Industry Pack Modules

IP480 Counter/Timer

IP480 modules provide up to six counter/timer channels for counting events, generating waveform control signals, measuring pulse-widths or periodic rates, and monitoring operations.

Support for internal or external triggering simplifies the synchronization of operations to specific events. Counter functions can use internally generated clocks or an externally supplied clock.

Features

- IP480-6: Six 16-bit (three 32-bit) counter/timers
- IP480-2: Two 16-bit (one 32-bit) counter/timers
- Event counters
- Output waveform generator
  - Continuous pulse
  - Single pulse
  - Continuous square waveforms
- Pulse-width or periodic rate monitor
- Watchdog timer with isolated relay output
- Interrupt support:
  - Watchdog timeout
  - Event count complete
  - Pulse-width or rate measurement complete
  - Successive waveform generation
- Extended temperature option (-40 to 85°C)

Benefits

- Most configuration is handled by a single register which minimizes programming.
- Timer outputs support high voltage/currents.
- Built-in clamp diodes provide added protection when driving inductive loads.
- Pullups are socketed for easy adjustment.

Specifications

**Counter/Timers**

Counter/timer configuration:

- IP480-6: Six 16-bit counter/timer function groups.
- IP480-2: Two 16-bit counter/timer function groups.
- Any two 16-bit counters may be combined together to create a 32-bit counter.

**Speed (with 8MHz internal clock):**

- Max. output pulse/square wave freq.: 4MHz.
- Minimum event pulse width: 130nS.
- Minimum pulse width measurement: 250nS.
- Minimum period measurement: 250nS.

**Mode accuracy (with external clocking):**

- Waveform generation: Period is ±62nS.
- Watchdog timeout: occurs within ±1 clock cycle.
- Pulse/period measurement: ±1 clock cycle.

**Internal clocks:** Programmable 1, 4, or 8MHz.

**External clocks:** Separate clock input for each counter supports frequencies up to 7MHz.

**Counter trigger:** External inputs for triggering counter functions. Input level is TTL or CMOS compatible. Vih=2.0V, Vil=0.8V. Inputs are buffered and include 4.7K ohm pull-ups to +5V.

**Input voltage range:** 0 to 5V.

**Input requirements:** 2.0V DC minimum high level, 0.8V DC maximum low level, 10µA maximum current.

**Output:** Non-isolated open drains of N-channel mosfets with 4.7K ohm pull-up resistor SIP. Drains protected to 60V DC and sink up to 250mA each.

**Output range (low side switch):**

- 0 to 5V with internal supply.
- 0 to 60V with pull-ups to external supply.

**Output open drain pull-ups:** A 4.7K ohms pull-up resistor SIP. Power limited to 0.15W/resistor.

**Output relays:** SPDT (Form C) electromechanical relays (one per counter) controlled in watchdog timer mode. Contacts rated to 125V AC, 1A.

**IP Compliance (ANSI/VITA 4):**

- Meets all written IP specs per ANSI/VITA 4-1995.
- IP data transfer cycle types supported: Input/output (IOSel*), ID read (IDSel*), Interrupt select (INTSel*).
- Access times (8MHz clock):
  - Read/write cycles: 0 wait states (250ns cycle);
  - 1 wait state (375ns cycle) to read the counter readback register.

**Environmental**

- Operating temperature: 0 to 70°C (IP480-2/6) or -40 to 85°C (IP480-2E/6E).
- Storage temperature: -55 to 125°C (all models).
- Relative Humidity: 5 to 95% non-condensing.
- MTBF: Consult factory.
- Power: +5V (±5%): 255mA max. (-6), 110mA (-2).
  - ±12V (±5%) from P1: 0mA max. (not used).

Ordering Information

**Industry Pack Modules**

- IP480-2: Two 16-bit (one 32-bit) counter/timers
- IP480-2E: Same as IP480-2 plus extended temperature range
- IP480-6: Six 16-bit (three 32-bit) counter/timers
- IP480-6E: Same as IP480-6 plus extended temperature range

**Software** (see Page 81)

- IPSW-API-VXW: VxWorks® software support package
- IPSW-API-QNX: QNX® software support package
- IPSW-ATX-PCI: ActiveX®/OLE Controls 2.0 software package
- IPSW-LINUX: Linux™ support (website download only)

For accessories information, see Page 87.