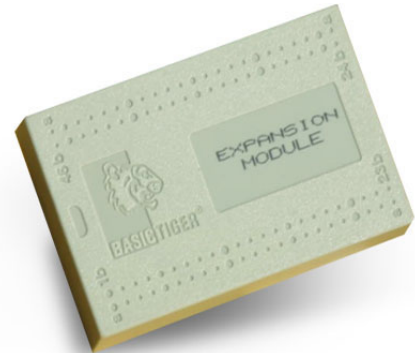


# Expansion Module EP33-4ser



Module - Version V1.0

## Four additional RS232 Interfaces for your BASIC-Tiger™ Multitasking Computer System



The Expansion Module EP33-4ser offers four additional full duplex RS232 Interfaces. BAUD-Rates up to 115.2k are possible at V.24 voltage level.

The not used transmit- and receive-drivers can be switched off to reduce power consumption. Two of the four Interfaces have bypassed transmit- and receive-drivers and it's possible to use this Interfaces at a TTL voltage level with Data rates up to 921.6 kbps.

Each RS232 Interface has transmit and receive FIFOs to support high performance data communication.

The Module can be connected to the XPORT System of any BASIC-Tiger™ Multitasking Computer. Only two port addresses are used. Each even base address is selectable.

### Features:

- ◆ 4 independent full duplex RS232 Interfaces
- ◆ Data rates up to 921.6 kbps
- ◆ 128 byte FIFOs for each channel
- ◆ V.24 voltage level
- ◆ single voltage power supply (5V DC)
- ◆ automatic hardware flow control (RTS/CTS)
- ◆ Supported by device driver

### Application Areas:

- ◆ Factory automation
- ◆ Process Controls
- ◆ High Speed Data Transfer
- ◆ BAUD Rate Adaption
- ◆ Connection to MODEM

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## Pin-Definition

Name	Pin	Row	Type	Description
ADR1	1	a	IN	Address select
ADR2	1	b	IN	Address select
ADR3	2	a	IN	Address select
ADR4	2	b	IN	Address select
ADR5	3	a	IN	Address select
/INE	3	b	IN	XPORT Input Enable Signal
ADR6	4	a	IN	Address select
ADR7	4	b	IN	Address select
CLKSEL	5	a	IN	Clock Select (connect to VCC)
-	5	b		not connected
-10V(AB)	6	a	OUT	-10V output
+10V(AB)	6	b	OUT	+10V output
/ENTA	7	a	IN	Enable Transmit Driver Channel A
/ENTB	7	b	IN	Enable Transmit Driver Channel B
/ENRA	8	a	IN	Enable Receive Driver Channel A
/ENRB	8	b	IN	Enable Receive Driver Channel B
DCD_AV	9	a	IN	Data Carrier Detect Channel A (V.24)
DSR_AV	9	b	IN	Data Set Ready Channel A (V.24)
RX_AV	10	a	IN	Receive Data Channel A (V.24)
RTS_AV	10	b	OUT	Request To Send Channel A (V.24)
TX_AV	11	a	OUT	Transmit Data Channel A (V.24)
CTS_AV	11	b	IN	Clear To Send Channel A (V.24)
DTR_AV	12	a	OUT	Data Terminal Ready Channel A (V.24)
RI_AV	12	b	IN	RING Channel A (V.24)
GND	13	a	PWR	Signal Ground
/INTA	13	b	OUT	Interrupt Request Channel A*
DCD_BV	14	a	IN	Data Carrier Detect Channel B (V.24)
DSR_BV	14	b	IN	Data Set Ready Channel B (V.24)
RX_BV	15	a	IN	Receive Data Channel B (V.24)
RTS_BV	15	b	OUT	Request To Send Channel B (V.24)
TX_BV	16	a	OUT	Transmit Data Channel B (V.24)
CTS_BV	16	b	IN	Clear To Send Channel B (V.24)
DTR_BV	17	a	OUT	Data Terminal Ready Channel B (V.24)
RI_BV	17	b	IN	RING Channel B (V.24)
GND	18	a	PWR	Signal Ground
/INTB	18	b	OUT	Interrupt Request Channel B*
DCD_AT	19	a	IN	Data Carrier Detect Channel A (TTL)
DSR_AT	19	b	IN	Data Set Ready Channel A (TTL)
RX_AT	20	a	IN	Receive Data Channel A (TTL)
RTS_AT	20	b	OUT	Request To Send Channel A (TTL)
TX_AT	21	a	OUT	Transmit Data Channel A (TTL)
CTS_AT	21	b	IN	Clear To Send Channel A (TTL)
DTR_AT	22	a	OUT	Data Terminal Ready Channel A (TTL)
RI_AT	22	b	IN	RING Channel A (TTL)
GND	23	a	PWR	Power Supply Ground
GND	23	b	PWR	Power Supply Ground

# Expansion Module EP33-4ser



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## Pin-Definition

Name	Pin	Row	Type	Description
RI_CT	24	a	IN	RING Channel C (TTL)
DTR_CT	24	b	OUT	Data Terminal Ready Channel C (TTL)
CTS_CT	25	a	IN	Clear To Send Channel C (TTL)
TX_CT	25	b	OUT	Transmit Data Channel C (TTL)
RTS_CT	26	a	OUT	Request To Send Channel C (TTL)
RX_CT	26	b	IN	Receive Data Channel C (TTL)
DSR_CT	27	a	IN	Data Set Ready Channel C (TTL)
DCD_CT	27	b	IN	Data Carrier Detect Channel C (TTL)
/INTD	28	a	OUT	Interrupt Request Channel D*
GND	28	b	PWR	Signal Ground
RI_DV	29	a	IN	RING Channel D (V.24)
DTR_DV	29	b	OUT	Data Terminal Ready Channel D (V.24)
CTS_DV	30	a	IN	Clear To Send Channel D (V.24)
TX_DV	30	b	OUT	Transmit Data Channel D (V.24)
RTS_DV	31	a	OUT	Request To Send Channel D (V.24)
RX_DV	31	b	IN	Receive Data Channel D (V.24)
DSR_DV	32	a	IN	Data Set Ready Channel D (V.24)
DCD_DV	32	b	IN	Data Carrier Detect Channel D (V.24)
/INTC	33	a	OUT	Interrupt Request Channel C*
GND	33	b	PWR	Signal Ground
RI_CV	34	a	IN	RING Channel C (V.24)
DTR_CV	34	b	OUT	Data Terminal Ready Channel C (V.24)
CTS_CV	35	a	IN	Clear To Send Channel C (V.24)
TX_CV	35	b	OUT	Transmit Data Channel C (V.24)
RTS_CV	36	a	OUT	Request To Send Channel C (V.24)
RX_CV	36	b	IN	Receive Data Channel C (V.24)
DSR_CV	37	a	IN	Data Set Ready Channel C (V.24)
DCD_CV	37	b	IN	Data Carrier Detect Channel C (V.24)
/ENRD	38	a	IN	Enable Receive Driver Channel D
/ENRC	38	b	IN	Enable Receive Driver Channel C
/ENTD	39	a	IN	Enable Transmit Driver Channel D
/ENTC	39	b	IN	Enable Transmit Driver Channel C
+10V(CD)	40	a	OUT	+10V output
-10V(CD)	40	b	OUT	-10V output
DCLK	41	a	IN	XPORT Data Clock
ACLK	41	b	IN	XPORT Address Clock
BUS-7	42	a	IO	XPORT Data/Address Bit7
BUS-6	42	b	IO	XPORT Data/Address Bit6
BUS-5	43	a	IO	XPORT Data/Address Bit5
BUS-4	43	b	IO	XPORT Data/Address Bit4
BUS-3	44	a	IO	XPORT Data/Address Bit3
BUS-2	44	b	IO	XPORT Data/Address Bit2
BUS-1	45	a	IO	XPORT Data/Address Bit1
BUS-0	45	b	IO	XPORT Data/Address Bit0
VCC	46	a	PWR	+5V Power Supply
VCC	46	b	PWR	+5V Power Supply

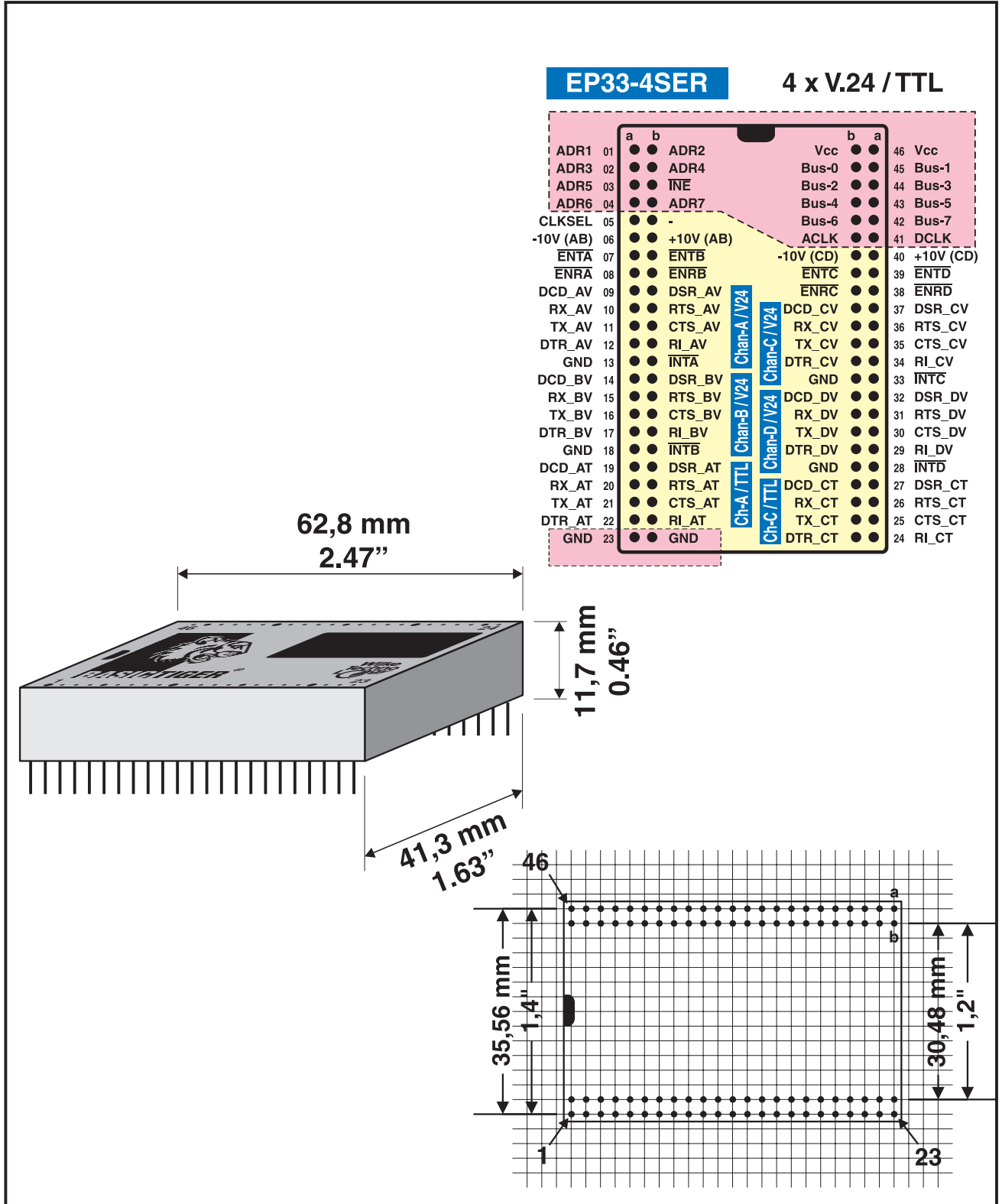
# Expansion Module EP33-4ser



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## Pinout and Module Size

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# Expansion Module EP33-4ser



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## Conection to BASIC-Tiger™

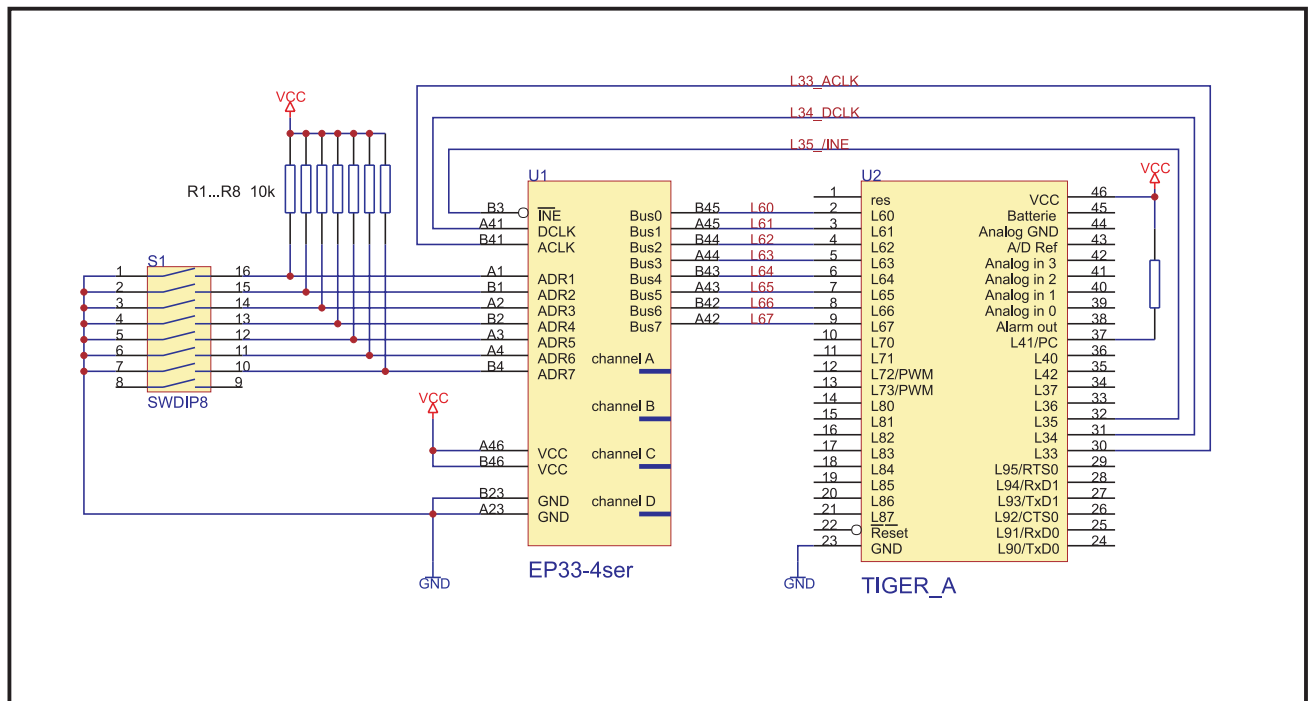
Connect the module EP33-4ser to the XPORT of your BASIC-Tiger™, as shown below. The data signals Bus-1 to Bus-7 are directly connected to the signals L60 to L67 of the BASIC-Tiger™, ACLK is connected to L33, DCLK is connected to L34 and /INE is connected to L35.

The module needs two addresses of the XPORT system (base address and base address +1). You can select each even base address by connecting the inputs ADR1 to ADR7 to GND or VCC. In the schematic below signals ADR1 to ADR7 are connected to GND with a DIP switch or to VCC with a pull up resistor. Close all DIP switches to select the base address 0 or open all switches to select address 254 (FE Hex, 1111 1110 bin). Make sure, that no other device uses the same XPORT addresses.

Serial communication can easily be done using the device driver „SER\_XUART.TDD“. If you do so, you must not send data with a XOUT instruction to the selected base address or to base address +1.

If you connect more than one EP33-4ser module to the BASIC-Tiger™ XPORT system then make sure that the selected address of the first additional module is base address + 1\*2, the address of the second additional module is base address + 2\*2, the address of the third additional module is base address + 3\*2,....

The device driver supports up to 128 modules.



## Signal Description

### **CLKSEL**

The CLKSEL signal is not supported by the device driver. Connect CLKSEL to VCC to get the correct BAUD Rate.

### **ENTA ... ENTD**

Enable Transmit Driver for channels A to D, low active.

Since the pins are internally connected to GND with a resistor (4k7), you do not need to connect them. Connect them to GND or leave them open to enable the V.24 output drivers. You can disable the V.24 output drivers of not used channels by connecting this pin to VCC. This will reduce power consumption. If you use the TTL outputs (channels A and/or C) and select BAUD rates above 115.2k, you must disable the V.24 output driver.

**Never select BAUD rates above 115.2k if the V.24 output driver is enabled!**

### **ENRA ... ENRD**

Enable Receive Driver for channels A to D, low active.

Since the pins are internally connected to GND with a resistor (4k7), you do not need to connect them. Connect them to GND or leave them open to enable the V.24 input drivers. You can disable the V.24 input drivers of not used channels by connecting this pin to VCC. This will reduce power consumption.

If you use the TTL inputs (channels A and/or C) you must disable the V.24 drivers by connecting this pin to VCC.

### **-10V(AB)**

Negative voltage output pin. You can use this negative voltage of the internal charge pump of channel A and B for other devices in your circuit. Do not draw more than 5mA from this pin.

### **-10V(CD)**

Negative voltage output pin. You can use this negative voltage of the internal charge pump of channel C and D for other devices in your circuit. Do not

draw more than 5mA from this pin.

### **+10V(AB)**

Positive voltage output pin. You can use this positive voltage of the internal charge pump of channel A and B for other devices in your circuit. Do not draw more than 5mA from this pin.

### **+10V(CD)**

Positive voltage output pin. You can use this positive voltage of the internal charge pump of channel C and D for other devices in your circuit. Do not draw more than 5mA from this pin.

### **TX\_AV, RX\_AV, ..., TX\_DV, RX\_DV**

Transmit and receive lines of channels A to D

### **RTS\_AV, CTS\_AV, ..., RTS\_DV, CTS\_DV**

Hardware handshake signals of channels A to D. If you don't need hardware handshake, then connect the CTS input to +10V. (If you use TTL signals and don't need hardware handshake, then connect CTS\_AT and/or CTS\_CT to GND)

### **DCD\_AV, DSR\_AV, DTR\_AV, RI\_AV, ..., RI\_D**

Software handshake signals and ring indicator line of channels A to D. Refer to the device driver documentation, if this pins are supported.

### **/INTA, /INTB, /INTC, /INTD**

Interrupt request pins for channels A to D. Refer to the device driver documentation, if this pins are supported.

# Expansion Module EP33-4ser



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## Absolute maximum ratings (beyond which permanent damage may occur)

Supply Voltage VCC	0...+5.5V
Input Voltage on any TTL/CMOS input pin	-0.5...VCC
Input Voltage on any V.24 input pin	-22V...22V
Maximum current per TTL -output pin Maximum current per V.24 -output pin	-6...+6 mA -35...+35 mA
Maximum current on each +10V Pin Maximum current on each -10V Pin	-10mA +10mA
Operating Temperature Range	0°C...50°C

## DC Specifications

Parameter	Conditions	Value
Supply current		200mA
TTL Input low voltage V.24 Input low voltage		0.8V max. 0.4V max.
TTL Input high voltage V.24 Input high voltage		2.2V...VCC 2.6V min.
Output high voltage for TTL Outputs Output low voltage for for TTL Outputs	I <sub>oh</sub> = -6 mA I <sub>ol</sub> = 6mA	2.4V min. 0.4V max.