup>C bus registers will contain FF bytes and the DAV pin will be set high. When the power supply is removed, the I<sup>2</sup>C bus will not be clamped to ground, leaving it free for other I<sup>2</sup>C bus traffic.

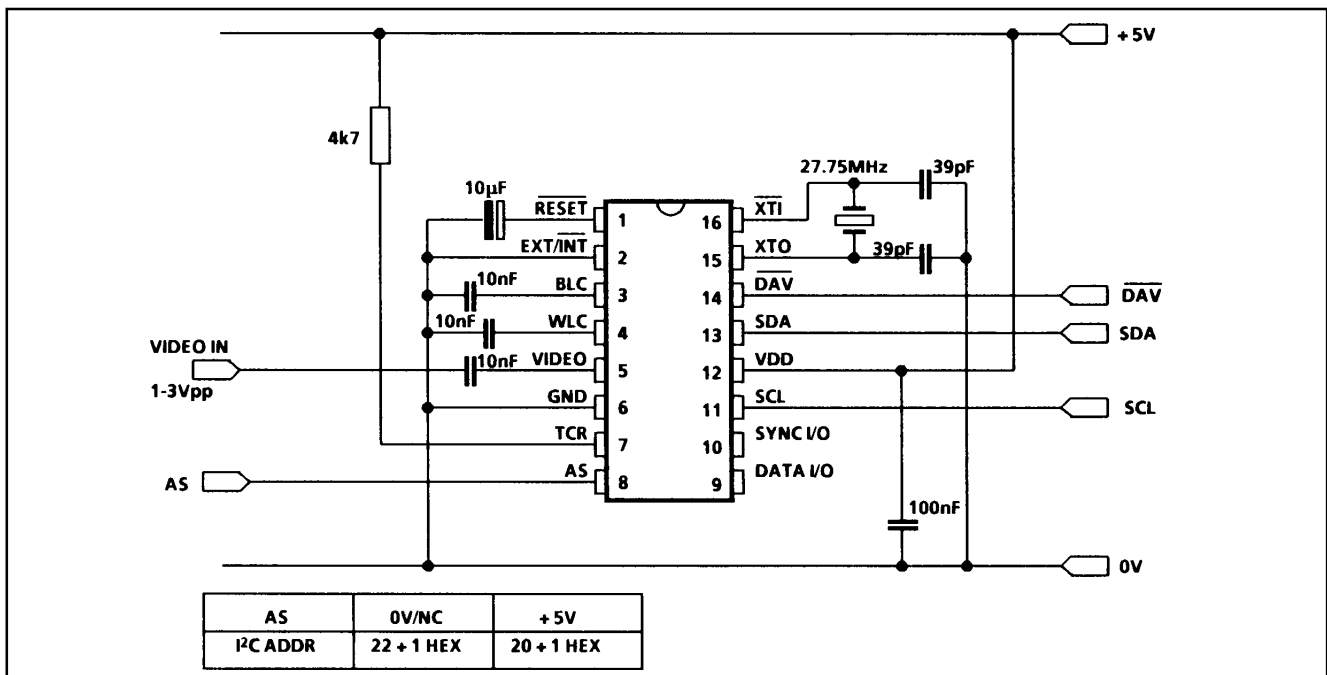


Fig.3 Typical application diagram

**ELECTRICAL CHARACTERISTICS (continued)**

These characteristics are guaranteed over the following conditions (unless otherwise stated)

$$T_{amb} = 0 \text{ to } 70^{\circ}\text{C}, V_{DD} = 5V \pm 10\%$$

Characteristic	Pin	Value			Units	Conditions
		Min	Typ	Max		
I2C bus						
SCL, SDA Schmitt inputs	11, 13					Not clamped when $V_{DD} = 0V$
Input voltage Low		0		1.5	V	
Input voltage High		3.5		$V_{DD}$	V	
Output voltage Low			0.1	0.4	V	$I_{OL} = 3.0mA$
SCL clock frequency	11		100	1000	kHz	
$\overline{DAV}$ data available						100k (nom) pull-up resistor
Output voltage low			0.2	0.4	V	$I_{OH} = 2.4mA$
$\overline{RESET}$ Schmitt input	1					100k (nom) pull-up resistor
Input voltage Low		0		0.8	V	
Input voltage High		$V_{DD}-1.0$		$V_{DD}$	V	
Input current Low		-22	-50	-220	$\mu A$	$V_{IN} = V_{SS}$
Input current High		-10		+10	$\mu A$	$V_{IN} = V_{DD}$

**NOTE**

Input voltage low and input voltage high for  $\overline{EXT}/\overline{INT}$ , AS and  $\overline{XTI}$  are as specified for DATA I/O.

PIN DESCRIPTION		
Symbol	Pin	Pin Name and Description
$\overline{RESET}$	1	<b>Active Low Reset.</b> Includes a 100k $\Omega$ pull - up resistor
$\overline{EXT}/\overline{INT}$	2	<b>Control Pin for SYNC I/O and DATA I/O.</b> Includes a 100k $\Omega$ pull - down resistor. When low or not connected, internal SYNC and DATA are used, pins 9 and 10 are outputs. When high, supply SYNC and DATA from an external source, pins 9 and 10 are inputs.
BLC	3	<b>Black level capacitor.</b>
WLC	4	<b>White level capacitor.</b>
VIDEO	5	<b>Input for composite video signal with negative going syncs</b>
GND	6	<b>Ground 0 volts.</b>
TCR	7	<b>Time constant resistor.</b> Controlling discharge rate of black and white level capacitor voltages.
AS	8	<b>Address select for I<sup>2</sup>C bus.</b> [0010 0001] with AS set high, or [0010 0011] with AS set low. Includes 100k $\Omega$ pull - down resistor.
DATA I/O	9	<b>Data input/output.</b>
SYNC I/O	10	<b>Sync input/output.</b>
SCL	11	<b>I<sup>2</sup>C bus serial clock.</b>
VDD	12	<b>Positive supply voltage +5V <math>\pm</math> 10%</b>
SDA	13	<b>I<sup>2</sup>C bus bi-directional data port.</b>
$\overline{DAV}$	14	<b>Active low open drain output data available signal to microprocessor.</b> Includes 100k $\Omega$ pull - up resistor
XTO	15	<b>Crystal out,</b> 27.75MHz fundamental crystal with on-chip 1M $\Omega$ resistor to $\overline{XTI}$ .
$\overline{XTI}$	16	<b>Crystal input.</b>

# MV1820

## ELECTRICAL CHARACTERISTICS

These characteristics are guaranteed over the following conditions (unless otherwise stated)

$$T_{amb} = 0 \text{ to } 70^{\circ}\text{C}, V_{DD} = 5V \pm 10\%$$

Characteristic	Pin	Value			Units	Conditions
		Min	Typ	Max		
Supply voltage	12	4.5	5.0	5.5	V	
Supply current	12		20	25	mA	
Video input	5					
Video amplitude		0.8	1.8	3.0	V <sub>pp</sub>	Bottom of sync to white (pk to pk)
Source impedance				250	Ω	
TCR input	7					
External resistance		4.7	4.7	200	kΩ	Connected to V <sub>DD</sub>
BLC and WLC	3 & 4					
Capacitor value			10		nF	Connected to GND
Capacitor tolerance		-10%		+10%		
Effective series resistance				5	Ω	1MHz
DATA I/O and SYNC I/O	9 & 10					
Output voltage High		V <sub>DD</sub> -1.0	4.5		V	I <sub>OH</sub> = -1.2mA
Output voltage Low			0.2	0.4	V	I <sub>OL</sub> = 2.4mA
Input voltage Low		0		0.8	V	
Input voltage High		V <sub>DD</sub> -1.0		V <sub>DD</sub>	V	
Input current		-30		+30	μA	V <sub>IN</sub> = V <sub>SS</sub> or V <sub>DD</sub>
EXT/INT	2					100k (nom) pull-down resistor
Input voltage Low		0		0.8	V	
Input voltage High		V <sub>DD</sub> -1.0		V <sub>DD</sub>	V	
Input current Low		-10		+10	μA	V <sub>IN</sub> = V <sub>SS</sub>
Input current High		22	50	220	μA	V <sub>IN</sub> = V <sub>DD</sub>
AS	8					100k (nom) pull-down resistor
Input voltage Low		0		1.0	V	
Input voltage High		V <sub>DD</sub> -1.0		V <sub>DD</sub>	V	
Input current Low		-10		+10	μA	V <sub>IN</sub> = V <sub>SS</sub>
Input current High		22	50	220	μA	V <sub>IN</sub> = V <sub>DD</sub>
X $\overline{\text{T}}$ I Input	16					
Input current Low		-0.5	-5.0	-20	μA	-0.3 < V <sub>IN</sub> < V <sub>IL</sub> max
Input current High		0.5	5.0	20	μA	V <sub>IHmin</sub> < V <sub>IN</sub> < (V <sub>DD</sub> + 0.3)
XTO Output	15					
Output voltage High		V <sub>DD</sub> -1.0	4.5		V	I <sub>OH</sub> = -1.0mA
Output voltage Low			0.2	0.4	V	I <sub>OL</sub> = 2.0mA
Frequency			27.750		MHz	±100ppm

## Video Programme Delivery Control Interface Circuit

Supersedes version in October 1995 Media IC Handbook, HB3120 - 3.0

DS3106 - 3.0 May 1996

The MV1820 is a high speed CMOS receiver for Programme Delivery Control (PDC) messages broadcast in World System Teletext (WST) Format Two Broadcast Service Data Packets (BSDP). The PDC message can be read on an I<sup>2</sup>C bus with data format similar to standard Video Programming Service (VPS) decoders. Additional data is appended to include new PDC features.

It is intended for use in Video Cassette Recorders to provide automatic recording of suitably labelled Television programmes requested by the user.

### FEATURES

- On chip data slicing
- Low external component count
- I<sup>2</sup>C bus for low cost interfacing
- Advanced CMOS technology gives low power dissipation and high reliability

### ABSOLUTE MAXIMUM RATINGS

Supply voltage	0.3V to 7V
All inputs	-0.3 to V <sub>DD</sub> +0.3V
Operating temperature	0 to +70°C
Storage temperature	-55 to 125°C

### ORDERING INFORMATION

MV1820F/CG/DPAS  
MV1820F/CG/MPES

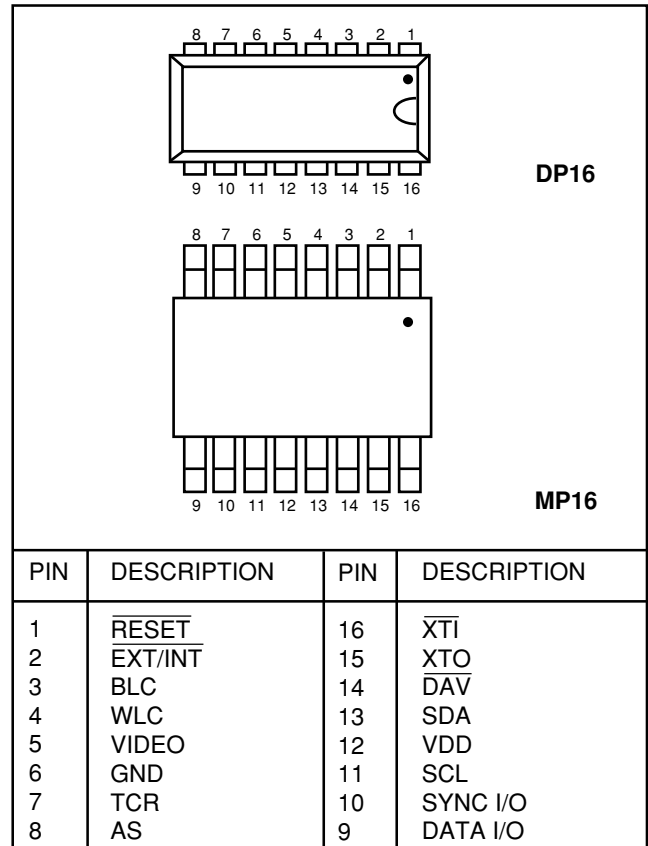


Fig.1 Pin connections - top view

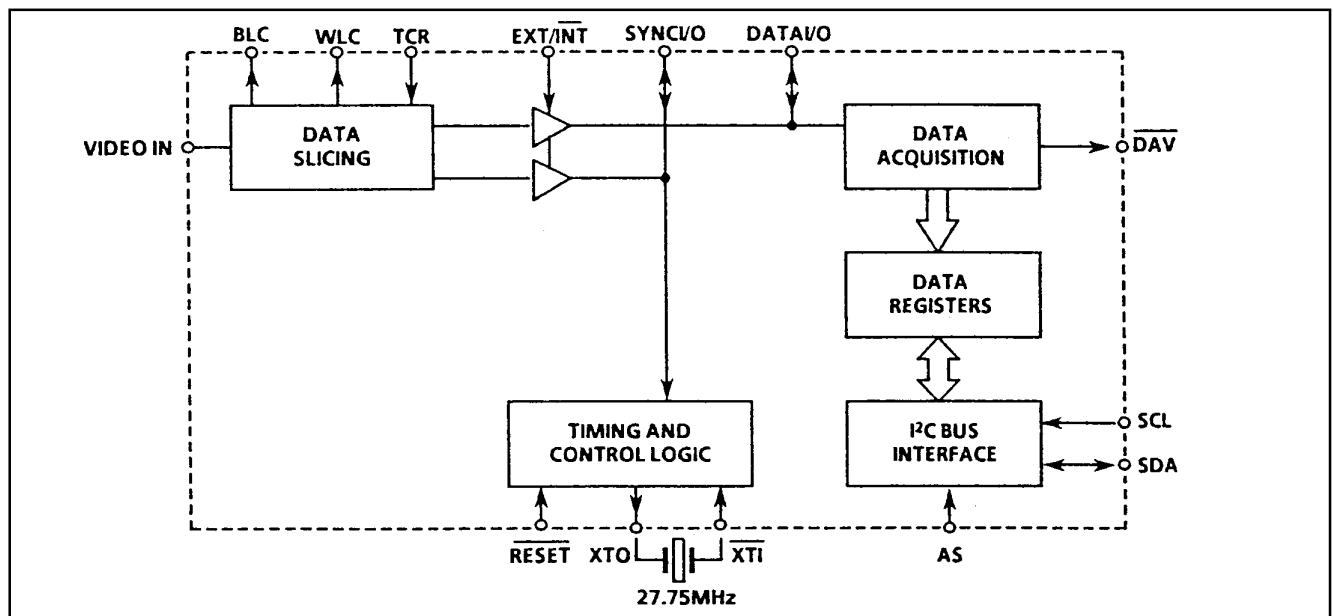
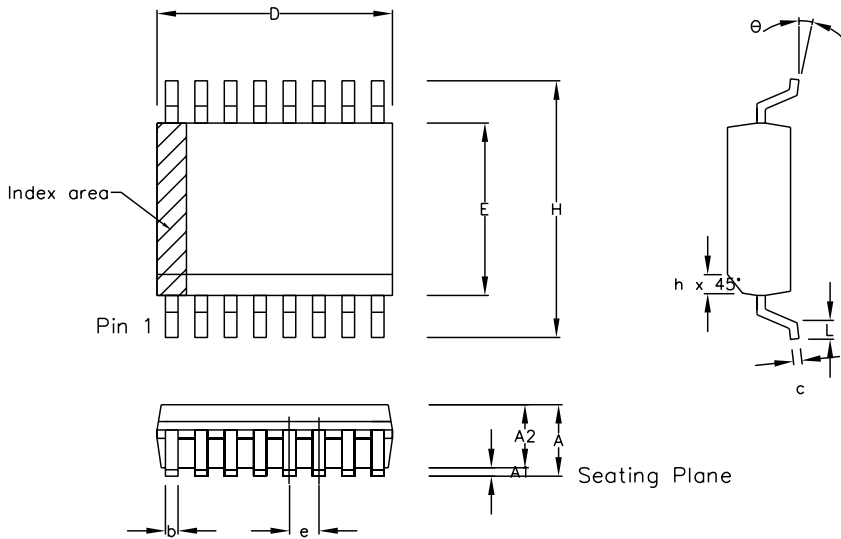



Fig.2 MV1820 block diagram

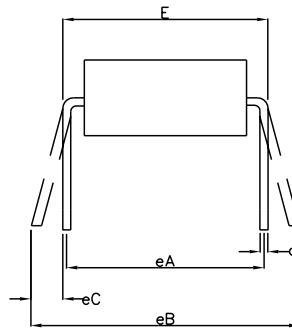
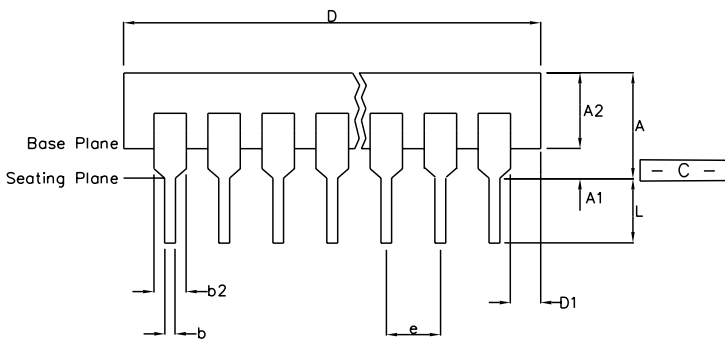
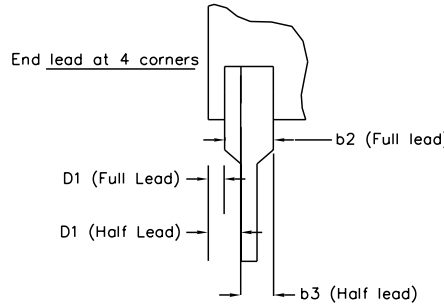
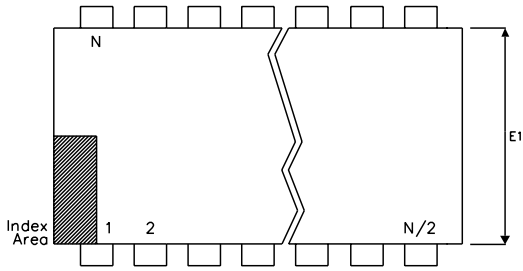


Symbol	Control Dimensions in millimetres			Altern. Dimensions in inches		
	MIN	Nominal	MAX	MIN	Nominal	MAX
A	2.35		2.65	0.093		0.104
A1	0.10		0.30	0.004		0.012
A2	2.25		2.35	0.089		0.092
D	10.10		10.50	0.398		0.413
H	10.00		10.65	0.394		0.419
E	7.40		7.60	0.291		0.299
L	0.40		1.27	0.016		0.050
e	1.27 BSC.			0.050 BSC.		
b	0.33		0.51	0.013		0.020
c	0.23		0.32	0.009		0.013
θ	0°		8°	0°		8°
h	0.25		0.75	0.010		0.029
Pin features						
N	16					
Conforms to JEDEC MS-013AA Iss. C						

Notes:

1. The chamfer on the body is optional. If it not present, a visual index feature, e.g. a dot, must be located within the cross-hatched area.
2. Controlling dimension are in millimeters.
3. Dimension D do not include mould flash, protrusion or gate burrs. These shall not exceed 0.006" per side.
4. Dimension E1 do not include inter-lead flash or protrusion. These shall not exceed 0.010" per side.
5. Dimension b does not include dambar protrusion/intrusion. Allowable dambar protrusion shall be 0.004" total in excess of b dimension.

© Zarlink Semiconductor 2002 All rights reserved.				 <b>ZARLINK</b> SEMICONDUCTOR	Package Code	DC
ISSUE	1	2	3		Previous package codes	Package Outline for 16 lead SOIC (0.300" Body Width)
ACN	6745	201939	213097		MP / S	
DATE	7Apr95	27Feb97	15Jul02			
APPRD.					GPD00013	



	Min mm	Max mm	Min Inches	Max Inches
A		5.33		0.210
A1	0.38		0.015	
A2	2.92	4.95	0.115	0.195
b	0.36	0.56	0.014	0.022
b2	1.14	1.78	0.045	0.070
b3	0.76	1.14	0.030	0.045
c	0.20	0.36	0.008	0.014
D	18.67	19.69	0.735	0.775
D1	0.13		0.005	
E	7.62	8.26	0.300	0.325
E1	6.10	7.11	0.240	0.280
e	2.54	BSC	0.100	BSC
eA	7.62	BSC	0.300	BSC
eB		10.92		0.430
eC	0.00	1.52	0.000	0.060
L	2.92	3.81	0.115	0.150
N		16		16
Conforms to JEDEC MS-001BB Issue D				

Notes:

- Dimensions D, D1 & E1 do not include mould flash or protrusions.
- Dimensions E & eA are measured with leads constrained to be perpendicular to datum  $- C -$
- Dimensions eB & eC are measured with the leads unconstrained
- Controlling dimensions are Inches. Millimeter conversions are not necessarily exact.
- N is the maximum of terminal positions.

This drawing supersedes: -  
UK drawing # 418/ED/39502/003

© Zarlink Semiconductor 2002 All rights reserved.			
ISSUE	1	2	
ACN	202541	213106	
DATE	23May97	15Jul02	
APPRD.			



Previous package codes	DP / E
------------------------	--------

Package Code	DA
Package Outline for	16 lead PDIP
	GPD00346





**For more information about all Zarlink products  
visit our Web Site at  
[www.zarlink.com](http://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 I<sup>2</sup>C components conveys a licence under the Philips I<sup>2</sup>C Patent rights to use these components in and I<sup>2</sup>C System, provided that the system conforms to the I<sup>2</sup>C 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**