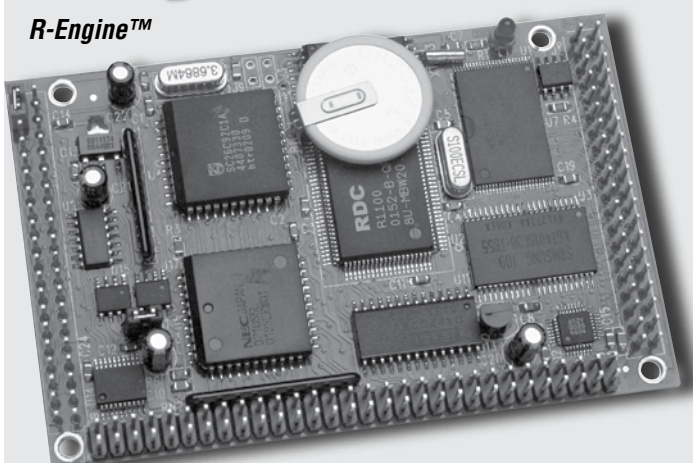# R-Engine™ (RE)

80 MHz 16-bit CPU, 3 UARTs, 16-bit ADCs, DAC, 40+ I/Os

R-Engine™

Features:

- 3.6 x 2.3 x 0.3", Easy to program in C/C++
- 160/20 mA normal/power-save
- 80 MHz R1100 or 40 MHz Am186ER
- 256 KW 16-bit Flash, 256 KW 16-bit SRAM, 512 bytes EE
- 40+ TTL I/Os, Real-time clock, 3 UARTs, PWM, counters
- 8 ch. 12-bit ADC (ADS7852), and 8 ch. 16-bit ADC (ADS8344)
- 4 ch. 12-bit DAC (DAC7625) and 4 12-bit DAC(DAC7612)

The **R-Engine™** (**RE**) is a high performance C/C++ programmable controller with a 16-bit external bus. Two versions of R-Engine are available: the **RE80** is based on the 80 MHz R1100, and **RE40** is based on the similar 40 MHz Am186ER. The **RE** is intended for OEM applications requiring industrial process control and high-speed data acquisition.

The **RE** features fast execution times through 16-bit ACTF Flash (256 KW) and battery-backed SRAM (256 KW); it also includes 3 timers, PWMs, 32 PIOs, 24 PPIs, 512-byte serial EEPROM, an internal UART, a sync serial port, 3 timer/counters, and a watchdog timer. The three 16-bit timers can be used to count or time external events, up to 10 MHz, or to generate non-repetitive or variable-duty-cycle waveforms as PWM outputs. The 32 PIO pins from the CPU are multifunctional and user programmable.

The **RE40** has 32KB internal RAM, which fulfills many embedded OEM product SRAM requirements. No external SRAM would be required for an OEM version of the RE40. This increases system reliability and decreases power consumption and cost.

A serial real-time clock (DS1337, Dallas) is a low power clock/calendar with two time-of-day alarms and a programmable square-wave output. A Dual UART (SCC2692 or SC26C92) provides two channels of full-duplex asynchronous receivers and transmitters; this combines with a single serial port available from the processor for a total of three UARTs. (This differs from most other core *Engine* controllers which offer 2 ports through the processor.) The SC26C92 DUART receivers are quadruple buffered to minimize the potential of receiver overrun or to reduce interrupt overhead. The UARTs incorporate 9-bit mode for multi-processor communications. Each DUART also offers 7 TTL inputs and 8 TTL outputs. The PPI (82C55) provides an additional 24 user programmable bi-directional I/Os.

The 16-bit ADC (ADS8344, TI) provides 8 single-ended or 4 differential analog inputs (0-5V, or 0-REF) with 65536 counts of resolution at up to 10 KHz sample rate. Two DAC (DAC7612) chips support four channels of 12-bit, 0-4.095V analog voltage outputs capable of sinking or sourcing 5 mA. A high speed parallel ADC (AD7852, 300KHz, 8 ch., 12-bit, 0-5V), and a parallel DAC (DA7625, 5 μs, 4 ch, 12-bit, 0-2.5V) can be installed.

All chips are surface mounted for highest reliability. RE works with TERN's expansion boards: MC, MCP, P50, P100 and FC0.

Ordering Information

RE80/RE40   **$99/$89/$69/$49**   **Qty 1/50/100/1K+**

Includes: 80/40MHz RE, I/Os, 3 UARTs, 3 timers, 82C55, watchdog timer, EE, 256KW Flash, 64KW SRAM

NOT including add-on options. OEM option discounts available.

Add-on Options:

1) SRAM: 256KW...$20
2) Real-time clock (RTC1337) and battery $20
4) 4 ch. 12-bit DAC, 200 KHz (DA7625)....................................$40
5) 2 ch. 12-bit DAC (DAC7612) up to 2...............................$20x2
6) 8 ch. 12-bit ADC, 300 KHz (ADS7852) $20
7) 8 ch. 16-bit ADC (ADS8344)...$30
8) Sockets for expansion: two 20x2, one 30x2 ....$9

Typical Order Example:

80 MHz R-Engine™, 256KW SRAM

RE80 + 1 = $99 + $20 = $119

Signals routed to J1 and J2, as shown below:

J1 signal

Function	Pin #	Pin #	Function
VCC	1	2	GND
OP1	3	4	CLK
RxDB	5	6	GND
TxDB	7	8	D0
VOFF	9	10	D1
/BHE	11	12	D2
D15	13	14	D3
/RST	15	16	D4
RST	17	18	D5
P16	19	20	D6
D14	21	22	D7
D13	23	24	GND
	25	26	P12
D12	27	28	A7
/WR	29	30	A6
/RD	31	32	A5
D11	33	34	A4
D10	35	36	A3
D9	37	38	A2
D8	39	40	A1

J2 signal

Function	Pin #	Pin #	Function
GND	40	39	VCC
P4	38	37	P14
IP0	36	35	P6
TxD0	34	33	/INT4
RxD0	32	31	P19
P5	30	29	P1
TxDA	28	27	OP0
RxDA	26	25	OP2
P2	24	23	P15
IP2	22	21	INT3
P0	20	19	/INT2
P25	18	17	P24
IP3	16	15	IP4
P11	14	13	OP7
P10	12	11	P13
A19	10	9	P23
/INT0	8	7	NMI
/INT1	6	5	SCLK
P26	4	3	SDAT
GND	2	1	GND