Timecode Reader/Generator
Model TPRO-PC104

The TPRO-PC104 performs timing and synchronization functions referenced to an input timecode signal, synchronizing its on-board clock to this timecode and providing its clock time as an IRIG-B output. Other features include a time-tag TTL input, programmable “heartbeat” pulse or squarewave output (with interrupt capability), and programmable “match” start/stop time output (with interrupt capability).

The board continues to increment time (“freewheel”) in the absence of an input timecode. It can serve as an IRIG-B timecode generator after initial time is set via the bus.

The input timecode format (IRIG-B, IRIG-A or NASA36) is automatically detected. Synchronization to the input timecode is also automatic and can be enabled/disabled via the ISA bus. A propagation delay offset may be specified to compensate for cable delays.

An automatic gain control (AGC) circuit permits a wide range of input timecode amplitudes. The timecode input is differential; the board does not reference this signal to ground. A single-ended input (referenced to ground) is also acceptable. One-pulse-per-second (1 PPS) input synchronization is also available (Option “–M”). In this case, the initial time is programmed via the ISA bus and the board begins counting on the next 1 PPS pulse.

PC104 Interface
The board occupies 16 consecutive addresses in I/O (not memory) space. Base address and interrupt level are selected using jumpers. All board functions can be used without interrupts and can be accessed using 8-bit transfers. The time can also be read using four 16-bit transfers. Binary-coded decimal (BCD) format is used for setting and reading the time.
Specifications

Timecode Input
Code Format (Autodetect): IRIG-A (A132), IRIG-B (B122), NASA36
Amplitude: 1.2 Vp-p min, 8.0 Vp-p max
Polarity: Detected automatically
Modulation Ratio: 2:1 min, 3:1 typ, 4:1 max
Input Impedance: >10K Ohms
Input Time Accuracy: Better than 100 ppm (not suitable for tape playback)
Common Mode Voltage: Differential input, ±100 V max

Timecode Output
Code Format: IRIG-B (B122)
Amplitude (Adjustable): 2.6 Vp-p typical
Modulation Ratio (Adjustable): 3:1
Output Impedance: 600 Ohms

On-Board Clock
Resolution: 1 µs
Range: 366:23:59:999999
Date Format: Integer (001–366)
Propagation Delay Correction: –1000 µs through +8999 µs
Propagation Delay Setting: Programmed over PC104 bus
Stability:
  - Disciplined to timecode: 2 x 10^-7
  - Undisciplined: 1 x 10^-6

Time-Tag Input
Input Voltage:
  - –0.5 V min, +0.8 V max for logic 0
  - +2.0 V min, +5.5 V max for logic 1
Tags rising edge
Input Current: <5 mA for logic 0 and 1
Rise/Fall Time: 500 nS max
Repetition Rate: 1000 events per second maximum
Timing Resolution: 1 µs

1 PPS Sync Input (Option –M only)
Input Voltage: 2.4 V min, 16.0 V max (high)
Rise/Fall Time: 500 nS max
Trigger Edge: Rising
1 PPS Accuracy: Must be 100 ppm or better

Heartbeat Output
Output Voltage:
  - High: 3.8 V min at 32 mA (source)
  - Low: 0.4 V max at –645 mA (sink)
Wave Shape: Pulse or squarewave (programmable)
Pulse Width: 150 nS min, 450 nS max
Pulse Polarity: Negative
Squarewave: 45% to 55%
Timing:
  - Falling edge on-time (pulse or squarewave)
Range:
  - 1.000 µS to 21.845 µS in µS increments
  - (1 MHz to 45,777 Hz)
Power-on Default Rate: 100 PPS (pulse)

Match Output
Output Voltage:
  - High: 3.8 V min at 32 mA (source)
  - Low: 0.4 V max at –64 mA (sink)
Settability: 1 µS

Bus Interface
I/O Address: 16 consecutive addresses
I/O Base Address: 0000–0FF00 (jumper selected)
Interrupt Level: IRQ 2–7, 10–12, 14, 15 (jumper selected)
Time Between Accesses: 100 µS minimum

General
Size: H 95.89 mm, L 90.17 mm
Power (from ISA bus):
  - +5 Vdc @ 0.7 mA max
  - +12 Vdc @ 175 mA max
  - –12 Vdc @ 20 mA max
Operating Temperature: –30º to +70º C (–22º to +158º F)
Storage Temperature: –40º to +80º C (–40º to +176º F)
Connectors: BNC and DB15 depending on input/output

Drivers
Major operating systems are supported.

Ordering Information
Model TPRO-PC104 (+option #)

Options
  - –M: Sync to 1 PPS input instead of timecode
  - –HB1PPS: 1 PPS heartbeat output
  - –FXB: RS-422 driver for heartbeat output (includes -HB1PPS)
  - –LOR1: Three outputs (1MHz, 1 PPS, GND)