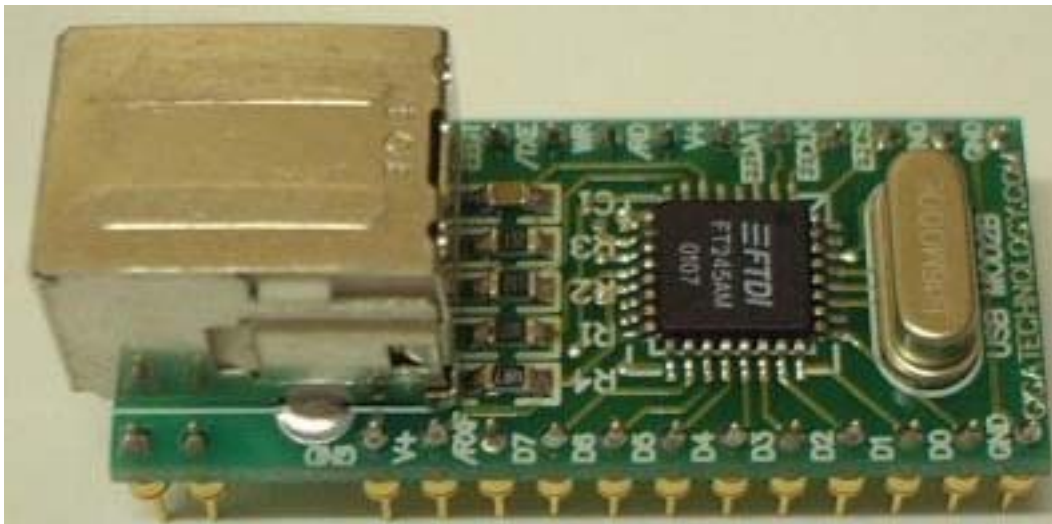


## **USB MOD2 - USB Plug and Play Parallel 8-Bit FIFO Development Module**

The USBMOD2 is a low-cost integrated module for transferring data to / from a peripheral and a host P.C at up to 8 Million bit (1 Megabyte) per second. Based on the FTDI FT8U245 USB FIFO – Fast Parallel Data Transfer IC, it's simple FIFO-like design makes it easy to interface to an CPU (MCU) either by mapping the device into the memory / I/O map of the PCU, using DMA or controlling the device via IO ports.

The USBMOD2 is ideal for rapid prototyping and development by offering a complete plug and play solution.



### **MODULE FEATURES**

- Single module High-Speed USB UART solution
- Based on FTDI FT8U245 USB FIFO – Fast Parallel Data Transfer IC
- Integrated Type-B USB Connector
- On-board 6MHz Crystal
- Provision for external EEPROM for USB enumeration data
- No external passive components required
- Module powered from USB bus (up to 60mA from USB for user application)
- 32-pin Dual In-Line Package (Ideal for prototyping)
- Fits into a standard 32-pin 600mil IC Socket



## FT8U245 IC FEATURES

- Single Chip Multi-Function Data Transfer Solution
- Send / Receive Data over USB at up to 1 Mb / Sec
- 384 byte receive buffer / 128 byte transmit buffer for high data throughput
- Simple interface to CPU or MCU bus
- No in-depth knowledge of USB required as all USB Protocol is handled automatically within the I.C
- FTDI's Virtual COM port drivers eliminate the need for USB driver development in most cases.
- Compact 32 pin (7mm x 7mm) MQFP package
- Integrated 6Mhz – 48Mhz Clock Multiplier aids FCC and CE compliance
- Integrated 3.3v Regulator – No External Regulator Required
- UHCI / OHCI Compliant
- USB 1.1 Specification Compliant
- USB VID, PID, Serial Number and Product Description Strings in external E2PROM.

### VIRTUAL COM PORT (VCP)

#### DRIVERS for

- Windows 98 and Windows 98 SE
- Windows 2000 / ME / XP
- Windows CE \*\*
- MAC OS-8 and OS9
- MAC OS-X
- Linux 2.40 and greater

[\*\* = In the planning or under development]

### D2XX

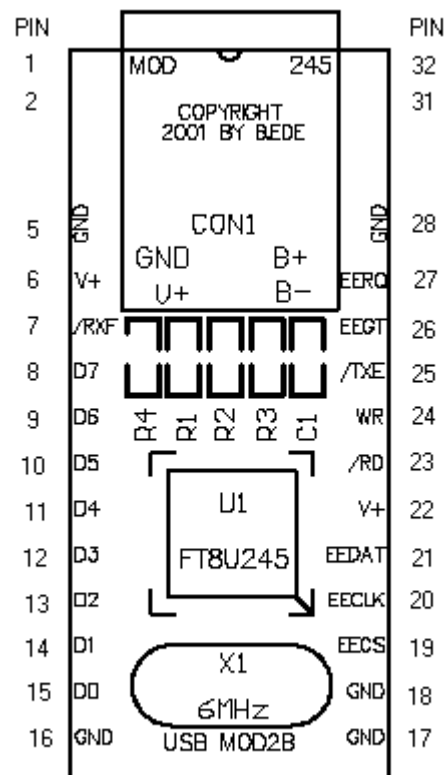
#### (USB Direct Drivers + DLL S/W Interface)

- Windows 98 and Windows 98 SE
- Windows 2000 / ME / XP

For further information regarding the FTDI FT8U245AM USB FIFO – Fast Parallel Data Transfer IC please refer to the FT8U245AM Datasheet. This datasheet can be found on the Ravar website at <http://www.ravar.net>

As mentioned above in module features, the USB MOD2 is in a 32-pin Dual In-Line Package. This allows the module to fit into a standard 32-pin 600mil IC Socket which makes the module ideal for prototyping and development work. Shown in diagram 2 below is the pin out for the USB MOD2.

## USB MOD2 PINOUT



**DIAGRAM 2**

On the following page is the pin out table showing what the various pins are on the module.

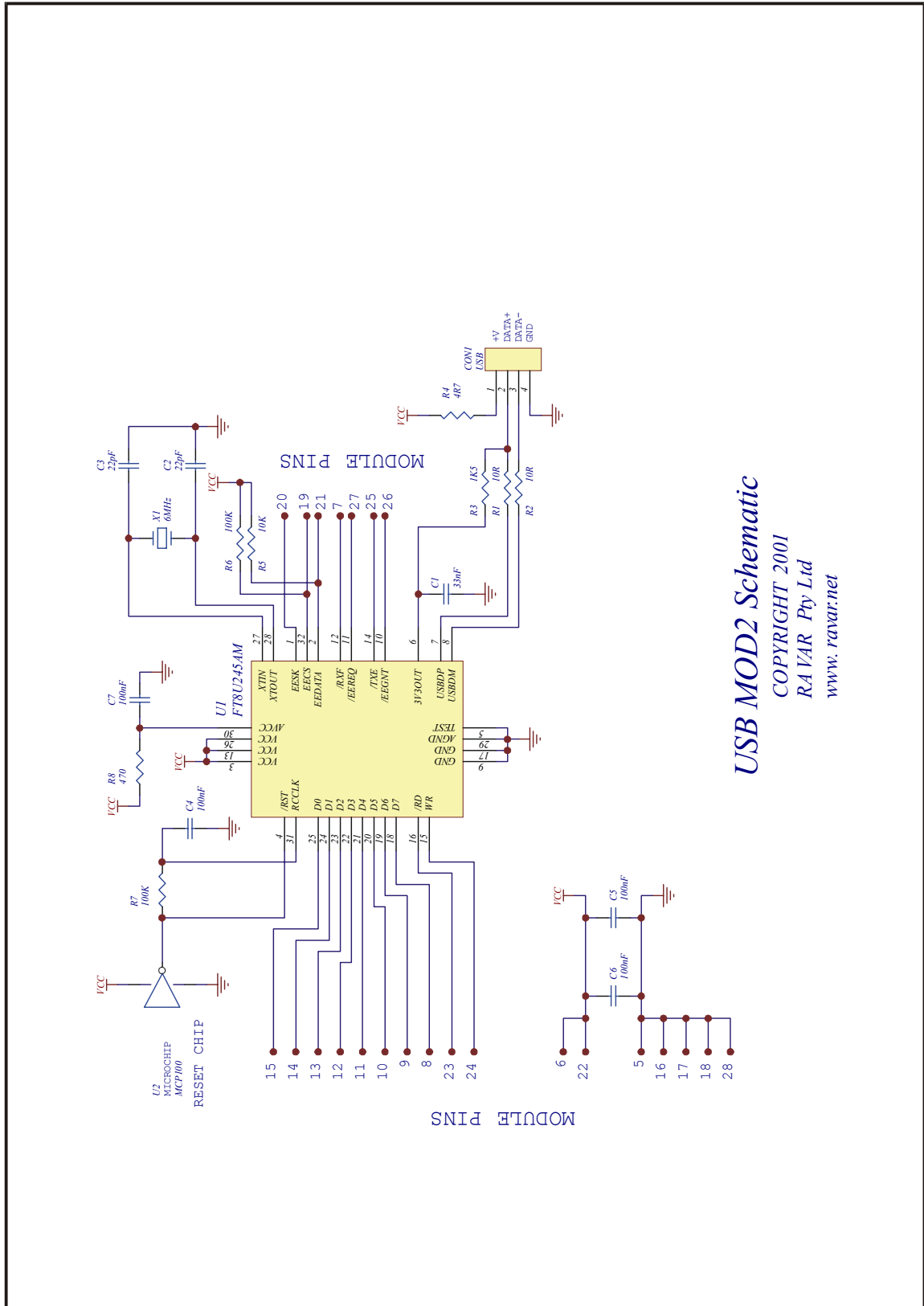


# USB MOD2 User's Manual

## USBMOD2 PINOUT

PIN #	SIGNAL	TYPE	DESCRIPTION
1	N/C	MOUNT	Mounting Pin for module USB connector support
2	N/C	MOUNT	Mounting Pin for module USB connector support
3	NO PIN	NO PIN	
4	NO PIN	NO PIN	
5	GND	PWR	Device – Ground Supply Pin
6	V+	PWR	Device - +4.4 volt to +5.25 volt Power Supply Pin
7	/RXF	OUT	When high, do not read data from FIFO. When low, there is data available in the FIFO which can be read by strobing RD# low the high again.
8	D7	I/O	Bi-Directional Data Bus Bit #7
9	D6	I/O	Bi-Directional Data Bus Bit #6
10	D5	I/O	Bi-Directional Data Bus Bit #5
11	D4	I/O	Bi-Directional Data Bus Bit #4
12	D3	I/O	Bi-Directional Data Bus Bit #3
13	D2	I/O	Bi-Directional Data Bus Bit #2
14	D1	I/O	Bi-Directional Data Bus Bit #1
15	D0	I/O	Bi-Directional Data Bus Bit #0
16	GND	PWR	Device – Ground Supply Pin
17	GND	PWR	Device – Ground Supply Pin
18	GND	PWR	Device – Ground Supply Pin
19	EECS	I/O	Optional EEPROM – Chip Select
20	EECLK	I/O	Optional EEPROM – Clock
21	EEDAT	I/O	Optional EEPROM – Data I/O
22	V+	PWR	Device - +4.4 volt to +5.25 volt Power Supply Pin
23	/RD	IN	Enables Current FIFO Data Byte on D0..D7 when low. Fetches the next FIFO Data Byte (if available) from the Receive FIFO Buffer when /RD goes from low to high.
24	WR	IN	Writes the Data Byte on D0..D7 into the Transmit FIFO Buffer when WR goes from high to low.
25	/TXE	OUT	When high, do not write data into the FIFO. When low, data can be written into the FIFO by strobing WR high then low.
26	EEGT	OUT	When low, allows the EEPROM contents to be accessed via the Data Bus
27	EERQ	IN	Requests the EEPROM contents to be accessed via the Data Bus.
28	GND	PWR	Device – Ground Supply Pin
29	NO PIN	NO PIN	
30	NO PIN	NO PIN	
31	N/C	MOUNT	Mounting Pin for module USB connector support
32	N/C	MOUNT	Mounting Pin for module USB connector support

## USB MOD 2 SCHEMATIC

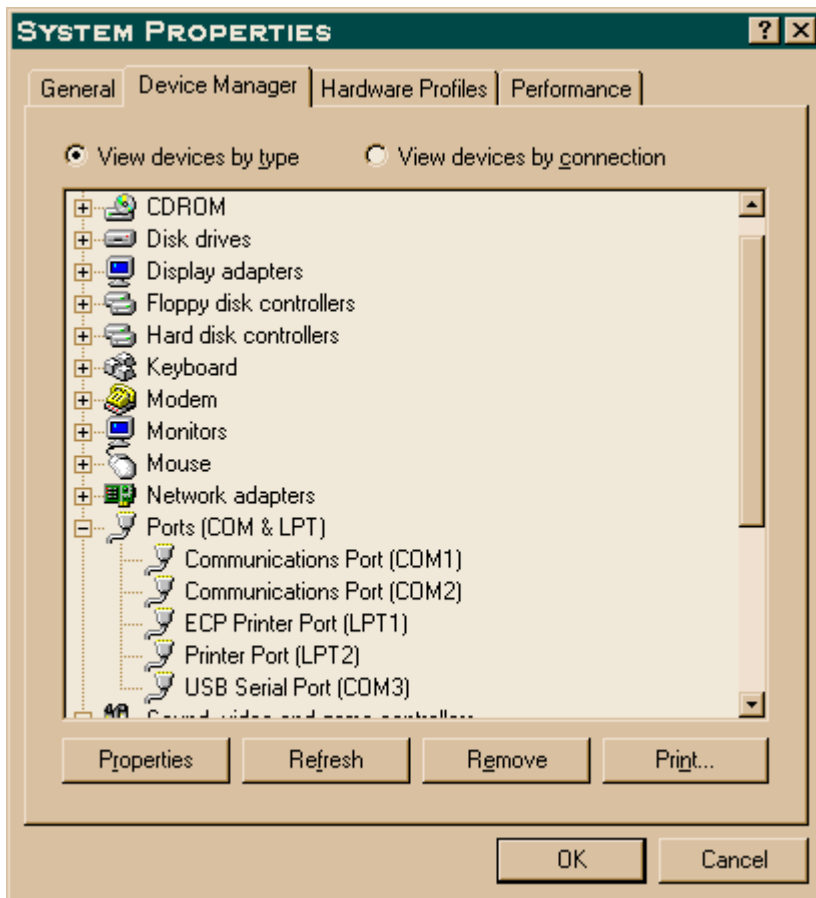


**USB MOD2 Schematic**  
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 www.ravar.net

## Driver Installation.

Your first choice when using the USBMOD is whether you want to use the Virtual Com Port driver or the Direct DLL driver.

For programming simplicity the best driver is the Virtual Com Port and when installed the USBMOD will appear in the System Properties / Device Manager as an USB Serial Port (COMn) as follows.



The Com port number will vary depending on the number of existing com ports on your computer and the number of USBMODs connected to your system.

To install the Virtual Com Port drivers, download the driver from our website or the ftdichip.com website and unzip the files to a local directory. Then connect the USBMOD and windows will automatically ask for the driver, select to specify a location and browse to the directory where you have unzipped the files. (Use the Non Plug & Play driver for the USBMOD to avoid a delay on connecting the USBMOD )



Once the Virtual Com Port is installed it can be programmed exactly as a regular serial com port using the MSComm control from Visual Basic or API calls from C or other languages. Set the com port to the same number as appears in the Device Manager, the baud rate, stop bits, parity etc are not used as the device always runs at full speed.

The Direct DLL driver is installed in a similar manner but using the alternative download from the website.

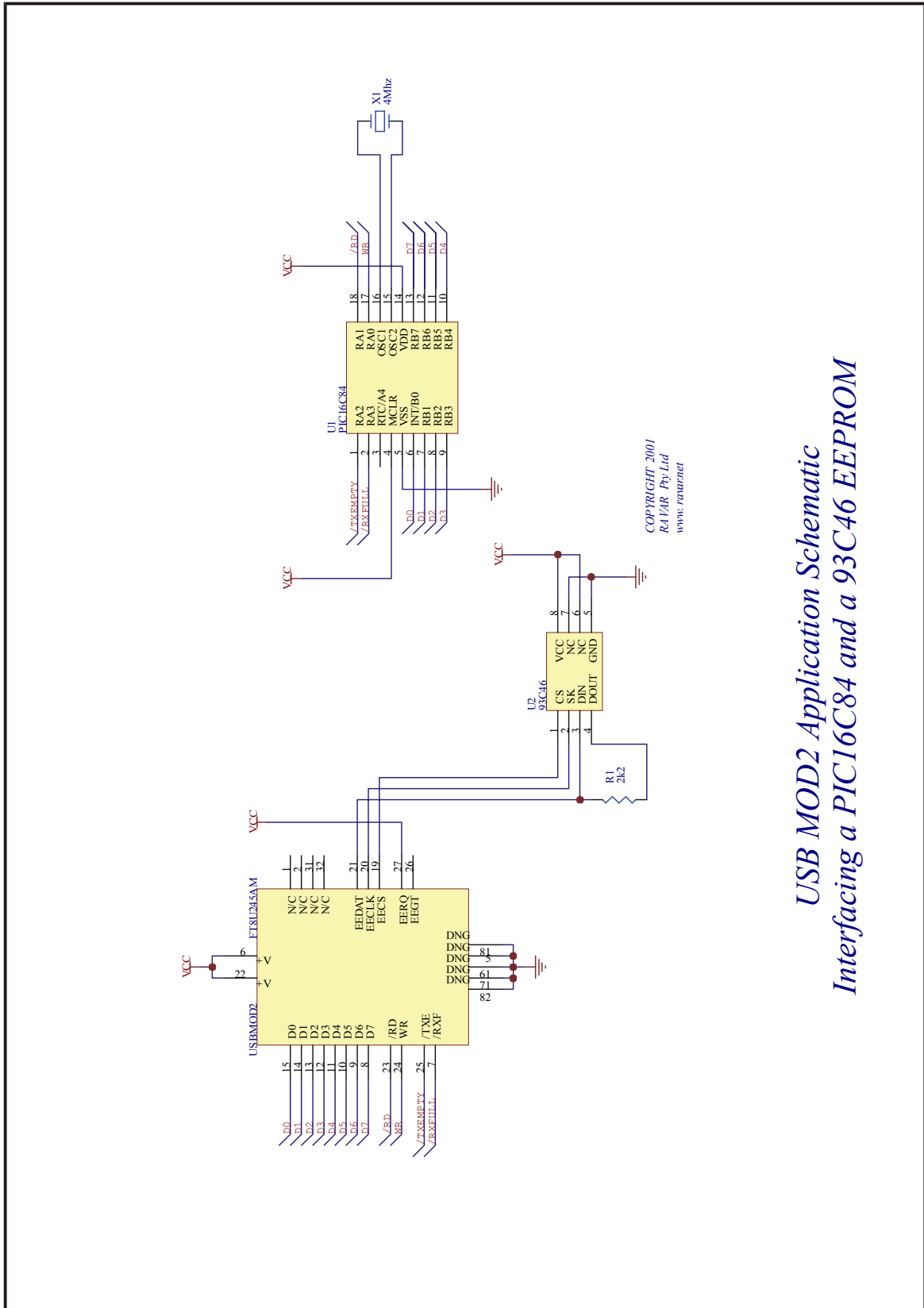
Programming the Direct DLL driver is by call to the DLL Library functions. Please download the Direct DLL programmers guide from the Ravar website.

## **Application Notes**

On the following pages there are schematic drawings showing a sample applications for the USB MOD2.

The application uses a micro controller, in this case we are using a PIC 16C84 as well as a 93C46 EEPROM chip.

## SAMPLE APPLICATION No. 2 Interfacing a PIC16C84 and a 93C46 EEPROM



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*USB MOD2 Application Schematic  
Interfacing a PIC16C84 and a 93C46 EEPROM*





## Absolute Maximum Ratings

Storage Temperature .....	-65°C to + 150°C
Ambient Temperature ( Power Applied ).....	0°C to + 70°C
VCC Supply Voltage .....	-0.5v to +6.00v
DC Input Voltage - Inputs .....	-0.5v to VCC + 0.5v
DC Input Voltage - High Impedance Bidirectionals .....	-0.5v to VCC + 0.5v
DC Output Current – Outputs .....	24mA
DC Output Current – Low Impedance Bidirectionals .....	24mA
Power Dissipation .....	500mW

## DC Characteristics (Ambient Temperature = 0°C .. 70°C)

	Description	Min	Max	Units	Condition
VCC	Operating Supply Voltage	4.4	5.25	V	
Icc1	Operating Supply Current		50	mA	Normal Operation
Icc2	Operating Supply Current		250	uA	USB Suspend
Ioh1	Digital IO Pins Source Current	4		mA	Voh = VCC – 0.5V
Iol1	Digital IO Pins Sink Current	8		mA	Vol = +0.5V
Voh1	Input Voltage Threshold (Low)		0.6	V	
Vol1	Input Voltage Threshold (High)	2.7		V	
VDif	USB Differential Input Sensitivity	0.2		V	
VCom	USB Differential Common Mode	0.8	2.5	V	
URxt	USB Single Ended RX Threshold	0.8	2.0	V	
UVh	USB IO Pins Static Output (Low)		0.3	V	RI = 1.5k to 3.6V
UVI	USB IO Pins Static Output (High)	2.8		V	RI = 15k to GND



## Technical Support and Further Information

For any questions relating to the USBMOD2 please contact us by Email, Fax or Phone.

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Queensland 4215  
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## Product Use Limitations, Warranty and Quality Statement.

The USBMOD2 should not be used in any situation where it's failure or failure of the PC or software controlling it could cause human injury or severe damage to equipment. This device is not designed for or intended to be used in any life critical application.

The USBMOD2 is warranted to be free from manufacture defects for a period of 12 months from the date purchase.

Subjecting the device to conditions beyond the Absolute Maximum Ratings listed above will invalidate this warranty.

The USBIO24 is a static sensitive device, anti static procedures should be used in the handling of this device.

All USBIO24 units are extensively tested at time of manufacture to be free of defects.

Ravar is committed to providing products of the highest quality. Should you experience any product quality issues with this product please contact our quality assurance manager at the above address.

## Disclaimer.

This product and its documentation are provided as-is and no warranty is made or implied as to their suitability for any particular purpose.

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