

Programmable Peripheral Interface  
iAPX86 Family  
MILITARY INFORMATION

8255A

**DISTINCTIVE CHARACTERISTICS**

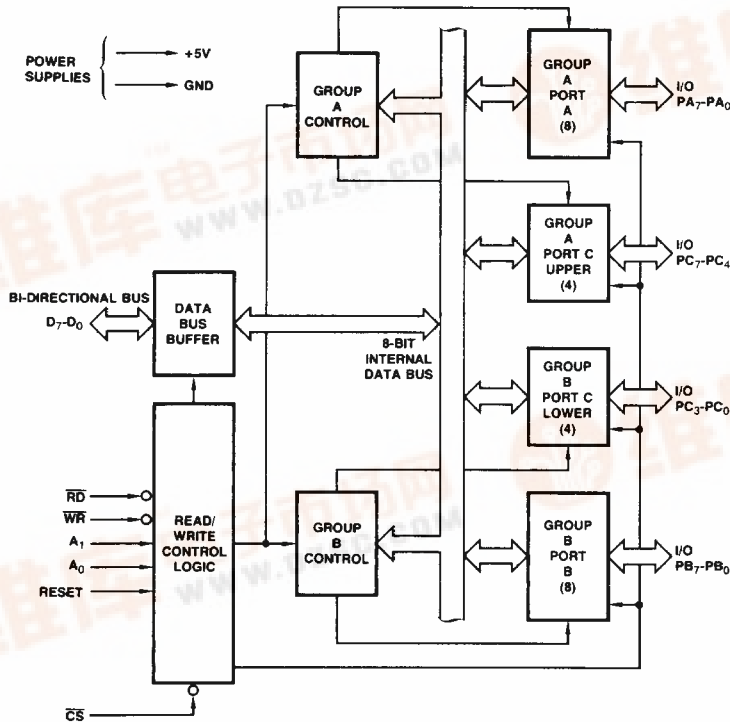
- SMD/DESC qualified
- Direct bit set/reset capability easing control application interface
- Reduces system package count
- Improved DC driving capability
- 24 programmable I/O pins
- Completely TTL-compatible
- Fully compatible with the iAPX86 microprocessor family
- Improved timing characteristics

**GENERAL DESCRIPTION**

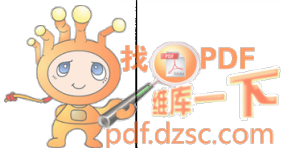
The 8255A is a general-purpose, programmable I/O device designed for use with iAPX Family microprocessors. It has 24 I/O pins which may be individually programmed in two groups of twelve, and used in three major modes of operation. In the first mode, each group of twelve I/O pins may be programmed in sets of four and eight to be input or output. In Mode 1, the second mode, each group may be

programmed to have eight lines of input or output. Of the remaining four pins, three are used for handshaking and interrupt control signals. The third mode of operation (Mode 2) is a bidirectional bus mode which uses eight lines for a bidirectional bus, and five lines, borrowing one from the other group, for handshaking.

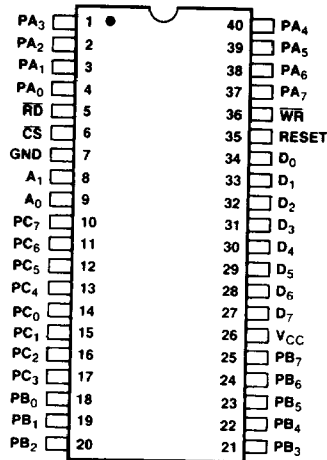
**BLOCK DIAGRAM**



BD003600



### CONNECTION DIAGRAM Top View



CD005401

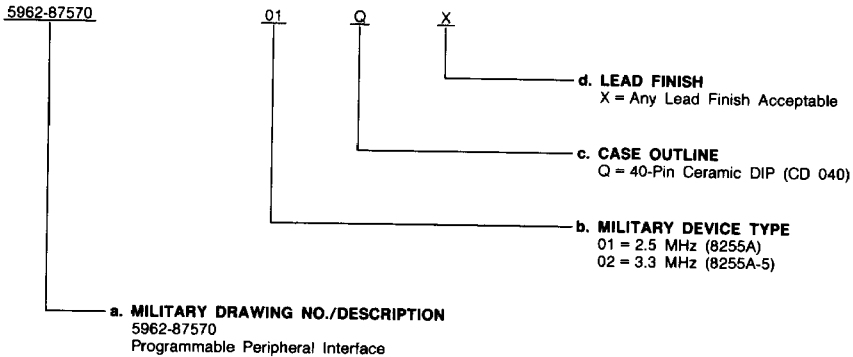
Note: Pin 1 is marked for orientation.

### MILITARY ORDERING INFORMATION

#### Standard Military Drawing (SMD)/DESC Products

AMD products for Aerospace and Defense applications are available in several packages and operating ranges. Standard Military Drawing (SMD)/DESC products are fully compliant with MIL-STD-883C requirements. The order number (Valid Combination) for SMD/DESC products is formed by a combination of:

- a. Military Drawing Part Number
- b. Device Type
- c. Case Outline
- d. Lead Finish



#### Valid Combinations

Valid Combinations	
5962-8757001	QX
5962-8757002	

Valid Combinations list configurations planned to be supported in volume for this device. Consult the local AMD sales office to confirm availability of specific valid combinations or to check for newly released valid combinations.

#### Group A Tests

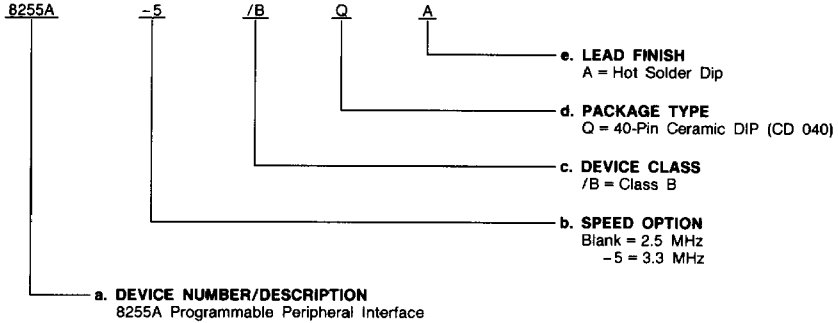
Group A tests consist of Subgroups  
1, 2, 3, 7, 8, 9, 10, 11.

**MILITARY ORDERING INFORMATION (Cont'd.)**

APL Products

AMD products for Aerospace and Defense applications are available in several packages and operating ranges. APL (Approved Products List) products are fully compliant with MIL-STD-883C requirements. The order number (Valid Combination) for APL products is formed by a combination of:

- a. Device Number**
- b. Speed Option** (if applicable)
- c. Device Class**
- d. Package Type**
- e. Lead Finish**

**Valid Combinations**

Valid Combinations list configurations planned to be supported in volume for this device. Consult the local AMD sales office to confirm availability of specific valid combinations or to check for newly released valid combinations.

Valid Combinations	
8255A	/BQA
8255A-5	

**Group A Tests**

Group A tests consist of Subgroups  
1, 2, 3, 7, 8, 9, 10, 11.

### ABSOLUTE MAXIMUM RATINGS

Storage Temperature ..... -65 to +150°C  
 $V_{CC}$  with Respect to  $V_{SS}$  ..... -0.5 to 7.0 V  
 All Signal Voltages  
 with Respect to  $V_{SS}$  ..... -0.5 to +7.0 V  
 Power Dissipation ..... 1.0 W

Stresses above those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent device failure. Functionality at or above these limits is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.

### OPERATING RANGES

Military (M) Devices  
 Temperature (TC) ..... -55 to 125°C  
 Supply Voltage ( $V_{CC}$ ) ..... 5 V  $\pm$  10%

Operating ranges define those limits between which the functionality of the device is guaranteed.

**DC CHARACTERISTICS** over operating range (for SMD/DESC and APL Products, Group A, Subgroups 1, 2, 3 are tested unless otherwise noted)

Parameter Symbol	Parameter Description	Test Conditions	Min.	Max.	Unit
$V_{IL}\dagger$	Input Low Voltage	$V_{CC} = 4.5$ V	-0.5*	0.8	V
$V_{IH}\ddagger$	Input High Voltage	$V_{CC} = 5.5$ V	2.2	5.5*	V
$V_{OL}(DB)$	Output Low Voltage (Data Bus)	$I_{OL} = 2.5$ mA, $V_{CC} = 5.5$ V		0.45	V
$V_{OL}(PER)$	Output Low Voltage (Peripheral Port)	$I_{OL} = 1.7$ mA, $V_{CC} = 5.5$ V		0.45	V
$V_{OH}(DB)$	Output High Voltage (Data Bus)	$I_{OH} = -400$ $\mu$ A, $V_{CC} = 5.5$ V	2.4		V
$V_{OH}(PER)$	Output High Voltage (Peripheral Port)	$I_{OH} = -200$ $\mu$ A, $V_{CC} = 5.5$ V	2.4		V
$I_{DAR}$	Darlington Drive Current (Note 1)	$R_{EXT} = 70$ $\Omega$ , $V_{EXT} = 1$ V, $V_{CC} = 5.5$ V	-1.0	-4.0	mA
$I_{CC}$	Power Supply Current (Note 2)	$V_{CC} = 5.5$ V		120	mA
$I_{IL}$	Input Load Current	$V_{CC} = 5.5$ V, $V_{OUT} = 0$ V, $V_{CC} = 5.5$ V		$\pm 10$	$\mu$ A
$I_{OFL}$	Output Fault Current	$V_{OUT} = V_{CC}$ to 0 V, $V_{CC} = 5.5$ V		$\pm 10$	$\mu$ A

### CAPACITANCE

$T = 25$  °C,  $V_{CC} = GND = 0$  V

Parameter Symbol	Parameter Description	Test Conditions	Min.	Typ.	Max.	Unit
$C_{IN}\ddagger$	Input Capacitance	$f_c = 1$ MHz			15*	pF
$C_{I/O}\ddagger$	I/O Capacitance	Unmeasured pins returned to GND			25*	pF

\*Guaranteed by design; not tested.

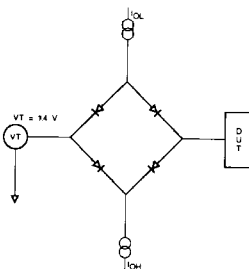
†Group A, Subgroups 9, 10, 11 only are tested.

‡Not included in Group A tests.

Notes: 1. Available on any 8 pins from Port B and C.

2.  $I_{CC}$  test conditions: the supply current is measured with loaded outputs while running AC patterns.

### SWITCHING TEST CIRCUIT



TC003850

This test circuit is the dynamic load of a Teradyne J941.

### SWITCHING TEST WAVEFORM



WF006351

AC testing: Inputs are driven at 2.4 V for a logic "1" and 0.45 V for a logic "0."

**SWITCHING CHARACTERISTICS** over operating range (for SMD/DESC and APL Products, Group A, Subgroups 9, 10, 11 are tested unless otherwise noted) (Note 1)

**BUS PARAMETERS**

No.	Parameter Symbol	Parameter Description	8255A		8255A-5		Unit
			Min.	Max.	Min.	Max.	
<b>READ</b>							
1	t <sub>AR</sub>	Address Stable Before READ	0		0		ns
2	t <sub>RA</sub>	Address Stable After READ	0		0		ns
3	t <sub>RR</sub>	READ Pulse Width	300		300		ns
4	t <sub>RD</sub>	Data Valid From READ (Note 1)		250		200	ns
5	t <sub>DF</sub>	Data Float After READ (Note 3)	10	150	10	100	ns
6	t <sub>RV</sub>	Time Between READs and/or WRITEs	850		850		ns
<b>WRITE</b>							
7	t <sub>AW</sub>	Address Stable Before WRITE	0		0		ns
8	t <sub>WA</sub>	Address Stable After WRITE	20		20		ns
9	t <sub>WW</sub>	WRITE Pulse Width	400		300		ns
10	t <sub>DW</sub>	Data Valid to WRITE (T.E.)		100		100	ns
11	t <sub>WD</sub>	Data Valid After WRITE	30		30		ns
<b>OTHER TIMINGS</b>							
12	t <sub>WB</sub>	WR = 1 to Output (Note 1)		350		350	ns
13	t <sub>IR</sub>	Peripheral Data Before RD	0		0		ns
14	t <sub>HR</sub>	Peripheral Data After RD	0		0		ns
15	t <sub>AK</sub>	ACK Pulse Width	300		300		ns
16	t <sub>ST</sub>	STB Pulse Width	500		500		ns
17	t <sub>PS</sub>	Per. Data Before T.E. of STB	0		0		ns
18	t <sub>PH</sub>	Per. Data After T.E. of STB	180		180		ns
19	t <sub>AD</sub>	ACK = 0 to Output (Note 1)		300		300	ns
20	t <sub>KD</sub>	ACK = 1 to Output Float (Note 3)	20	250	20	250	ns
21	t <sub>WOB</sub>	WR = 1 to OBF = 0 (Note 1)		650		650	ns
22	t <sub>AOB</sub>	ACK = 0 to OBF = 1 (Note 1)		350		350	ns
23	t <sub>SIB</sub>	STB = 0 to IBF = 1 (Note 1)		300		300	ns
24	t <sub>RIB</sub>	RD = 1 to IBF = 0 (Note 1)		300		300	ns
25	t <sub>RIT</sub>	RD = 0 to INTR = 0 (Note 1)		400		400	ns
26	t <sub>SIT</sub>	STB = 1 to INTR = 1 (Note 1)		300		300	ns
27	t <sub>AIT</sub>	ACK = 1 to INTR = 1 (Note 1)		350		350	ns
28	t <sub>WIT</sub>	WR = 1 to INTR = 0 (Note 1)		450		450	ns

Notes: 1. Test Conditions: V<sub>CC</sub> = 5.5 V and 4.5 V, V<sub>IH</sub> = 2.4 V, V<sub>IL</sub> = .45 V, V<sub>OH</sub> = 2.0 V, V<sub>OL</sub> = .8 V, C<sub>L</sub> = 100 pF ± 20 pF.

2. Period of Reset pulse must be at least 50 μs during or after power on. Subsequent Reset pulse can be 500 ns min.

3. AC float timing parameters t<sub>DF</sub> and t<sub>KD</sub> are tested Logic 0 to float only.