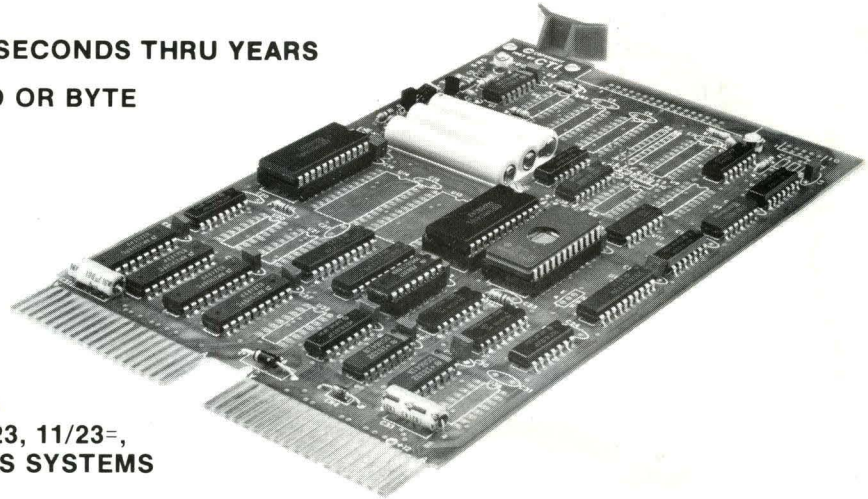# CTIMER™

MODEL 150 FEATURES

- **CMOS CALENDAR CLOCK - 0.1 SECONDS THRU YEARS**

- **CMOS RAM - 2K X 16 BIT, WORD OR BYTE ADDRESSABLE**

- **WATCHDOG TIMER - 12 SELECTABLE DELAYS**

- **SOFTWARE SUPPORT PROVIDED FOR RT-11 & RSX-11**

- **LONG LIFE ON-BOARD NI-CAD BATTERY BACKUP**

- **SUPPORTS LSI-11/02, 11/21, 11/23, 11/23=, 11/73, MicroVAX 1, & 68000 Q-BUS SYSTEMS**

GENERAL

The Model 150 C-Timer features a complete CMOS Calendar Clock on a dual-wide Q-bus module. Additional functions include a 16-bit by 2048 word CMOS memory, battery backup and a unique Watchdog Timer. We provide all required software for RT-11 and RSX-11 integration. No sysgen or patching of your operating system is required. Time consuming system integration is totally elimintated!

CALENDAR CLOCK

The CMOS Calendar Clock provides time and date information including tenths of seconds, seconds, minutes, hours, days, day of the week, month and year with automatic Leap Day insertion. The Calendar Clock is controlled by a stable crystal oscillator which provides a typical error of less than 4 seconds per month.

The C-Timer contains Ni-Cad batteries which provide 60 days of standby power to the CMOS memory and Calendar Clock. The batteries are long-life devices (3 to 5 years) designed specifically for the high-temperature conditions found in computers. Premature failures, which often occur in low cost button cell devices, are virtually eliminated. The batteries are automatically trickle-charged when 5 volt system power is available.

WATCHDOG TIMER

The Watchdog Timer will automatically re-boot your LSI-11 system in the event a hardware or software problem prevents normal code execution. (The re-boot is accomplished by toggling the Q-Bus DCOK line which produces a re-start operation.) The Watchdog is prevented from performing a re-boot by reading I/O address 777340 at least once during the selected time interval. Twelve different time delays from less than 0.14 seconds to greater than 18 minutes can be jumper selected for the re-boot interval. The Watchdog Timer can be disabled with a single jumper.

Many insidious problems can and do prevent proper code execution in real world situations. Examples include static discharge, power line transients, operating system bugs, memory or media errors and intermittent hardware problems with disk or tape. The result is often a hung or halted machine which can be prevented by the Watchdog Timer's automatic system recovery.

CMOS RAM

The CMOS RAM provides 2048 16-bit words of read/write memory, each of which is word or byte addressable. The CMOS RAM appears in the I/O page as 256 contiguous words. Different 256 word pages are selected using a page select register. Memory contents are fully protected by the battery backup, in conjunction with power fail circuitry.

TECHNICAL SUPPORT

The C-Timer manual provides step-by-step instructions and documented program source listings to simplify integration of the Calendar Clock into your RT-11 or RSX-11 system. The routines are simply edited into the start-up command file of your operating system. On power up, the appropriate registers within the operating system are automatically loaded with the correct date and time information. The date and time are subsequently up-dated by the operating system in conjunction with the system line time clock. Support routines and hardware diagnostics are available, as an option, on floppy disk or tape.

WARRANTY

Each C-Timer is tested using temperature and power cycling for a minimum of 96 hours - a procedure which insures an exceptionally reliable product. In the unlikely event a failure should occur, the C-Timer is backed by a one-year warranty.

TECHNICAL SPECIFICATIONS

Compatibility:	All LSI-11 processors; 16, 18, or 22 bits
Module Size:	5.2" x 8.9" dual-wide Q-Bus
Operating Power:	5V ± 5% 0.48 Amp
Operating Temperature:	0°C - 50°C
Relative Humidity:	5 - 95% noncondensing
Bus Loading:	1 LSI-11 bus load per I/O line
Batteries:	3 x 1.2 Volt Ni-Cad, 180 ma hours
Battery Back-up:	60 days minimum, 75 days typical
Battery Life:	3-5 years typical
Clock Accuracy:	4 seconds/month typical, 8 seconds max. error
Address EPROM:	4096 x 8-bit, 2732, EPROM
CMOS Memory:	2048 x 16-bit static CMOS RAM
Watchdog delay:	.133 seconds to 18.2 minutes, 12 selections
I/O Response Time:	9 microseconds maximum

STANDARD REGISTER ADDRESS ASSIGNMENTS

REGISTER	I/O ADDRESS	ATTRIBUTE
Calendar Clock	777300-777336	Read/Write
CMOS Memory	766000-766777	Read/Write
CMOS Page Select Register	777342	Write Only
Watchdog Timer	777340	Read Only