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M97 - Universal Counter

- **1 channel with 2 input lines**
- **100-MHz counter technology**
- **32 bits resolution (9½ digits)**
- **10 ns @ ±1 LSB**
- **Quartz oscillator better than 1 ppM**
- **Variable conversion**
- **6 measuring functions**
- **0..100MHz, HV input: ±300V, LV input: ±10V**
- **Input voltages over 60 V DC and 42 V AC (EN60950)**
- **20 mV sensitivity**
- **Programmable switching points and hysteresis**
- **Optical isolation**
- **-40 to +85°C screened versions**

The M97 is based on the M-Module™ ANSI mezzanine standard. It can be used as an I/O extension in any type of bus system, i.e. CPCI, VME or on any type of stand-alone SBC. Appropriate M-Module™ carrier cards in 3U, 6U and other formats are available from MEN or other manufacturers.
The M97 is a universal counter that is perfectly suited for automated testing systems. Its extremely accurate time base together with the 100-MHz counter technology guarantee the highest precision. The switching points and hysteresis of the input signals can be programmed in a broad range. Optical isolation permits usage of the M-Module™ even in critical applications.

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Technical Data

Basic Features
- 100-MHz counter technology
- 32 bits resolution (9 1/2 digits)
- 6 measuring functions
- Programmable switching points and hysteresis

Measurement Functions
- Frequency (line A)
- High time
- Low time
- Period
- Totalize (line A) during external gate (line B)
- Time difference (line A to B)

Input Characteristics (A to B input)
- 2 input lines
  - 2 high-voltage inputs for ±300V
  - 2 coax inputs for ±10V
- Input voltage range
  - ±10V peak-to-peak, input impedance 100 kOhm, frequency AC: 10Hz..100MHz, DC: 0..100MHz
  - ±300V peak-to-peak, input impedance 2 MOhm, frequency AC: 10Hz..100kHz, DC: 0..100kHz; fully usable only if requirements of EN60950 are fulfilled through additional safety measures (see user manual)
- Maximum input voltage if no further safety measures are taken:
  - 60V DC / 42V AC
- Sensitivity: programmable in steps of
  - 5.37mV @ ±10V
  - 164mV @ ±300V
- Minimum pulse duration: 10ns
- Input noise: < 100µV typ.
- Coupling: AC or DC (programmable)

Frequency A
- Resolution: measuring time 10ns @ ±1 LSB
- Measuring times: programmable in steps of 1ms

High time, Low time, Period
- Range: 42s
- Resolution: 10ns @ ±1LSB

Totalize
- Gate by line B
- Maximum pulse duration: 42s
- Resolution: 10ns @ ±1LSB
- Gate error ±10ns

Time Difference
- Maximum time difference: 42s
- Resolution: 10ns @ ±2LSB

Time Base
- Frequency: 1kHz, based on 100MHz system clock
- Time range: 1ms..32.767s
- Resolution: 1ms @ ±10ns

Peripheral Connections
- Via front panel on a 5-pin DBM 5W5S D-Sub connector with two high-voltage contacts and two coax contacts by FCT
- Via carrier board using 24-pin connector (rear I/O)

M-Module™ Characteristics
- A08, D16, INTA, IDENT

Electrical Specifications
- Isolation voltage (inputs): 500V DC
- Absolute maximum input voltages:
  - High-voltage contacts: 500V (only with additional safety measures according to EN60950)
  - Coax contacts: 20V
- Supply voltage/power consumption: +5V (4.85V..5.25V), 750mA
- MTBF: tbd. @ 50°C (derived from MIL-HDBK-217F)

Mechanical Specifications
- Dimensions: conforming to M-Module™ Standard
- Weight: 120g

Environmental Specifications
- Temperature range (operation):
  - 0..+60°C or -40..+85°C
  - Airflow: min. 10m³/h
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300m to + 3,000m
- Shock: 15g/11ms
- Bump: 10g/16ms
- Vibration (sinusoidal): 2g/10..150Hz
- Conformal coating on request

Safety
- THE M97 DOES NOT COMPLY WITH THE REQUIREMENTS OF THE EN60950 STANDARD. THE MAXIMUM INPUT VOLTAGES ARE 60V DC AND 42V AC. HOWEVER, THE M97 WAS DESIGNED TO PROVIDE HIGH-VOLTAGE FUNCTIONALITY. IF YOU NEED TO APPLY VOLTAGES HIGHER THAN 60V DC AND 42V AC, TAKE APPROPRIATE MEASURES TO KEEP THE SAFETY REQUIREMENTS OF EN60950.
- PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers

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EMC

- Tested according to EN 55022 (radio disturbance), IEC1000-4-2 (ESD) and IEC1000-4-4 (burst)

Software Support

- MEN Driver Interface System (MDIS™ for Windows®, Linux, VxWorks®, QNX®, OS-9®)
- For more information on supported operating system versions and drivers see Software.

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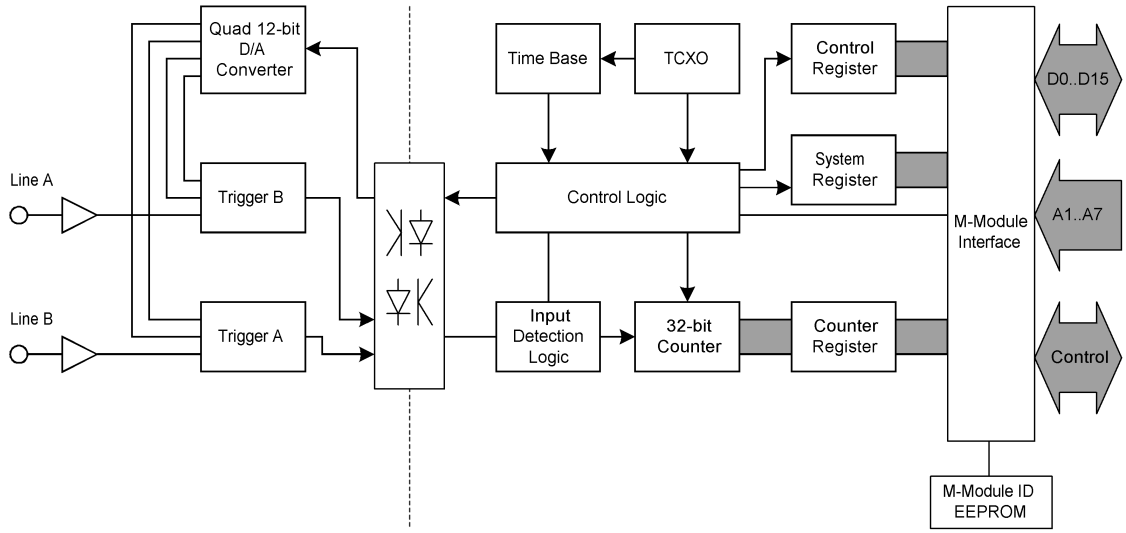
Diagram


Quad 12-bit D/A Converter
Time Base
TCXO
Control Register
D0..D15
Line A
Trigger B
Control Logic
System Register
M-Module Interface
A1..A7
Line B
Trigger A
Input Detection Logic
32-bit Counter
Counter Register
Control
M-Module ID EEPROM

Ordering Information

Standard Hardware

04M097-00	Universal counter, closed metal housing, 0..+60°C
04M097-02	Universal counter, open metal housing, 0..+60°C
04M097-03	Universal counter, open metal housing, -40..+85°C screened

Miscellaneous

05M000-17	25 mounting screw sets to fix M-Modules on carrier boards
05M000-27	5W5 D-Sub plug connector, 3 high-voltage plug contacts, 2 coaxial 50-Ohm plug contacts

Software: OS independent

13M097-06	MDIS4/2004 low-level driver sources (MEN) for M97

Software: Windows

13M097-70	MDIS4/2004 Windows driver (MEN) for M97

Documentation

20M000-00	M-Module Draft Specification, Rev. 3.0
20M097-00	M97 User Manual

For the most up-to-date ordering information and direct links to other data sheets and downloads, see the M97 online data sheet under » www.men.de.

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