TINY-Tiger™ 2

T2CI-8/16 / T2CI-8/32

High Speed Multitasking Computers - V1.0

Technical Documentation

TINY-Tiger™ Multitasking Computers
2nd Generation

The second generation of TINY-Tiger™ Multitasking Computer provides advanced, high speed multitasking power, rich memory sizes, interrupts and additional I/O capability as well as 5V CMOS and 3.3V LVTTL logic systems.

With memory capacities of 2 MByte or 4 MByte FLASH and 1 MByte SRAM inside, this module series can handle large projects with ten-thousands of codelines as well as large data-memory areas for all kinds of permanent storage, tables, sound and graphic, databases, data logging, parameter set storage, multi-language user menues ... etc.

TINY-Tiger™ 2 Multitasking Computers are highly comtatible to existing TINY-Tiger™ Computers. They too offer the well known, highly stable multitasking system with high code density, shortest development times and robust runtime code.
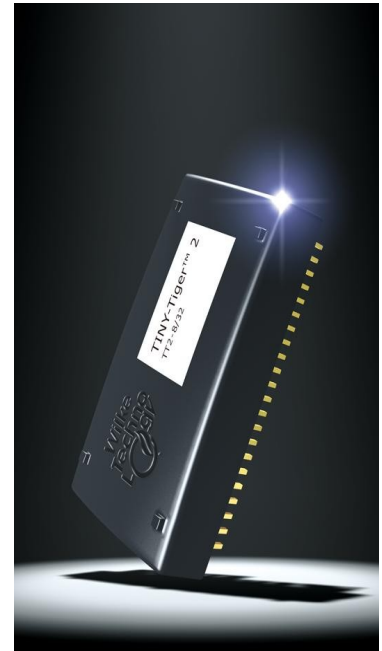
Features

- 2 MByte or 4 MByte FLASH for program and data areas
- 1 MByte SRAM with backup input
- 56 I/O lines in total
- 40 universal digital I/O bitwise programmable as input or output, expansion bus, timers, counters and encoders
- 2 serial UART-interfaces with hardware handshake
- Multi-channel serial Soft-UART with or without handshake
- 12 channel 10 bit analog to digital converter inputs
- CAN Bus 2.1
- I²C Bus, SPI, Microwire
- 2 channel PWM
- 3 interrupt inputs and additional timer Interrupt, which can be used by BASIC interrupt tasks
- Real Time Clock, ultra low power with separate battery input and alarm output
- Separate battery input for RAM buffering
- Fast downloads

Application Areas:

- Industrial control
- Datalogging
- Medical equipment
- Communication applications
- Converters
- POS units
- GPS tracking devices
- Energy distribution networks
- Productionline testers
- Traffic applications
- Access control units
- Laser distance monitors
- Measuring devices
- GSM / GPRS devices
- ... and many more

Contents

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Pin-Definition

Name	Pin	Type	Type	Description
L60	1 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 0
L61	2 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 1
L62	3 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 2
L63	4 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 3
L64	5 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 4
L65	6 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 5
L66	7 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 6
L67	8 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 7
L70	9 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 7 bit 0
L71	10 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 7 bit 1
L72 / PWM0	11 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 7 bit 2
L73 / PWM1	12 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 7 bit 3
L80	13 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 8 bit 0
L81	14 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 8 bit 1
L82	15 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 8 bit 2
L83	16 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 8 bit 3
L84	17 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 8 bit 4
L85	18 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 8 bit 5
L86	19 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 8 bit 6
L87	20 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 8 bit 7
-RESET	21 a	IN: 0...5V		Reset input, low active
GND	22 a	PWR		0V power supply
AN11 / L11 3	1 b	IN: AGND...AREF IN: 0...5V		Analog input signal Channel-11 Digital input port 11 bit 3
AN10 / L11 2	2 b	IN: AGND ... AREF IN: 0...5V		Analog input signal Channel-10 Digital input port 11 bit 2
AN09 / L11 1	3 b	IN: AGND ... AREF IN: 0...5V		Analog input signal Channel-09 Digital input port 11 bit 1
AN08 / L11 0	4 b	IN: AGND ... AREF IN: 0...5V		Analog input signal Channel-08 Digital input port 11 bit 0
reserved	5 b	do not connect		---
reserved	6 b	do not connect		---
INTM3	7 b	IN: 0...5V	(Pull-Up 10K)	Maskable INT-Input 3: rising edge
INTM1	8 b	IN: 0...5V	(Pull-Up 10K)	Maskable INT-Input 1: rising edge
reserved	9 b	do not connect		---
L74	10 b	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 7 bit 4
L75	11 b	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 7 bit 5
L76	12 b	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 7 bit 6
L77	13 b	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 7 bit 7

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Name	Pin	Type	Type	Description
L90 / TxD0	23 a	IN: 0...5V	OUT: 0...5V OUT: 0...5V	Digital I/O port 9 bit 0 Transmit line of serial channel 0
L91 / RxD0	24 a	IN: 0...5V IN: 0...5V	OUT: 0...5V	Digital I/O port 9 bit 1 Receive line of serial channel 0
L92 / CTS0	25 a	IN: 0...5V IN: 0...5V	OUT: 0...5V	Digital I/O port 9 bit 2 Clear To Send line of serial channel 0
L93 / TxD1	26 a	IN: 0...5V	OUT: 0...5V OUT: 0...5V	Digital I/O port 9 bit 3 Transmit line of serial channel 1
L94 / RxD1	27 a	IN: 0...5V IN: 0...5V	OUT: 0...5V	Digital I/O port 9 bit 4 Receive line of serial channel 1
L14 / RTS0	28 a	IN: 0...5V	OUT: 0...5V OUT: 0...5V	Digital I/O port 1 bit 4 Request To Send of serial channel 0
L33	29 a	IN: 0...5V	OUT: 0V..3.3V	Digital I/O port 3 bit 3
L34	30 a	IN: 0...5V	OUT: 0V..3.3V	Digital I/O port 3 bit 4
L35	31 a	IN: 0...5V	OUT: 0V..3.3V	Digital I/O port 3 bit 5
L36	32 a	IN: 0...5V	OUT: 0V..3.3V	Digital I/O port 3 bit 6
L37	33 a	IN: 0...5V	OUT: 0V..3.3V	Digital I/O port 3 bit 7
L54[1] / ALARM	34 a	OUT:[1] OUT:	open drain, 1mA[1] open drain, 1mA	Digital-Out port 5 bit 4 (0V...BATT-RTC)[1] 0 = high impedance 1 = FET active Alarm-Out of RTC (0V...BATT-RTC) 0 = high impedance 1 = FET active
INTM4/COUNT	35 a	IN: 0...5V	(Pull-Up 10K)	Maskable INT-Input 4: both edges, rising or falling Counter Input: both edges, rising or falling
L41 / PC-Mode	36 a	IN: 0...5V	OUT: 0V..3.3V	Digital I/O port 4 bit 1 () Mode input pin (RUN/PC), Key-Param-input
AN00 / L10 0	37 a	IN: AGND...AREF IN: 0...5V		Analog input signal channel-00 Digital input port 10 bit 0
AN01 / L10 1	38 a	IN: AGND...AREF IN: 0...5V		Analog input signal channel-01 Digital input port 10 bit 1
AN02 / L10 2	39 a	IN: AGND...AREF IN: 0...5V		Analog input signal channel-02 Digital input port 10 bit 2
AN03 / L10 3	40 a	IN: AGND...AREF IN: 0...5V		Analog input signal channel-03 Digital input port 10 bit 3
AGND	41 a	Analog GND		AD reference voltage low
AREF	42 a	IN		AD reference voltage high
BATT-RAM	43 a	PWR		Battery Backup input for Static RAM
VCC	44 a	PWR		+5V main power supply input

[1] L54 is available in TINY-Tiger™2 modules since version no. "S1.01 H1.2" or newer.

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Name	Pin	Type	Type	Description
L15 / RTS1	32 b	IN: 0...5V OUT	OUT: 0V..5V	Digital I/O port 1 bit 5 Request To Send line of serial port 1
L95 / CTS1	33 b	IN: 0...5V IN: 0...5V	OUT: 0V..5V	Digital I/O port 9 bit 5 Clear To Send line of serial port 1
L96 / CAN-TX	34 b	IN: 0...5V OUT: 0V..5V	OUT: 0V..5V	Digital I/O port 9 bit 6 Transmit line of CAN Bus interface
L97 / CAN-RX	35 b	IN: 0...5V IN: 0...5V	OUT: 0V..5V	Digital I/O port 9 bit 7 Receive line of CAN Bus interface
PWR3.3	36 b	PWR-OUT		3.3V Power output for driving low energy devices (see absolute maximum ratings)
L40	37 b	IN: 0...5V	OUT: 0V..3.3V	Digital I/O port 4 bit 0
L42	38 b	IN: 0...5V	OUT: 0V..3.3V	Digital I/O port 4 bit 2
AN04 / L10 4	39 b	IN: AGND...AREF IN: 0...5V		Analog input signal channel-04 Digital input port 10 bit 4
AN05 / L10 5	40 b	IN: AGND...AREF IN: 0...5V		Analog input signal channel-05 Digital input port 10 bit 5
AN06 / L10 6	41 b	IN: AGND...AREF IN: 0...5V		Analog input signal channel-06 Digital input port 10 bit 6
AN07 / L10 7	42 b	IN: AGND...AREF IN: 0...5V		Analog input signal channel-07 Digital input port 10 bit 7
BATT-RTC	43 b	PWR		Battery backup input for Real Time Clock
VCC	44 b	PWR		+5V main power supply input

Do **not** connect the reserved Pins

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Case Dimensions

Approx. 27g, 70-Pin case

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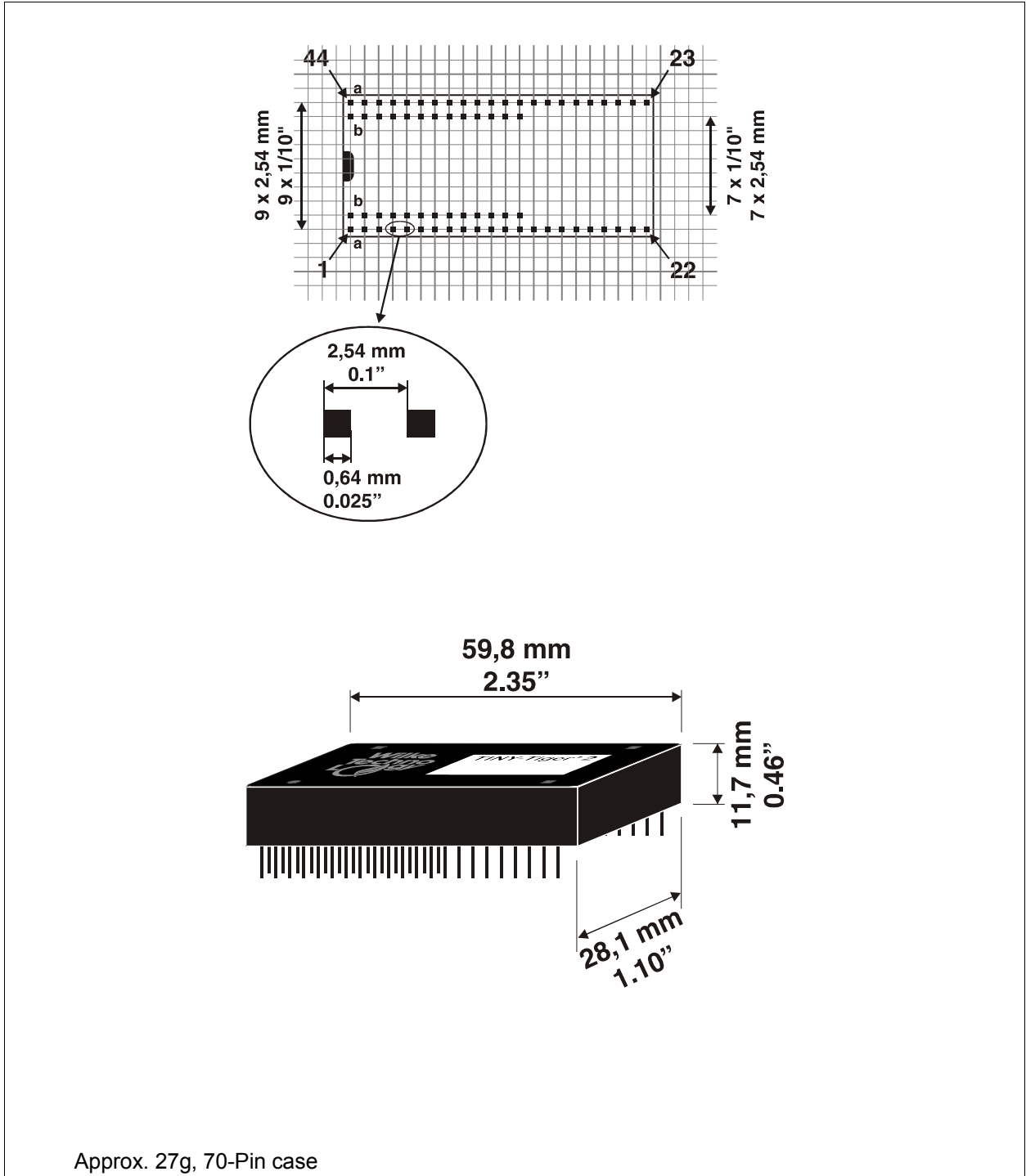
Electrical Characteristics

Absolute Maximum Ratings (beyond which permanent damage may occure)

Supply Voltage Vcc	5.5V
Input Voltage any input pin	-0.5V...5.5V VCC + 0.5V
Maximum current per output pin (Ports 3,4,6,7,8) Maximum current per output pin (Ports 1, 9) Total current (absolut values) all outputs	+/- 24 mA per pin +/- 3 mA per pin 90 mA total
PWR3.3 Power supply out for driving low energy 3.3V Devices	90 mA - total current on all Output pins
Maximum current at L54 / ALARM Input Voltage at L54 / ALARM if VCC < BATT-RTC	1 mA -0.5V...BATT-RTC
Maximum no of erase cycles per sector, speed flash area Maximum no of erase cycles per sector, standard flash area	100 1 000 000
Operating Temperature	-40°C...80°C

Do **not** connect the reserved pins!

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DC Specifications T_A = 20°C if not specified otherwise

Parameter and Conditions	Value
Supply Voltage (VCC) Supply Current	4.6 V...5.25V 80 mA$_{typ}$
Standby Voltage RTC Standby Current RTC @5V Standby Current RTC @2V	2.1 V ... 5.5 V 800 nA$_{max}$ / 330 nA$_{typ}$ 650 nA$_{max}$ / 250 nA$_{typ}$
RTC Tolerance @25°C RTC Tolerance over Temperture range -10°C ... +70°C RTC Tolerance over supply voltage range: 1.8 ... 5.5V RTC aging	-18 ... +28 ppm -120 ... +10 ppm -2 ... +2 ppm -5 ... +5 ppm / per year
Standby Voltage SRAM Standby Current SRAM @ 5V Standby Current SRAM @ 3V	2.3 V ... 5.0 V 80 µA$_{typ}$ 20 µA$_{typ}$
Input low voltage (Port 3, 4, 6, 7, 8), LVTTL compatible I/Os Input high voltage (Port 3, 4, 6, 7, 8), LVTTL compatible I/Os Input leak current (Port 3, 4, 6, 7, 8), LVTTL compatible I/Os	0 V ... 0.8 V 2.0 V...5.5 V +/- 10 µA$_{max}$
Input low voltage (Port 1, 9), 5VCMOS compatible I/Os Input high voltage (Port 1, 9), 5VCMOS compatible I/Os Input leak current (Port 1, 9), 5VCMOS compatible I/Os	0 ... 0.25*VCC 0.75*VCC ... VCC +/- 10 µA$_{max}$
Input low voltage (Port 10, 11), 5VCMOS compatible Inputs Input high voltage (Port 10, 11), 5VCMOS compatible Inputs Input leak current (Port 10, 11), 5VCMOS compatible Inputs Input leak current (Port AN00...AN11), Analog Inputs	0 ... 0.3*VCC 2.2V ... VCC +/- 10 µA$_{max}$ +/- 10 µA$_{max}$
Output low voltage (Port 3, 4, 6, 7, 8), LVTTL compatible I/Os Output high voltage (Port 3, 4, 6, 7, 8), LVTTL compatible I/Os	0.4 Vmax @ 24 mA 2.4Vmin @ 24 mA
Output low voltage (Port 1, 9), 5VCMOS compatible I/Os Output high voltage (Port 1, 9), 5VCMOS compatible I/Os Output high voltage (Port 1, 9), 5VCMOS compatible I/Os Output high voltage (Port 1, 9), 5VCMOS compatible I/Os	0.4 Vmax @ 3 mA 2.4Vmin @ 0.4 mA 0.75*VCC @ 0.1 mA 0.9*VCC @ 0.02 mA
12 Channel, 10 Bit ADU: ADREF input ADREF input current Total Error excl. quantize Error	 VCC-1.5V ... VCC 1.2 mAmax +/- 3LSB @ Vref: VCC-0.2V...VCC
LSB is the unit describing the resolution of the AD converter	4.883mV @ Vref = VCC

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Revision Table

V000...V016	preliminary versions
V017	first released version
V018	Feature list updated
V019	DC Specifications: leakage currents AN00...AN11 added, links added
V020	Version number of TINY-Tiger™ 2 modules with L54 added.
V021	INTM4/COUNT pin description corrected to: "both edges, rising or falling"