

Extended Temperature Range (-40°C to +85°C)

### Features

- Single 5 V ±5% power supply
- N channel, silicon gate, depletion load technology
- Eight bit parallel processing
- 56 Instructions
- Decimal and binary arithmetic
- Thirteen addressing modes
- True indexing capability
- Programmable stack pointer
- Variable length stack
- Interrupt capability
- Non-maskable interrupt
- Use with any type or speed memory
- Bi-directional Data Bus
- Instruction decoding and control
- Addressable memory range of up to 65 K bytes
- "Ready" input
- Direct memory access capability
- Bus compatible with MC6800
- Choice of external or on-board clocks
- 1 MHz and 2 MHz operation
- On-chip clock options
  - \* External single clock input
  - \* Crystal time base input
- 40 and 28 pin package versions
- Pipeline architecture
- Operation over wide temperature range (-40°C to +85°C)

### Description

The SYE6500 Series Microprocessors represent the first totally software compatible microprocessor family. This family of products includes a range of software compatible microprocessors which provide a selection of addressable memory range, interrupt input options and on-chip clock oscillators and drivers. All of the microprocessors in the SYE6500 family are software compatible within the group and are bus compatible with the MC6800 product offering.

The family includes six microprocessors with on-board clock oscillators and drivers and four microprocessors driven by external clocks. The on-chip clock versions are aimed at high performance, low cost applications where single phase inputs or crystals provide the time base. The external clock versions are geared for the multi-processor system applications where maximum timing control is mandatory. All versions of the microprocessors are available in 1 MHz and 2 MHz maximum operating frequencies.

### Members of the Family

PART NUMBERS			CLOCKS	PINS	$\overline{IRQ}$	$\overline{NMI}$	RDY	ADDRESSING
Plastic	Cerdip	Ceramic						
SYEP6502	SYED6502	SYEC6502	On-Chip	40	✓	✓	✓	16 (64 K)
SYEP6503	SYED6503	SYEC6503	"	28	✓	✓		12 (4 K)
SYEP6504	SYED6504	SYEC6504	"	28	✓			13 (8 K)
SYEP6505	SYED6505	SYEC6505	"	28	✓		✓	12 (4 K)
SYEP6506	SYED6506	SYEC6506	"	28	✓			12 (4 K)
SYEP6507	SYED6507	SYEC6507	"	28			✓	13 (8 K)
SYEP6512	SYED6512	SYEC6512	External	40	✓	✓	✓	16 (64 K)
SYEP6513	SYED6513	SYEC6513	"	28	✓	✓		12 (4 K)
SYEP6514	SYED6514	SYEC6514	"	28	✓			13 (8 K)
SYEP6515	SYED6515	SYEC6515	"	28	✓		✓	12 (4 K)

## Absolute Maximum Ratings\*

Rating	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	-0.3 to +7.0	V
Input Voltage	$V_{in}$	-0.3 to +7.0	V
Operating Temperature	$T_A$	-40 to +85	°C
Storage Temperature	$T_{STG}$	-55 to +150	°C

## Comment\*

This device contains input protection against damage due to high static voltages or electric fields; however, precautions should be taken to avoid application of voltages higher than the maximum rating.

D.C. Characteristics ( $V_{CC} = 5.0V \pm 5\%$ ,  $T_A = -40^\circ C$  to  $+85^\circ C$ )

( $\phi_1, \phi_2$  applies to SYE651X,  $\phi_0$  (in) applies to SYE650X)

Symbol	Characteristic	Min.	Max.	Unit
$V_{IH}$	Input High Voltage			
	Logic, $\phi_0$ (in) $\phi_1, \phi_2$	2.0 $V_{CC} - 0.5$	$V_{CC}$ $V_{CC} + 0.25$	V
$V_{IL}$	Input Low Voltage			
	Logic, $\phi_0$ (in) $\phi_1, \phi_2$	-0.3 -0.3	+0.8 +0.2	V
$I_{IL}$	Input Loading ( $V_{in} = 0V$ , $V_{CC} = 5.25V$ ) RDY, S.O.	-10	-300	$\mu A$
$I_{in}$	Input Leakage Current ( $V_{in} = 0$ to $5.25V$ , $V_{CC} = 0$ )			
	Logic (Excl. RDY, S.O.)	-	2.5	$\mu A$
	$\phi_1, \phi_2$ $\phi_0$ (in)	- -	100 10.0	$\mu A$ $\mu A$
$I_{TSI}$	Three-State (Off State) Input Current ( $V_{in} = 0.4$ to $2.4V$ , $V_{CC} = 5.25V$ ) DB0-DB7	-	10	$\mu A$
$V_{OH}$	Output High Voltage ( $I_{LOAD} = -100\mu A$ dc, $V_{CC} = 4.75V$ ) SYNC, DB0-DB7, A0-A15, R/W	2.4	-	V
$V_{OL}$	Output Low Voltage ( $I_{LOAD} = 1.6mA$ dc, $V_{CC} = 4.75V$ ) SYNC, DB0-DB7, A0-A15, R/W	-	0.4	V
$P_D$	Power Dissipation 1 MHz and 2 MHz $V_{CC} = 5.25V$	- -	700	mW
C	Capacitance ( $V_{in} = 0$ , $T_A = 25^\circ C$ , $f = 1MHz$ )			
$C_{in}$	RES, NM1, RDY, IRQ, S.O., DBE DB0-DB7	- -	10 15	pF
$C_{out}$	A0-A15, R/W, SYNC	-	12	
$C_{\phi_0}$ (in)	$\phi_0$ (in) (650X)	-	15	
$C_{\phi_1}$	$\phi_1$ (651X)	-	50	
$C_{\phi_2}$	$\phi_2$ (651X)	-	80	

Note: IRQ and NM1 require 3 K pull-up resistors.