

## TINY-Tiger™ Multitasking Computers 2<sup>nd</sup> 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 and 3V 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 menus ... etc.

TINY-Tiger™ 2 Multitasking Computers are highly compatible 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
- I<sup>2</sup>C Bus, SPI, Microwire
- 2 channel PWM
- Real Time Clock, ultra low power with separat Battery input and alarm output
- 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

Pin-Definition.....	2
Case Dimensions.....	5
Electrical Characteristics.....	6
Revision Table.....	8

## Pin-Definition

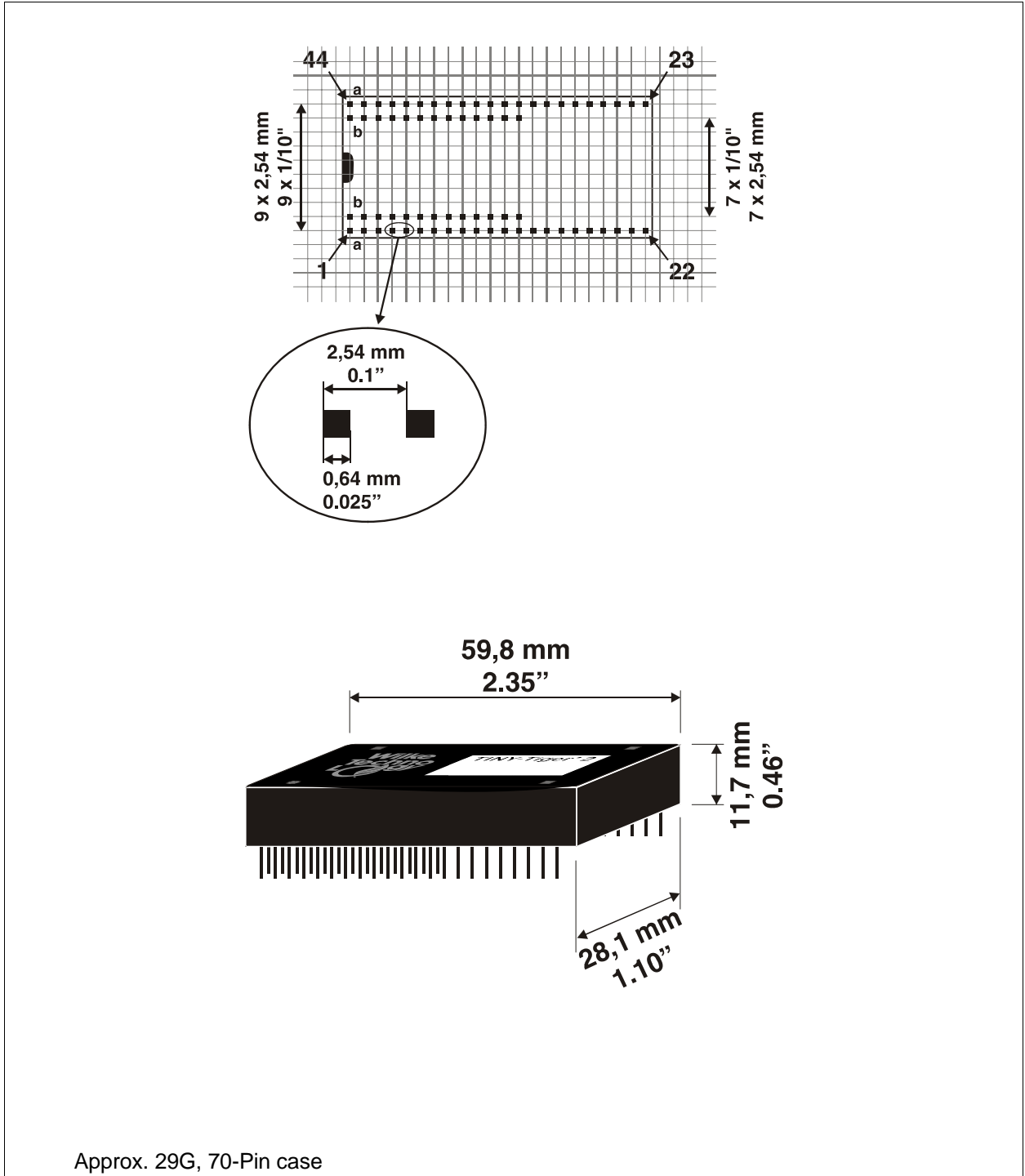
Name	Pin	Type	Type	Description
L60	1 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 0
L61	2 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 1
L62	3 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 2
L63	4 a	IN: 0...5V	OUT: 0...3.3V	Digital I/O port 6 bit 3
L64	5 a	IN: 0...5V	OUT: 0...3.3V	Digital 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 2	3 b	IN: AGND ... AREF IN: 0...5V		Analog input signal Channel-09 Digital input port 11 bit 1
AN08 / L11 1	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

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 / ALARM	34 a	OUT:	open drain, 1mA	Digital-Out port 5 bit 4 (0V...BATT-RTC) 0 = high impedance 1 = FET active
		OUT:	open drain, 1mA	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: rising edge Counter Input: rising edge
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

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

Case Dimensions



## Electrical Characteristics

### Absolute Maximum Ratings (beyond which permanent damage may occur)

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

Do **not** connect the reserved pins!

## DC Specifications $T_A = 20^\circ\text{C}$ if not specified otherwise

Parameter and Conditions	Value
Supply Voltage (VCC) Supply Current	4.6 V...5.25V 80 mA <sub>typ</sub>
Standby Voltage RTC Standby Current RTC @5V Standby Current RTC @2V	2.1 V ... 5.5 V 800 nA <sub>max</sub> / 330 nA <sub>typ</sub> 650 nA <sub>max</sub> / 250 nA <sub>typ</sub>
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 <sub>typ</sub> 20 μA <sub>typ</sub>
Input low voltage (Port 3, 4, 6, 7, 8), LVTTTL compatible I/Os Input high voltage (Port 3, 4, 6, 7, 8), LVTTTL compatible I/Os Input leak current (Port 3, 4, 6, 7, 8), LVTTTL compatible I/Os	0 V ... 0.8 V 2.0 V...5.5 V +/- 10 μA <sub>max</sub>
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 <sub>max</sub>
Input low voltage (Port 10, 11), 5VCMOS compatible I/Os Input high voltage (Port 10, 11), 5VCMOS compatible I/Os Input leak current (Port 10, 11), 5VCMOS compatible I/Os	0 ... 0.3*VCC 2.2V ... VCC +/- 10 μA <sub>max</sub>
Output low voltage (Port 3, 4, 6, 7, 8), LVTTTL compatible I/Os Output high voltage (Port 3, 4, 6, 7, 8), LVTTTL compatible I/Os	0.4 V <sub>max</sub> @ 24 mA 2.4V <sub>min</sub> @ 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 V <sub>max</sub> @ 3 mA 2.4V <sub>min</sub> @ 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 mA <sub>max</sub> +/- 3LSB @ Vref: VCC-0.2V...VCC
LSB is the unit describing the resolution of the AD converter	4.883mV @ Vref = VCC
Operating Temperature	-40°C...80°C

TINY-Tiger™, BASIC-Tiger™, ECONO-Tiger™, NANO-Tiger™, Tiger C™ are registered Trademarks.

