

# TERMINAL1

## Process controlling computer

Terminal1 is a reconfigurable modular, structural, measuring oriented, scalable, error tolerant, industrial quality, FPRC class process controlling computer that has long life and high reliability factor. Its uniquely flexible multiprocessing structure, hardware and software module set provide its applicability either in SCADA or DOS application on levels above instrumentation, having multi protocol data transmission connection.

### The structure of Terminal 1:

- The size of the rack: 19" wide, 6Ehigh
- 3E and 6E moduls can be applied mixed
- Two visible and several virtual systembuses:
- Totally programmable flexible bus
- "Semi-rigid bus", containing partly fixed lines
- Reconfigurable partsbasis
- Relatively few applied modul types (only A, C, D and communicational modules even in complete structure)

### Technical data

<i>Number of implementable controlling modules</i>	$C_{max}=14$
<i>Number of implementable digital modules</i>	$D_{max}=14$
<i>Number of signals controlling by the digital module</i>	$D_{smax}=36$
<i>Number of digital signals controlled by Terminal1</i>	$D_{max}*D_{smax}=504$
<i>Number of implementable analogue modules</i>	$A_{max}=14$
<i>Number of signals controlled by analogue module</i>	$A_{smax}=24$
<i>Number of analogue signals controlled by Terminal1</i>	$A_{max}*A_{smax}=336$
<i>Number of communicational modules</i>	$K_{max}=14$

**Module C:** Module C is suitable for doing several tasks by its hardware capacity:

- In uni master system it is suitable for:
- Managing the CPU's tasks
- Forming an intelligent communicational periphery (high speed data transmission interface, modem bushes, gauge interface bushes)
- Controlling on intelligent subsystem
- For the maximum increase of reliability two or more Terminal1 can be formed in one panel using common or separate data transmission directions

- In multi master system it's suitable for:
- Realizing all the tasks listed at uni master system
- Realizing co-directing function by arbitral (round, robin, cyclical, constant) and data coupling (common memory, divided memory, message coupled) mechanical. Every directing module has the disposal of its own serial channels, data transfer interfaces controlled through semi-rigid buses, subsystems.

<i>Microprocessor</i>	<i>16bit/20MHz...40MHz</i>
<i>Inner databus width</i>	<i>16bit</i>
<i>External databus width</i>	<i>16bit</i>
<i>Clock signal frequency</i>	<i>20MHz...40MHz</i>
<i>Inner bus frequency</i>	<i>20MHz...40MHz</i>
<i>Resident memory Flash</i>	<i>512kw (1Mbyte)</i>
<i>RAM protected by battery</i>	<i>256kw (0.512Mbyte)</i>
<i>1<sup>st</sup>. Standard serial channel. Configurable towards the flexible bus /semi-rigid bus/ front (RS232)</i>	<i>Max.1.5Mbps</i>
<i>2<sup>nd</sup>. Standard serial channel. Configured towards the face to RS232/RS422/RS485 transmission</i>	<i>Max. 1.5Mbps</i>
<i>3<sup>rd</sup>.-4<sup>th</sup>. Standard serial channel. Configured towards the face to RS232 transmission</i>	<i>Max. 1.5Mbps</i>
<i>5<sup>th</sup>. Standard serial channel. For local testing, display, program downloading, configured .towards the face to RS232 transmission</i>	<i>Max. 0,5 Mbps</i>
<i>Real Time Clock and Calendar</i>	<i>Year/month/day/hour/min./sec.</i>
<i>FPGA businterface towards the flexible bus</i>	<i>20000 gate</i>
<i>FPGA/"C" interface towards the semi- rigid bus</i>	<i>20000 gate</i>
<i>DMA channel with M/I0, M/M transmission</i>	<i>A+B channel</i>
<i>Dual watch-dog circuit</i>	<i>Power fall outHALT,MR</i>
<i>LED display</i>	<i>8 bit</i>

#### **Module D:**

- 36 digital and/or analogue input/output
- 18 pcs of signal conditional cards controlling 2 points or 9pcs of signal conditional cards controlling 4 points
- Non-volatile local memory
- Standard serial channel
- In- Circuit programmable Flash program-memory

Treatable types of signals:

- Digital input (contact , AC/DC voltage, AC/DC current, frequency, series of pulse, data transmission line)
- Digital output (contact , AC/DC voltage, AC/DC current, frequency, series of pulse, data transmission line)
- Analogue input (AC/DC voltage and current)
- Analogue output (AC/DC voltage and current)

Data of digital signals

<i>Potential independent signals</i>	<i>18 bit / modul</i>
<i>Signals, common an one end</i>	<i>36 bit/modul</i>
<i>Multiplexed signals</i>	<i>64... 128 bit / modul</i>
<i>Detectable signal width</i>	<i>50 (s...100ms, programmable).</i>
<i>Measurable frequency</i>	<i>max. 200kHz.</i>
<i>Separation</i>	<i>2 kV...8kV (opto coupled).</i>
<i>Polling voltage</i>	<i>internal 12Vdc, separated 12Vdc</i>
<i>Polling current</i>	<i>2 mA for each channel.</i>
<i>Open contact</i>	<i>Min. 20 Kohm.</i>
<i>Closed contact</i>	<i>Max. 300 ohm.</i>
<i>SWC</i>	<i>ANSI C37.90a 16 bit/modul.</i>
<i>SWC</i>	<i>ANSI C37.90 32 bit/modul.</i>

### Data of counted signals

<i>Modularity</i>	<i>Max. 36/modul</i>
<i>Cutting frequency</i>	<i>max. 200 KHz, programmable.</i>
<i>Accuracy of the cutting frequency</i>	<i>+20%</i>
<i>Separation</i>	<i>2 kV...8kV (opto coupled)</i>
<i>Polling voltage</i>	<i>internal 12 Vdc, separated 12Vdc</i>
<i>Polling current</i>	<i>max. 2 mA</i>
<i>Open contact</i>	<i>min. 20 K ohm</i>
<i>Closed contact</i>	<i>max. 300 ohm</i>
<i>Counting length</i>	<i>16/32bit, can be programmed for each channel</i>
<i>Foredividing</i>	<i>Can be programmed by request</i>
<i>SWC</i>	<i>According to ANSI C37.90</i>

### Data of digital outputs

<i>Modularity</i>	<i>max 36 output / modul</i>
<i>Timing range</i>	<i>0,6 - 11 sec</i>
<i>Coupled capacity</i>	<i>max 100 VA</i>
<i>Coupled voltage</i>	<i>max. 500 Vdc</i>
<i>Coupled current</i>	<i>max. 10 A</i>
<i>Life time</i>	<i>10<sup>9</sup> (in case of relay realization)</i>
<i>Separation</i>	<i>1400Vdc...8kV</i>
<i>SWC</i>	<i>According to ANSI C37.90a</i>

### The module controlling card / T1-UDB 167-2-300-0 /

<i>FLASH program memory</i>	<i>8Kw</i>
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<i>RAM</i>	<i>386 byte</i>
<i>EEPROM</i>	<i>8kbyte</i>
<i>Communication</i>	<i>UART/SPI</i>
<i>Clock signal frequency</i>	<i>16MHz</i>

**Module A:**

- 24 analogue and/or digital input/output
- 6pcs of signal conditioning cards handling 4 points
- non volatile local memory
- standard serial channel
- In circuit programmable Flash program-memory

Treatable types of signals:

- Analogue input (AC/DC voltage and current)
- Analogue output (AC/DC voltage and current)
- Digital input (contact, AC/DC voltage, current, frequency, series of pulse, data-transmission line)
- Digital output (contact, AC/DC voltage, current, frequency, series of pulse, data-transmission line)

Data of analogue signals

<i>Potential independent signals</i>	<i>12 / modul</i>
<i>One side coupled signal</i>	<i>24 / modul</i>
<i>Multiplexed signals</i>	<i>64... 128 / modul.</i>

Integrating converter card

/ T1-ADB 167-2-200-0 /.

<i>Method of converting</i>	<i>Multislope</i>
<i>Accuracy</i>	<i>0.01% FSR, in case of 16 conv/sec</i>
<i>Input signal range</i>	<i>+ - 0...1V</i>
<i>Resolution</i>	<i>Maximum 18 bit</i>
<i>Temperature factor</i>	<i>20 ppm/°C, compensatable</i>
<i>Source of temperature compensation</i>	<i>Internal: 2.3mV/°C</i>
<i>CMMR</i>	<i>Max. 0.5 of FSR</i>
<i>Period of the cycle</i>	<i>10 ms...72ms</i>
<i>Separation</i>	<i>Min 2.5kV towards the system earth</i>
<i>Method of isolation</i>	<i>DC/DC and opto coupled</i>

THE FLASH A/D CONVERTER CARD

<i>Converting method</i>	<i>FLASH /sigma-delta</i>
<i>Accuracy</i>	<i>0.05% FSR</i>

<i>Range of input signal</i>	$\pm 0...1V$
<i>Resolution</i>	<i>Maximum 14 bit</i>
<i>CMMR</i>	<i>60dB</i>
<i>Period of the cycle</i>	<i>12<math>\mu</math>s..16<math>\mu</math>s</i>
<i>Separation</i>	<i>Min 2.5kV towards the system earth</i>
<i>Method of isolation</i>	<i>DC/DC and opto coupler</i>

RELY MULTIPLEXER CARD  
/ T1-ASCB-RCM 167-2-400-0 /.

<i>Relay</i>	<i>TAKAMISAWA NA12-WK</i>
<i>Arrangement of the contact</i>	<i>two Morse</i>
<i>Isolation resistance</i>	<i>minimum 1Mohm / 500V</i>
<i>Isolation between the contacts</i>	<i>1500 VAC / 1perc</i>
<i>Isolation between the contact and the coil</i>	<i>2500 V / 2x10Us</i>
<i>No of connection</i>	<i>100 million</i>
<i>Contacts</i>	<i>Gold plated silver</i>
<i>Initial contact resistance</i>	<i>50 mohm</i>
<i>Current voltage</i>	<i>UPR 50 ohm 0,02%</i>
<i>Input filtration</i>	<i>100 Hz</i>

FOTO-SSR MULTIPLEXER CARD  
/ T1-ASCB-OCM 167-2-500-0 /.

<i>Arrangement connections</i>	<i>Two closing switches</i>
<i>Isolation resistance</i>	<i>Minimum 500kohm / 100V...400V</i>
<i>Separation</i>	<i>2500 Vdc</i>
<i>No of connections</i>	<i>Unlimited</i>
<i>Current voltage</i>	<i>UPR 50 ohm 0,02%</i>
<i>Input filtration</i>	<i>100 Hz</i>
<i>Temperature factor</i>	<i>20 ppm/(C, compensatable</i>

THE MODULCONTROLLING CARD / T1-UDB 167-2-300-0 /.

<i>FLASH program memory</i>	<i>8Kw</i>
<i>RAM</i>	<i>386 byte</i>
<i>EEPROM</i>	<i>8kbyte</i>
<i>Communication</i>	<i>UART/SPI</i>
<i>Clock signal frequency</i>	<i>16MHz</i>

**FSK modem V.23:**

- Two data- transmission lines: two- wired, standard PSTN, four- wired, leased line
- Microcontroller controlling
- 3 data- transfer interfaces: standard RS232, RS422/485, CMOS level channel directed to the semi-rigged bus

**DATA OF THE MODEM**

<i>Modulation</i>	<i>FSK</i>
<i>Methods of transmission</i>	<i>CCITT v.23 / BELL 202 (HART)</i>
<i>Speed of data transmission v.23 B2</i>	<i>75 / 1200 bit/s</i>
<i>Speed of data transmission v.23 B3</i>	<i>1200 / 75 bit/s</i>
<i>Speed of data transmission v.23 half duplex</i>	<i>1200 / 1200 bit/s</i>
<i>DTE connections1</i>	<i>RS 232 C</i>
<i>DTE connections2</i>	<i>RS485/RS422</i>
<i>DTE connections3</i>	<i>CMOS</i>
<i>Transmitting level</i>	<i>-6... -30 dBm,</i>
<i>Sensitivity of reception</i>	<i>-43 dBm</i>
<i>Stability of setting</i>	<i>Min. 0,5 dB/month</i>
<i>Direction of transmission A, B</i>	<i>2 / 4 wired</i>
<i>Line impedance</i>	<i>600(</i>
<i>Permissible signal/ noise relation</i>	<i>20 dB</i>

**DATA OF THE MODULE CONTROLLING**

<i>FLASH program memory</i>	<i>8kw</i>
<i>RAM</i>	<i>64kbyte</i>
<i>Communication</i>	<i>UART/SPI</i>
<i>Clock</i>	<i>16MHz</i>

**Relay output card:**

- 8pcs of big- capacity/ power Morse output
- arc-damping electric circuits
- Programmable 1:N or N:N typed coding
- Timed or static working method

**PARAMETERS OF THE CONTACT**

<i>Ohmic load</i>	<i>8A/250Vac,24Vdc</i>
<i>Coupled current</i>	<i>10A</i>
<i>Coupled voltage</i>	<i>380Vac</i>
<i>Separation</i>	<i>2000V /192W</i>
<i>No. Of connections</i>	<i>&gt;20e7</i>
<i>No. Of connections with total load</i>	<i>&gt;106</i>
<i>Material the contact</i>	<i>Gold plated silver</i>
<i>Resistance of contact</i>	<i>&lt;30mohm</i>

**General data**

<i>Resistance of isolation</i>	<i>1000 Mohm/500Vdc</i>
<i>Puncture between the contacts</i>	<i>&gt;1000Vac</i>
<i>Puncture between the contact and the coil</i>	<i>&gt;5000Vdc</i>
<i>Pulse between the contact and the coil</i>	<i>10000V (1.2x50us)</i>

**PSU (Power- Supply Unit):**

- Two galvanically separated channel feeding the modules and the periphery side
- The periphery modules can be fed by an outside source

AC POWER SUPPLY  
T1-BMT / 167-6-400-0- /.

<i>Type</i>	<i>VICOR FlatPAC Family f=49Hz..63Hz</i>
<i>Classification</i>	<i>UL, CSA, TÜV, VDE 0805, EN60950, IEC 950</i>
<i>Output capacity</i>	<i>100W...400W optional</i>
<i>Range of input voltage</i>	<i>90-250 Vac,</i>
<i>Input current</i>	<i>Maximum 300mA / Pki=75W</i>
<i>Regulating accuracy</i>	<i>1%</i>
<i>Output noise</i>	<i>Less than 1%</i>
<i>Efficiency</i>	<i>85-90 %</i>
<i>Isolation</i>	<i>2500 Vdc or Ac peak voltage between the input and output</i>

EGYENÁRAMÚ TÁPEGYSÉG

<i>Type</i>	<i>VICOR ComPAC Family</i>
<i>Classification</i>	<i>UL, CSA, TÜV, VDE 0805, N60950, IEC 950</i>
<i>Output capacity</i>	<i>100W...400W, optional</i>
<i>Range of input voltage</i>	<i>15...400Vdc, optional</i>
<i>Input current</i>	<i>maximum 2.5 A / Pki=75W</i>
<i>Isolation</i>	<i>2500 Vdc or Ac peak voltage between the input and output</i>
<i>Regulating accuracy</i>	<i>1%</i>
<i>Output noise</i>	<i>Less than 1%</i>
<i>Efficiency</i>	<i>80 -90%</i>