EasySYNC Ltd

USB2-H-500X-M FAMILY Hi-Speed USB to Multi-Ports RS485 Adapter

Data Sheet

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Version 1.1

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Part Number				
USB2-H-5016-M	USB2-H-5008-M	USB2-H-5004-M	USB2-H-5002-M	USB2-H-5001-M

The USB2-H-500X-M family provide a simple method of adapting legacy serial devices with RS485 interfaces to modern USB ports by incorporating the FTDI's Hi-Speed USB bridge chips.

The adaptor which is contained within a metal enclosure is either USB powered or externally powered (depends on the number of ports) and can supply an output of +5VDC @ up to 80mA on the 5mm terminal block connectors or 30mA on the Pin 9 of DB9 connectors. Indicator LEDs provide functional status.

The USB2-H-500X-M family have been tested to be compliant with both FCC Part 15 Subpart B and European EMC Directive.

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1   Introduction

1.1 Functional Description

The USB2-H-500X-M modules are a family of communication devices. This model, USB2-H-500X-M, provides a simple method of adapting many legacy RS485 serial devices to a modern USB port. This is accomplished by incorporating the industry standard FTDI USB2.0 Hi-Speed serial bridge chip.
The integrated electronics of the USB2-H-100X-M utilise the FTDI FT4232H, FT2232H or FT232H plus RS485 level shifters and TXD/RXD LEDs to provide a visual indication of data traffic through the module.

Figure 1.1 - USB2-H-5001-M

Figure 1.2 - USB2-H-5002-M

Figure 1.3- USB2-H-5004/5008/5016-M

The module uses a standard USB-B device connector for connection to an upstream host or hub port. RS485-level signals, including modem handshake signals, are available on an industry-standard DE-9P connector, The Singal and Dual port module also provide 5mm terminal block connector, customer can use these signals friendly. The maximum RS485-level data rate is 8Mbps.

The USB2-H-500X-M module requires USB device drivers, available free from http://www.easysync-ltd.com/product-downloads, which are used to make the USB2-H-500X-M appear as Virtual COM Ports (VCP). This allows existing serial communications software, such as HyperTerminal, to exchange data through the USB2-H-500X-M to a legacy RS485 peripheral device.

1.2 LED Description

The USB2-H-500X-M has three type of LEDs to indicate a valid link as well as data traffic according to the following table:

LED Colour	Function	Description	LED quantity
Yellow	Enumerated	ON when USB2-H-500X-M is configured and ready	1
Red	TxD Activity	Flashes when data is transmitted from the USB2-H-500X-M to the attached RS485 device	Each ports have one TXLED
Green	RxD Activity	Flashes when data is transmitted from the attached RS485 device to the USB2-H-500X-M.	Each ports have one RXLED

Table 1.1 – LED Description

1.3 Block Diagram

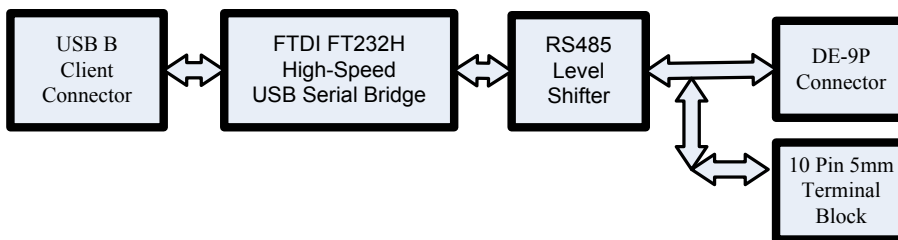### 1.3.1 Singal Port Block Diagram

Figure 1.4 - USB2-H-5001-M Block Diagram

1.3.2 Dual Port Block Diagram
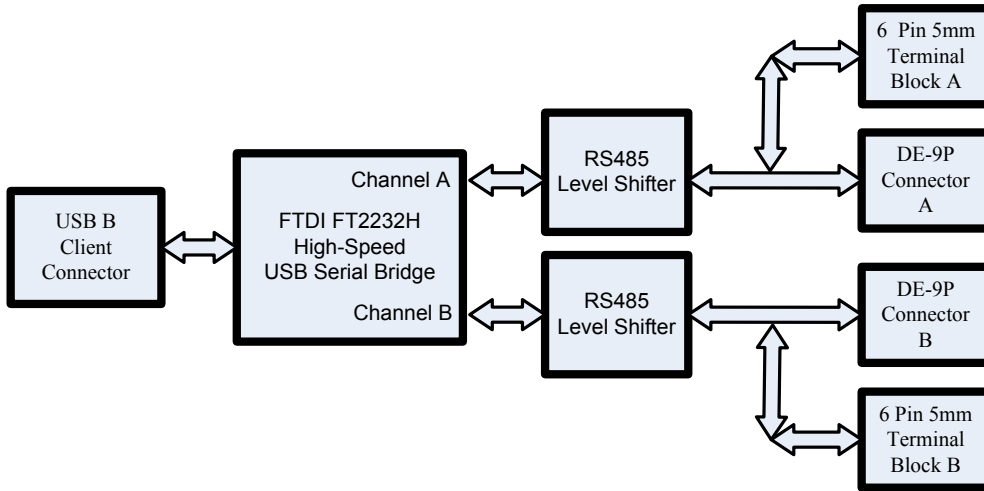
Figure 1.5 - USB2-H-5002-M Block Diagram

1.3.3 Four, Eight and Sixteen Ports Block Diagram
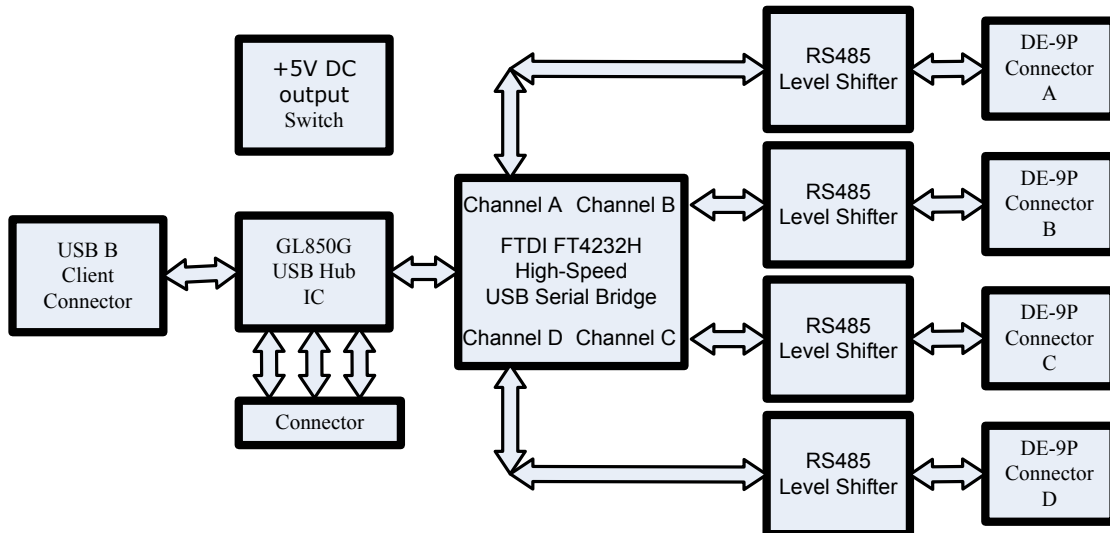
Figure 1.6 - USB2-H-5004/5008/5016-M Main Board Block Diagram
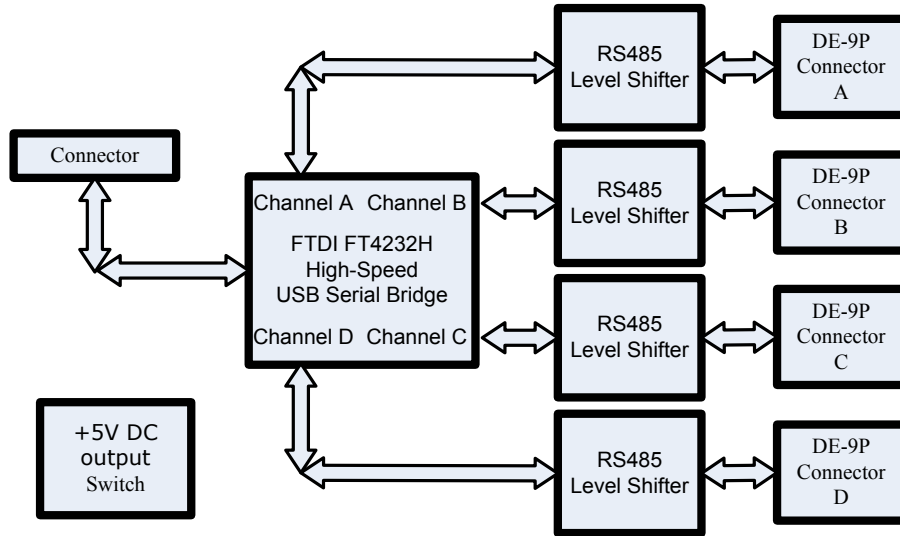
Figure 1.7 - USB2-H-5008/5016-M Daughter Board Block Diagram

1.3.4 Block description

USB B Client Connector

This connector provides the interface for connection to a USB Host or Hub port. The maximum cable length is 5 meters, according to the USB 2.0 specification.

Genesys GL850G

The Genesys GL850G is advanced version Hub solutions which fully comply with Universal Serial Bus

Specification Revision 2.0.

FTDI FT4232H

The FTDI FT4232H provides the Hi-Speed USB-to-Serial conversion. Operating system device drivers are required in order to work with the FT4232H to provide the quad Virtual COM Port serial interfaces.

FTDI FT2232H

The FTDI FT2232H provides the Hi-Speed USB-to-Serial conversion. Operating system device drivers are required in order to work with the FT2232H to provide the daul Virtual COM Port serial interfaces.

FTDI FT232H

The FTDI FT232H provides the Hi-Speed USB-to-Serial conversion. Operating system device drivers are required in order to work with the FT232H to provide the one Virtual COM Port serial interface.

RS485 Level Shifter

The RS485 level shifter converts the signals provided by the Hi-Speed USB-to-Serial conversion of FTDI into the voltage levels required by RS485 devices.

DE-9P Connector (Male)

The DE-9P connector is configured in an industry standard (TIA/EIA-574) pin-out to provide connection to RS485 peripherals through standard cables. See section 3.1.2

5mm Terminal Block

There are 5mm terminal block connectors provide the connection to RS485 peripherals devices.

+5V DC Output Switch

This switch can disable/Enable the +5VDC to an external devices.

Main Board

This is using on 4 and 16 ports product. When product is 4-ports that use a main board, when product is 16-ports product that use two main boards.

Daughter board

This is using on 8 and 16 ports product. When product is 8-ports that use a daughter board, when product is 16-ports product that use two daughter boards.

1.4 Features

- RS-485 serial ports by connecting to Hi-Speed USB 2.0 interface.

- Easy plug & play installation and RS-485 device connection

- Provide USB2.0 Hi-Speed(480Mbps) interface and works with USB 1.1 & 2.0 Host and Hub ports

- Industry Standard FTDI chip set & device drivers for maximum compatibility

- Microsoft Windows® WHQL-certified, Mac OS X, Linux and Windows CE device drivers

- Installs as standard Windows COM ports

- COM port number can be changed to any available COM port number, to support HyperTerminal, or any other serial communications software application running in Windows

- Supports Windows Server 2008, 2003, Vista, XP 2000, Linux, Mac OS X

- FIFO: USB2-H-5004/5008/5016-M - FT4232H 2K byte transmit buffer, 2K byte receive buffer

    USB2-H-5002-M - FT2232H 4K byte transmit buffer, 4K byte receive buffer

    USB2-H-5001-M FT232H 1K byte transmit buffer, 1K byte receive buffer

- RS-485 data signals: Data+, Data-, GND

- Single, dual and quad Ports product are Powered by USB port. No external power adapter is required. Note that they can also be powered from external power adapter.

- Serial port speed up to 8Mbps

- Serial Communication Parameters

    o   Parity: None, Even, Odd

    o   Data bits: 7, 8

    o   Flow control: X-ON/X-OFF, None

- The standard DE-9P male connectors

- LEDs indicate USB Enumeration, RxD, TxD for monitoring port status & easy diagnostics

- Operating temperature of -40°C to +85°C

- 5mm terminal block connectors

- Echo and non-Echo two modes can be selected.

- Termination ON and OFF two modes can be selected.

- +5V DC power output for external devices

    o The maximum current of 4, 8 and 16 port are 30mA

    o The maximum current of 1 and 2 port are 80mA

Note. The Windows CE5.0 can only support COM0~COM9, When the FTDI COM ports are over the Windows CE available COM ports, you cannot use FTDI COM port.

Note. HyperTerminal is no longer provided with Windows 7/Vista.

1.5 Performance Figures

Parameter	Performance
USB Interface	480Mbps USB 2.0 High-Speed
RS485 Interface	Standard Windows baud rates (300bps to 921.6Kbps) Custom baud rates (300bps to 8Mbps) through baud rate aliasing. See FTDI Application Note: AN_120_Aliasing_VCP_Baud_Rates
Max Cable Length	USB = 5m, RS485 =12m (at 10Mbps)

Table 1.2 - Performance Figures

Part Number	Description
USB2-H-5016-M	Hi-Speed USB to 16-Ports RS485 module
USB2-H-5008-M	Hi-Speed USB to 8-Ports RS485 module
USB2-H-5004-M	Hi-Speed USB to quad-Port RS485 module
USB2-H-5002-M	Hi-Speed USB to dual-Port RS485 module
USB2-H-5001-M	Hi-Speed USB to single-Port RS485 module

Table 1.3 - Ordering Information

2 Installation

2.1 Hardware Configureations

Insert the A-plug of USB cable into an available USB Host or Hub port. Insert the B-plug of USB cable into the B-receptacle on the USB2-H-500X-M.

2.1.1 Wiring

RS485 cables have followed a standard 9-pin configuration on a D-sub connector since the mid 1980s. The USB2-H-500X-M family follows this standard as a Data Terminal Equipment (DTE) device. If the RS485 equipment being connected is a Data Communication Equipment (DCE) device, it's typical that a straight-through cable can be used.

DTE Pin Number	Signal Name	Expected Connect Signal
1	DATA- = Transmit/Receive Data, negative polarity	DATA-
2	DATA+ = Transmit/Receive Data, positive polarity	DATA+
3	N/A	N/A
4	N/A	N/A
5	GND = signal ground	GND
6	N/A	N/A
7	N/A	N/A
8	N/A	N/A
9	PWR = +5V DC output (4,8 and 16 ports product.)	PWR

Table 2.1 – RS485 DTE to DCE connection

Single-Port Switch Setting

SW1 Position	Open (off)	Closed (on)
1	Echo ON	Echo OFF
2	Termination OFF	Termination ON

Table 2.2 – Switch Setting Configuration of USB2-H-5001-M.

Dual-Port Switch Setting

The Dual-Port has two switches to control the Termination and Echo function of the two channels.

Channel 1:

SW1 Position	Open (off)	Closed (on)
1	Echo ON	Echo OFF
2	Termination OFF	Termination ON

Table 2.3 – SW1 Setting Configuration of the USB2-H-5002-M.

Channel 2:

SW2 Position	Open (off)	Closed (on)
1	Echo ON	Echo OFF
2	Termination OFF	Termination ON

Table 2.4 – SW2 Setting Configuration of the USB2-H-5002-M.

4 Ports Switch Setting

SW1 Position	Ports Position	Open (off)	Closed (on)
1	CH4		
2	CH3	Echo ON	Echo OFF
3	CH2		
4	CH1		

Table 2.5 – SW1 Setting Configuration of the USB2-H-5004-M.

SW2 Position	Ports Position	Open (off)	Closed (on)
1	CH4		
2	CH3	Termination OFF	Termination ON
3	CH2		
4	CH1		

Table 2.6 – SW2 Setting Configuration of the USB2-H-5004-M.

SW3 Position	Ports Position	Open (off)	Closed (on)
1	CH4		
2	CH3	5V Out Disable	5V Out Enable
3	CH2		
4	CH1		

Table 2.7 – SW3 Setting Configuration of the USB2-H-5004-M.

8 Ports Switch Setting

SW Position		Ports Position	Open (off)	Closed (on)
SW1	1	CH4		
	2	CH3	Echo ON	Echo OFF
	3	CH2		
	4	CH1		
SW4	1	CH8	ECNo ON	ECNo OFF
	2	CH7		
	3	CH6		
	4	CH5		

Table 2.8 – Echo function Switch Setting Configuration of the USB2-H-5008-M.

SW Position		Ports Position	Open (off)	Closed (on)
SW2	1	CH4	Termination OFF	Termination ON
	2	CH3		
	3	CH2		
	4	CH1		
SW5	1	CH8	Termination OFF	Termination ON
	2	CH7		
	3	CH6		
	4	CH5		

Table 2.9 – Termination function Switch Setting Configuration of the USB2-H-5008-M.

SW Position		Ports Position	Open (off)	Closed (on)
SW3	1	CH4	5V Out Disable	5V Out Enable
	2	CH3		
	3	CH2		
	4	CH1		
SW6	1	CH8	5V Out Disable	5V Out Enable
	2	CH7		
	3	CH6		
	4	CH5		

Table 2.10 – 5V Out Switch Setting Configuration of the USB2-H-5008-M.

16 Ports Switch Setting

SW Position		Ports Position	Open (off)	Closed (on)	SW Position		Ports Position
SW1	1	CH4	Echo ON	Echo OFF	SW7	1	CH12
	2	CH3				2	CH11
	3	CH2				3	CH10
	4	CH1				4	CH9
SW4	1	CH8			SW10	1	CH16
	2	CH7				2	CH15
	3	CH6				3	CH14
	4	CH5				4	CH13

Table 2.11 – Echo function Switch Setting Configuration of the USB2-H-50016-M.

SW Position		Ports Position	Open (off)	Closed (on)	SW Position		Ports Position
SW2	1	CH4	Termination OFF	Termination ON	SW8	1	CH12
	2	CH3				2	CH11
	3	CH2				3	CH10
	4	CH1				4	CH9
SW5	1	CH8			SW11	1	CH16
	2	CH7				2	CH15
	3	CH6				3	CH14
	4	CH5				4	CH13

Table 2.12 – Termination function Switch Setting Configuration of the USB2-H-5008-M.

SW Position		Ports Position	Open (off)	Closed (on)	SW Position		Ports Position
SW3	1	CH4	5V Out Disable	5V Out Enable	SW9	1	CH12
	2	CH3				2	CH11
	3	CH2				3	CH10
	4	CH1				4	CH9
SW6	1	CH8	5V Out Disable	5V Out Enable	SW12	1	CH16
	2	CH7				2	CH15
	3	CH6				3	CH14
	4	CH5				4	CH13

Table 2.13 – 5V Out Switch Setting Configuration of the USB2-H-5008-M.

5V Out:

This +5V supply is available after the USB2-H-500X-M is fully enumerated and device drivers are loaded, and each port provides a maximum current of 30mA.

The single and dual port models do not have the switch but they can provide a maximum current of 80mA (when powered from the USB BUS). When using the external power adapter the maximum current can be increased.

2.2 Device Driver Installation

The USB2-H-500X-M Series adaptor drivers are available for download from:

http://www.easysync-ltd.com/product-downloads

2.2.1 Microsoft Windows

With the device drivers being Windows Hardware Quality Labs (WHQL) certified, they are also available through download directly from the Microsoft® Windows® Update service. This is the best choice when connecting the USB2-500X-M Series to a computer running Windows Vista. Additional installation options are noted below:

Installation Executable on Windows XP

1) Login to your system as Administrator, or a user with Administrator rights.

2) Prior to connecting the USB2-500X-M Series to the USB Host or Hub port, download the latest device driver version from the EasySYNC web site.

Operating System	Release Date	x86 (32-bit)	x64 (64-bit)	Comments
Windows*	2011-04-12	2.08.14	2.08.14	2.08.14 WHQL Certified Available as setup executable Release Notes
	2011-08-26	2.08.17 (Beta)	2.08.17 (Beta)	2.08.17 Beta Version Release Notes

3) Run this executable to install the device drivers.

4) Connect the USB2-500X-M Series to your computer. A notification will appear near the task bar indicating that new hardware has been installed and is ready for use. It is normal if this notice appears twice.
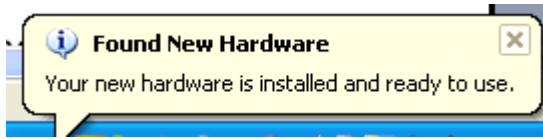

Figure 2.1 - Hardware Ready

Windows Update shown on Windows XP

You must have an active Internet connection and the Windows Update Service enabled.

1) Connect the USB2-500X-M Series to your USB Host or Hub.

2) The "Found New Hardware" Wizard will appear. The first dialog should ask whether it is acceptable to use the Windows Update Service to find the device driver.
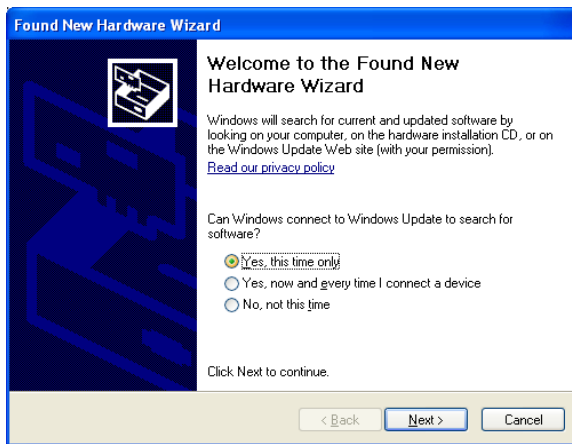
Figure 2.2 – Found New Hardware Wizard

3) Select one of the "Yes" choices and click "Next".

4) The following screen appears:

Figure 2.3 – Automatic Install

5) Wait while the driver is found, downloaded, and installed. This step may take a couple minutes depending on the Internet speed.

6) After the files are found and installed, click "Finish" to complete the installation.

Figure 2.4 - Complete Hardware Installation

7) Steps 2 through 6 will repeat. The first time installs the basic USB Serial Converter in the USB device tree. The second time installs the Virtual COM Port layer in the Ports tree and assigns the COM port number.

8) When both portions of the device driver have been installed successfully, the following message will appear, indicating that the device is ready.
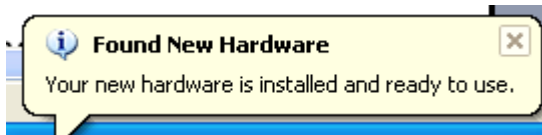
Figure 2.5 - Hardware Ready

COM Port Assignment

Next, to determine which COM port has been assigned, open the Windows Device Manager from the System Control Panel.
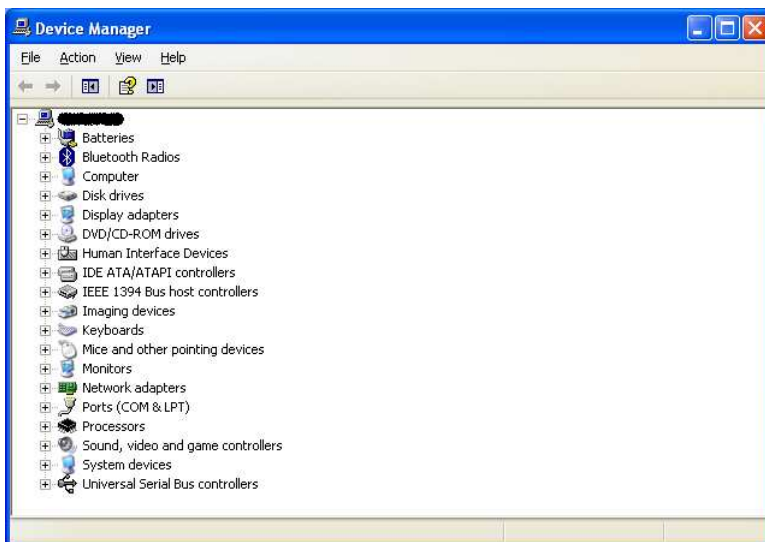
Figure 2.6 - Device Manager

Click on the Plus "+" sign next to the Ports tree to list the available COM port. You will see "USB Serial Port", followed by a COMn assignment. In the figure below, the USB2-H-500X-M-Dual port is assigned to COM3 to COM4, so how many COM Ports are depend on your device.

Figure 2.7 - COM Port Assignment

Use this COM port number with your application software in order to access the USB2-H-500X-M.

If an application requires use of a different COM port number, the assignment may be changed through the Advanced Driver Options settings.

From the Device Manager listing above, right-click on the USB Serial Port and select Properties.

Figure 2.8 – Access COM Port Properties

Next, click on the "Port Settings" tab.

Figure 2.9 - Settings Tab

Then click on the "Advanced…" button.
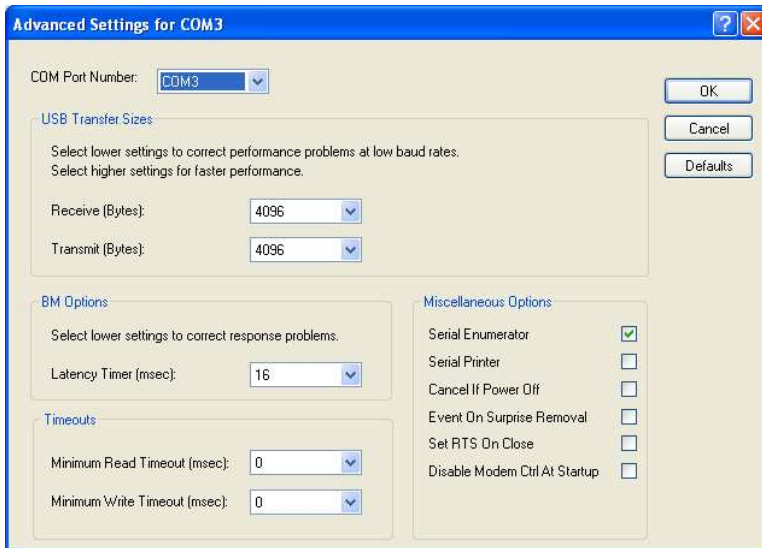
Figure 2.10 - Advanced Options

This will display the various advanced settings. Note the COM port assignment in the upper left. Clicking on the drop-down list will display the available port numbers. Select one that is not in use and click OK on each dialog box to activate the selection. Windows will remember this COM port number.

2.2.2 Mac OS X, Linux, Windows CE

Device drivers and FTDI installation guides for Mac OS X, Linux and Windows CE are available for download on the EasySYNC web sites. Follow the respective FTDI installation guides for the chosen operating system.

The Windows CE5.0 can only support COM0~COM9, When the FTDI COM ports are over the Windows CE available COM ports, you could not use FTDI COM port.

3   Connections

3.1 External Connectors

3.1.1 USB

The USB2-H-500X-M famly are a downstream USB 2.0 High-speed Device. A standard USB Series "B" receptacle is mounted inside the USB2-H-500X-M FAMILY to facilitate connection to an upstream USB Host or Hub.

Pin Number	Pin Type	Description
1	Power	VBUS – USB Power provided from upstream USB Host or Hub
2	Bidirectional	D− = USB data signal, negative polarity
3	Bidirectional	D+ = USB data signal, positive polarity
4	Ground	GND = USB signal ground
Shield	Case Ground	Drain = typically connected to the host PC case

Table 3.1 – USB "B" Receptacle Pin-Out

3.1.2 RS485

The RS485 ports are configured as Data Terminal Equipment (DTE), with a 9-contact D-Sub Pin connector. Pin assignments are according to TIA/EIA-485. In addition, pin9 of DB9 provides +5VDC to an external device with a maximum current draw of 30mA once the USB2-H-500X-M has been enumerated by the system.

Pin Number	Pin Type	Description
1	DATA- = Transmit/Receive Data, negative polarity	DATA-
2	DATA+ = Transmit/Receive Data, positive polarity	DATA+
3	N/A	N/A
4	N/A	N/A
5	GND = signal ground	GND
6	N/A	N/A
7	N/A	N/A
8	N/A	N/A
9	PWR = +5V DC output	PWR

Table 3.2 – DE-9P RS485 Pin-Out

3.1.3 5mm Terminal Block

The Singal and Dual port product also provide another interface for customer using that is 5mm terminal block connector. Each RS485 signals also connected through a 5mm terminal block connector. This is shown in the following table:

Single Port Terminal Block

Single Port Terminal Block		
Terminal Block Pin Number	**Pin Type**	**Description**
1	Input	Channel 1 DATA-
2	Input	Channel 1 DATA+
3	N/A	N/A
4	N/A	N/A
5	Ground	GND = RS485 signal ground
6	N/A	N/A
7	N/A	N/A
8	N/A	N/A
9	N/A	N/A
10	PWR output	+5V DC output

Table 3.3 – USB2-H-5001-M Terminal Block interface
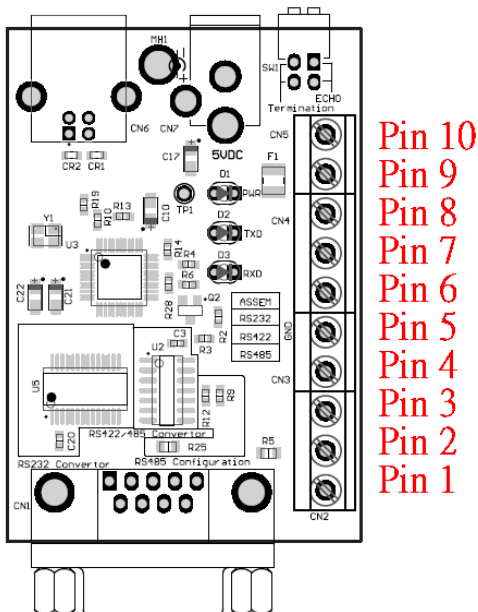
Figure 3.1 - USB2-H-5001-M Terminal Block Connector Assignment

Dual Port Terminal Block

Dual Port Terminal Block		
Terminal Block Pin Number (Channel 1 and Channel 2)	Pin Type	Description
1	Input	Channel 1 DATA-
2	Input	Channel 1 DATA+
3	N/A	N/A
4	N/A	N/A
5	PWR output	+5V DC output
6	Ground	GND = RS485 signal ground

Table 3.4 –USB2-H-5002-M Terminal Block interface
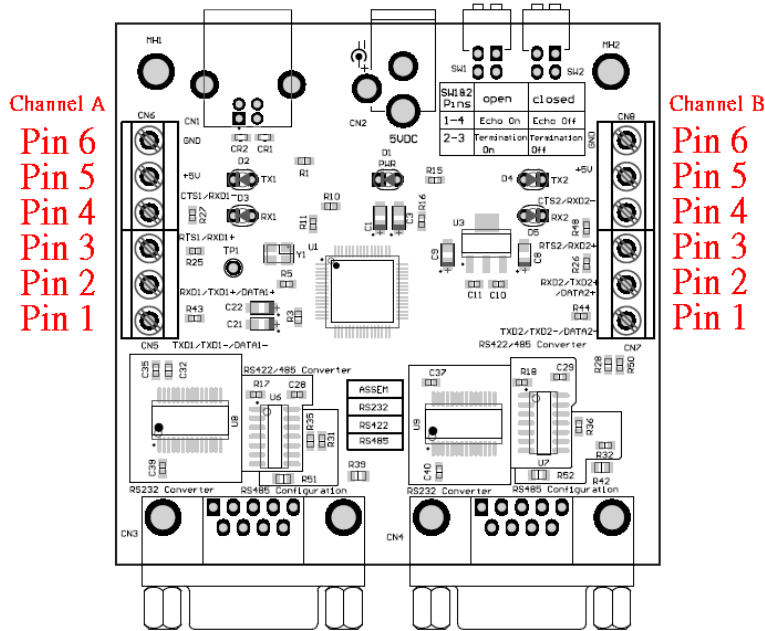
Figure 3.2 - USB2-H-5002-M Terminal Block Connector Assignment

In addition, one pin of terminal block connector can provide +5VDC to an external device with a maximum current draw of 80mA once the USB2-5001/5002-M have been enumerated by the system.

4   Termination and BIAS Resistors Setting

Figure 4.1 shows a general-purpose RS-485 network which has 4 devices. Each node has a transceiver that interfaces between RS-485 and TTL logic levels. Each node also has two 10KΩ biasing resistors which hold the line in a known state when no drivers are enabled.
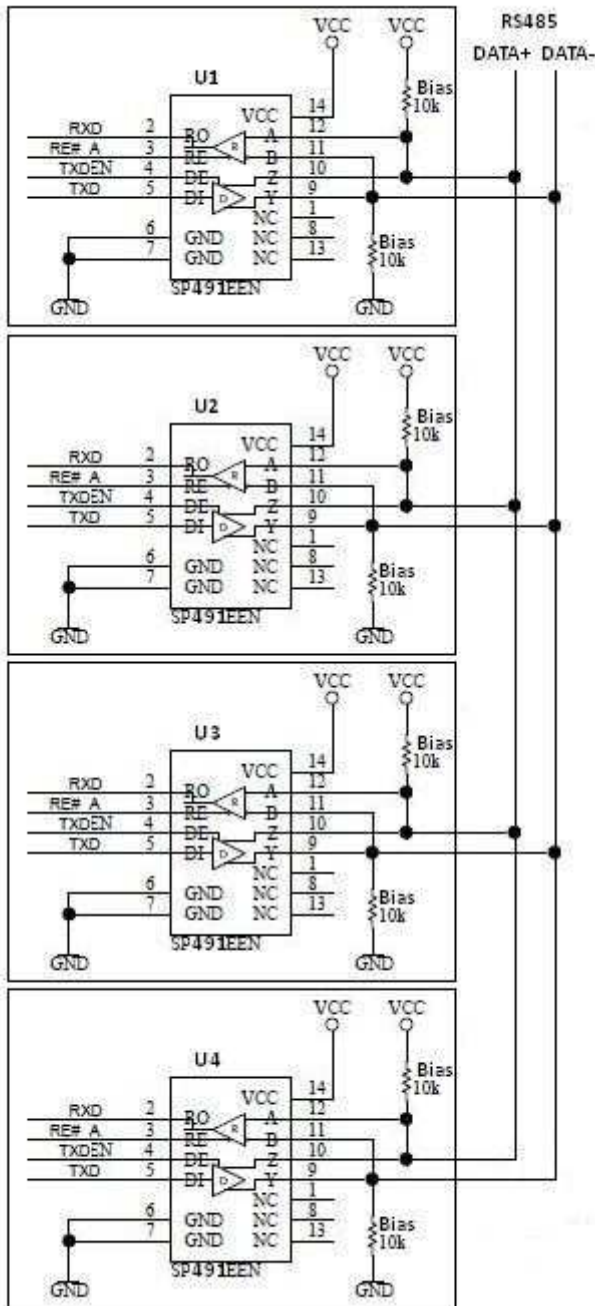
Figure 4.1 – An example for RS485 network (Without Terminations)

The USB2-H-500X-M has these biasing circuits fitted internally. The unit is supplied with a 10K Ω pullup from line Data+ to VCC and a 10K Ω pulldown from line Data- to ground. When no drivers are enabled, the biasing resistors hold line Data+ more positive than line Data-. Note that these are sufficient when no termination is enabled on the bus, but additional resistors may be required if termination is enabled. Please refer to Figure 4.2 in this case.

If there are over 20 devices in the network, the parallel value of bias resistors will reduce to 500 Ω, and the value will be too small and the transceiver output may not drive the signal high or low correctly. Removing the internal bias resistors from some nodes to reduce the combined value to greater than 500 Ω will improve the signal quality in this case. There should not be issues if the parallel value of the bias resistors is over 500 Ω.

Adding terminations will reduce voltage reflections that can cause the receiver to misread logic levels. The receiver sees reflected voltages as output switches, and the line settles from its initial current to its final current. The termination eliminates reflections by making the initial and final currents equal. The circuit has two 120-Ω terminating resistors connected in parallel, at or just beyond the final node at each end of the link. One end of the link also has two 750-Ω biasing resistors.
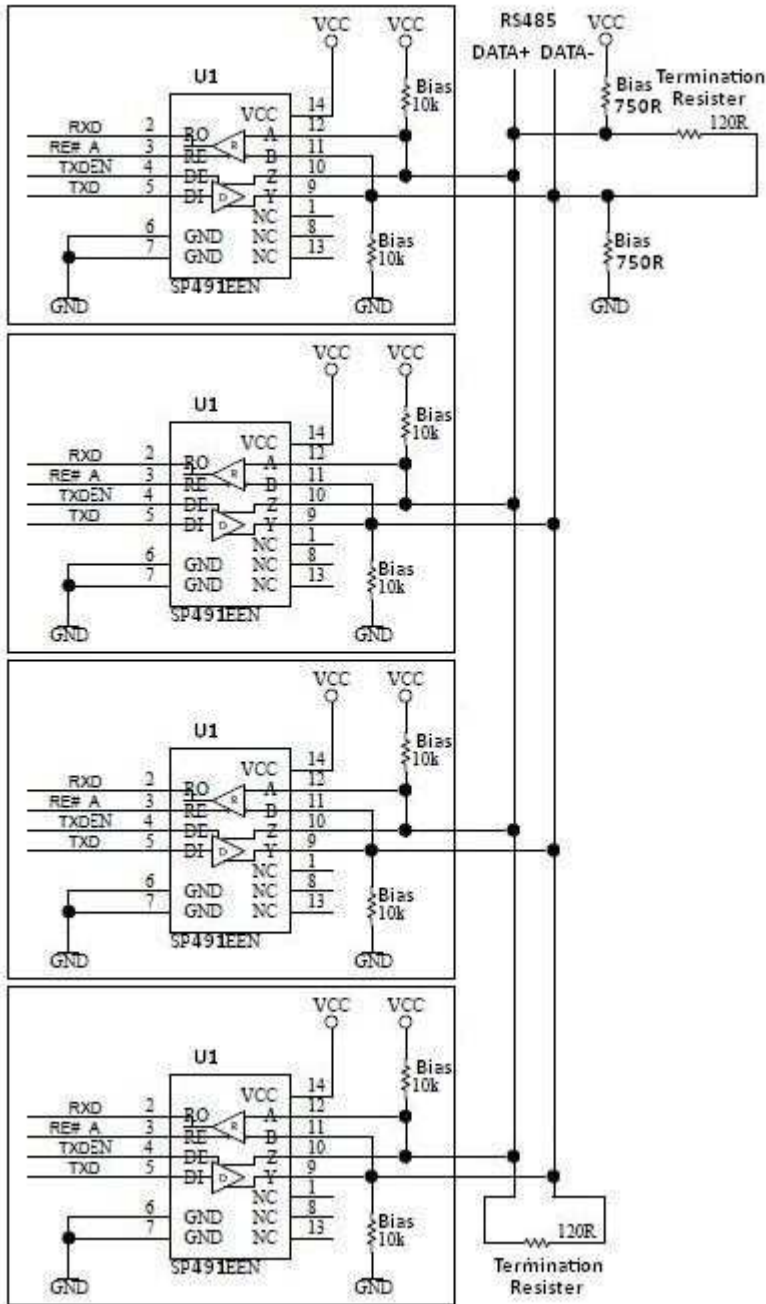
Figure 4.2 – An example for RS485 network (With Terminations)

The final current is a function of the line termination, the receivers' input impedance, and the line's series impedance. In a typical RS-485 line without a termination, the initial current is greater than the final current because the characteristic impedance is less than the receivers' combined input impedance.

On a line without a termination, the first reflection occurs when the initial current reaches the receiver. The receiver's input can absorb only a fraction of the current. The rest reflects back to the driver. As the current reverses direction, its magnetic field collapses and induces a voltage on the line. As a result, the receiver initially sees a greater voltage than what was transmitted.

When the reflected voltage reaches the driver, which has a lower impedance than the line, the driver absorbs some of the reflection and bounces the rest back to the receiver. This reflection is of opposite polarity to the first reflection and causes the receiver to see a reduced voltage. The reflections bounce back and forth like this for a few rounds before they die out and the line settles to its final current.

If the line terminates with a resistor equal to the line's characteristic impedance, there are no reflections. When the initial current reaches the termination, it sees exactly what it was expecting—a load equal to the line's characteristic impedance. The entire transmitted voltage drops across the load. In a network with two parallel terminations, the drivers drive two lines with each ending at a termination.

When two 120Ω termination resistors are added,the difference between Data+ and Data- shrinks to a few millivolts, much less than the required 200 mV. The solution is to add smaller resistors in parallel with the internal biasing so that a greater proportion of the series voltage drops across the termination.

The size of the biasing resistors is a tradeoff. For a greater voltage difference and higher noise immunity on an idle line, use smaller values. For lower power consumption and a greater differential voltage on a driven line, use larger values.

The table 4.1 below shows the component numbers of the bias resistors in each module. All termination resistors in the USB2-H-500X-M can be enabled or disabled by switches. Please refer to table 2.12. The user can also remove or modify the internal bias resistors to meet their requirements. All default value of bias resistors are 10KΩ .

Modules Name	Bias Resistor Numbers	
	Daughter Board	Main Board
USB2-H-50016-M	(R41,R47),(R46,R48),(R49,R67),(R66,R68)	(R38,R40),(R39,R41),(R42,R48),(R47,R49)
USB2-H-5008-M	(R41,R47),(R46,R48),(R49,R67),(R66,R68)	(R38,R40),(R39,R41),(R42,R48),(R47,R49)
USB2-H-5004-M	R38,R40),(R39,R41),(R42,R48),(R47,R49)	
USB2-H-5002-M	(R51,R53),(R52,R54)	
USB2-H-5001-M	R25,R26	

Table 4.1 –Bias Resistor Numbers Of Each Modules

5 Electrical details

5.1 USB

Parameter		Description	Minimum	Typical	Maximum	Units	Conditions
USB_VCC		Input Power Voltage*	4.25	5.0*	5.25	V	*Present when USB cable is attached and USB Host or Hub powered.
1 port	I_{cc}	USB current		61	62	mA	***Does not include power supplied to external device when RI/PWD pin is configured for +5V output
2 ports				85	100		
4 ports				115	135		

Table 5.1 - USB Electrical Details

5.2 5V Power Adapter

Parameter		Description	Minimum	Typical	Maximum	Units	Conditions
5V Power adapter_VCC		Power Voltage	4.75	5	5.25	V	Adapter provide 5V 2A of power.
8 ports	I_{cc}	Power adapter current		300	320	mA	***Does not include power supplied to external device when RI/PWD pin is configured for +5V output
16 ports				535	555		

Table 5.2 - 5V Power Adapter Electrical Details

5.3 RS485

Parameter	Description	Minimum	Typical	Maximum	Units	Conditions
V_{trans}	Transmitter output voltage swing	2			V	R_L = 50R, C_L = 50pF
V_{rec}	Receiver input voltage range	-7		+12	V	R_L = 50R, C_L = 50pF
ESD HBM	N/A		±15		KV	For all RS-485 Inputs and Outputs pin

Table 5.3 –RS485 Electrical Details

5.4 Power Output

The USB2-H-500X-M provides +5V DC for an external device that requires power on pin9 of DB9 and termination block connector. The +5V output is only enabled when the USB interface is not in suspend and the switch is setting in closed.

Parameter	Description	Minimum	Typical	Maximum	Units	Conditions
I_O	Single and Dual port Output Power Current	0		80	mA	USB interface is not in SUSPEND. This is the total current available on all ports
	4, 8 and 16 ports Output Power Current	0		30	mA	The Switch is set in +5V DC enable,and USB interface is not in SUSPEND.

Table 5.4 - Power Output for USB2-H-500X-M

6   Physical Environment Details

6.1 Storage

Parameter	Description	Minimum	Typical	Maximum	Units	Conditions
T	Storage Temperature Range	-65		+150	ºC	

Table 6.1 - Storage Temperature

6.2 Operating

Parameter	Description	Minimum	Typical	Maximum	Units	Conditions
T	Operating Temperature Range	−40		+85	ºC	5% to 95% RH, non condensing

Table 6.2 - Operating Temperature

7   Physical Dimensions

All dimensions are in mm, and the tolerance are +/-0.1mm.

7.1 USB2-H-5001-M Dimension
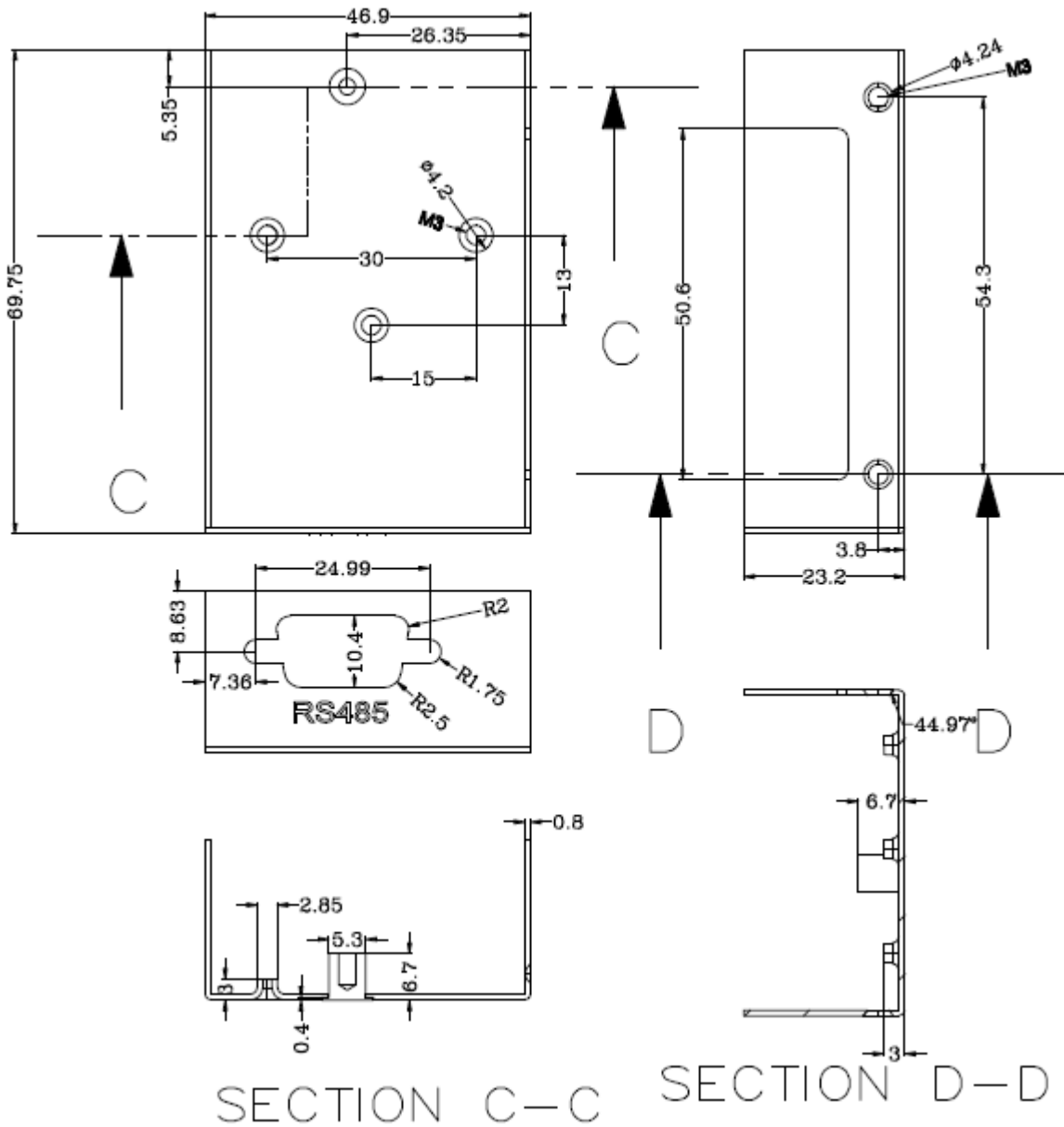
Figure 7.1 - USB2-H-5001-M Top Cover of Dimension
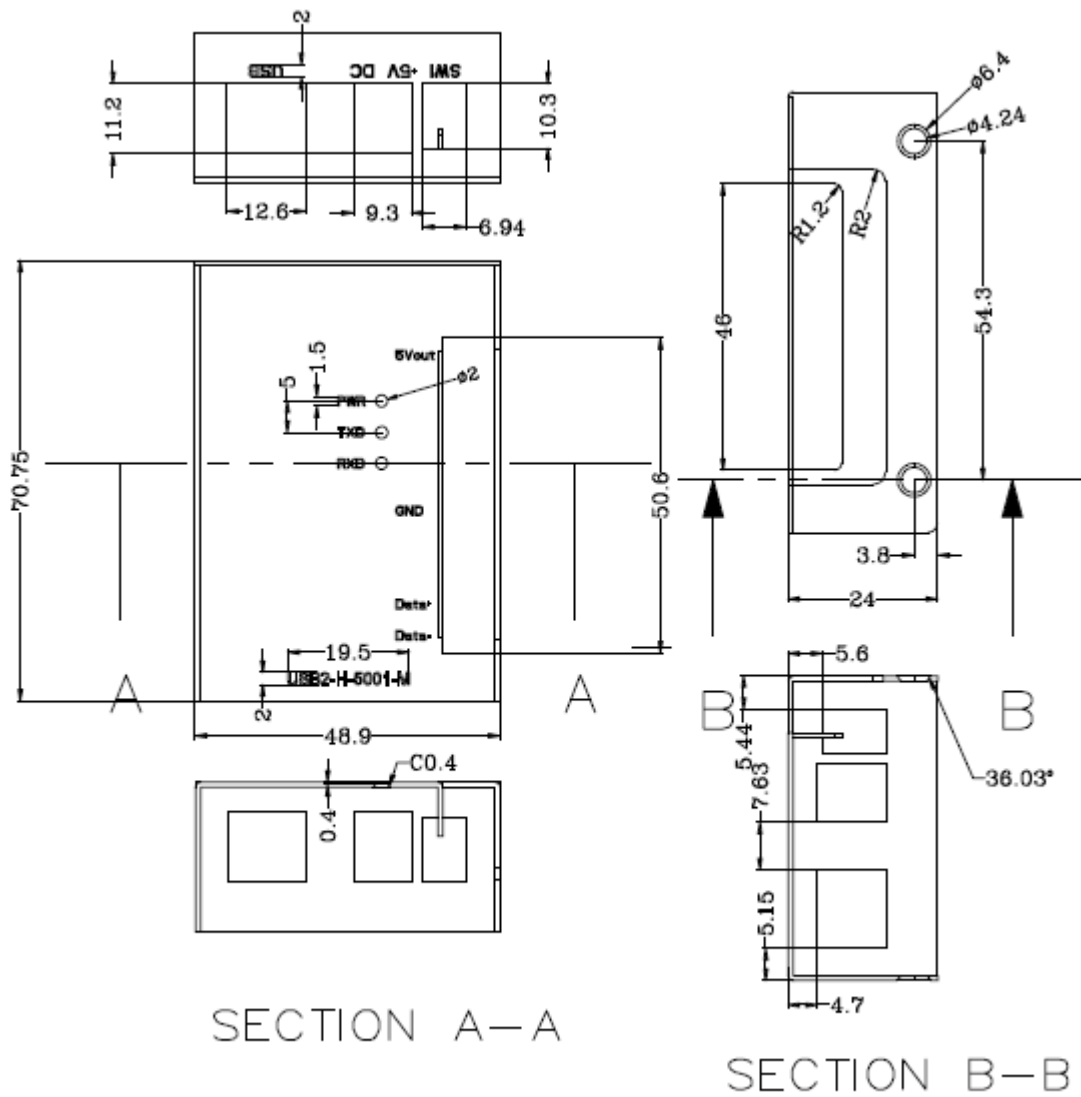
Figure 7.2 - USB2-H-5001-M Bottom Cover of Dimension

7.2 USB2-H-5002-M Dimension
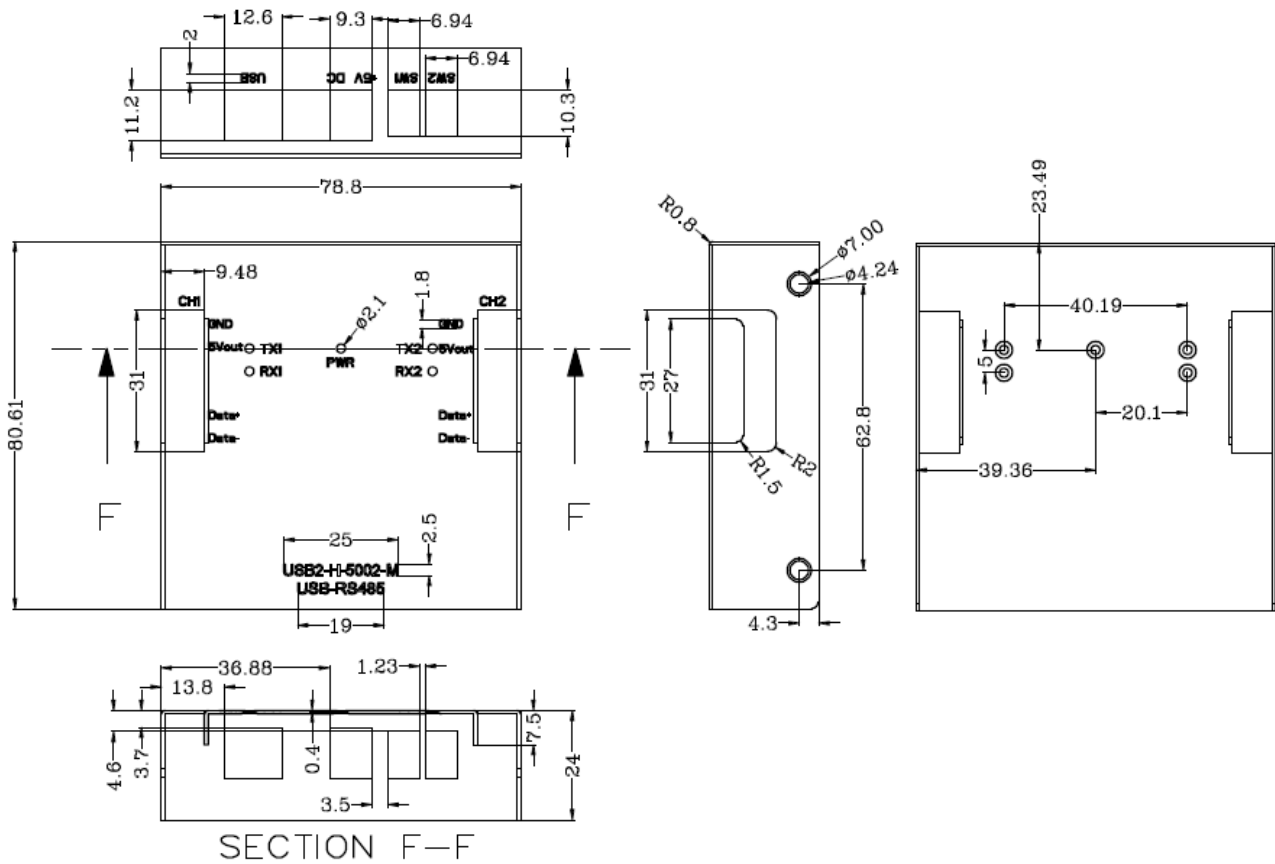
Figure 7.3 - USB2-H-5002-M Top Cover of Dimension
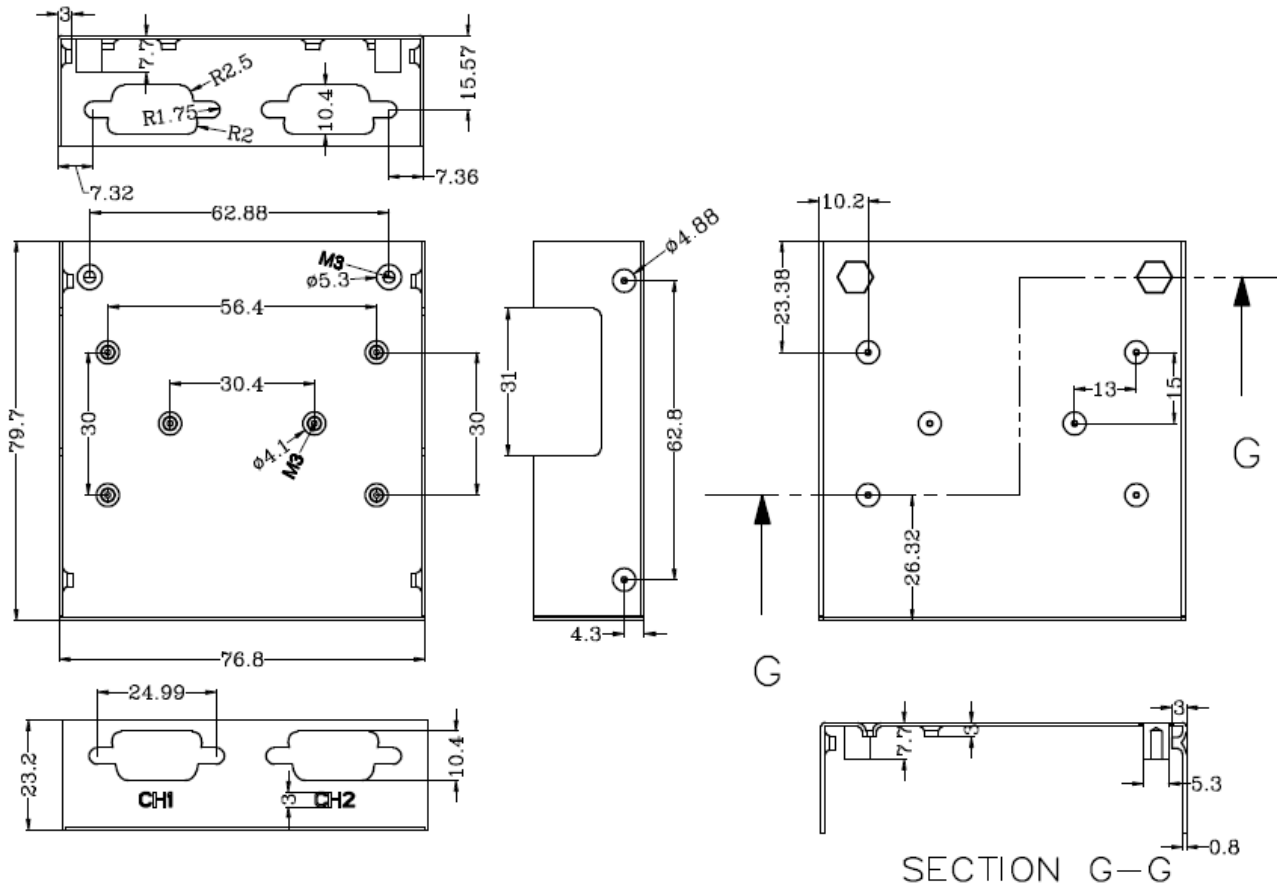
Figure 7.4 - USB2-H-5002-M Bottom Cover of Dimension

7.3 USB2-H-5004-M Dimension
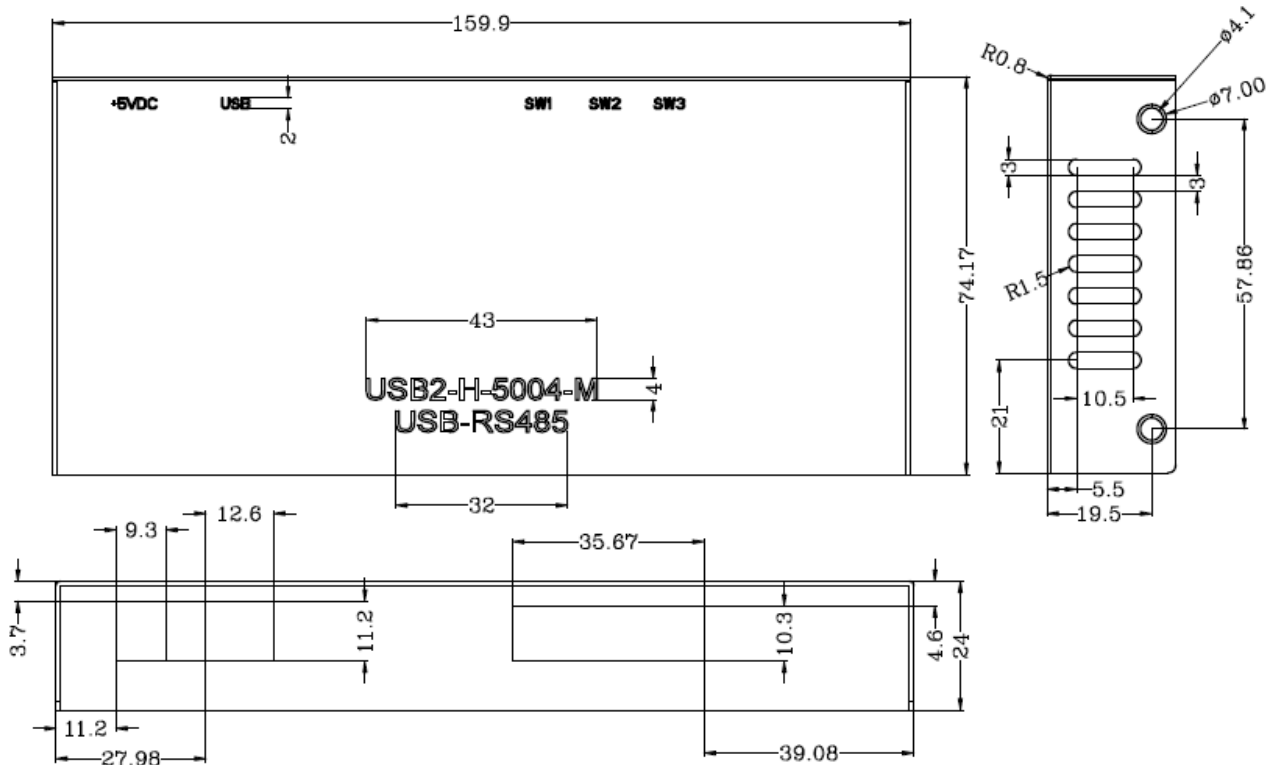
Figure 7.5 - USB2-H-5004-M Top Cover of Dimension
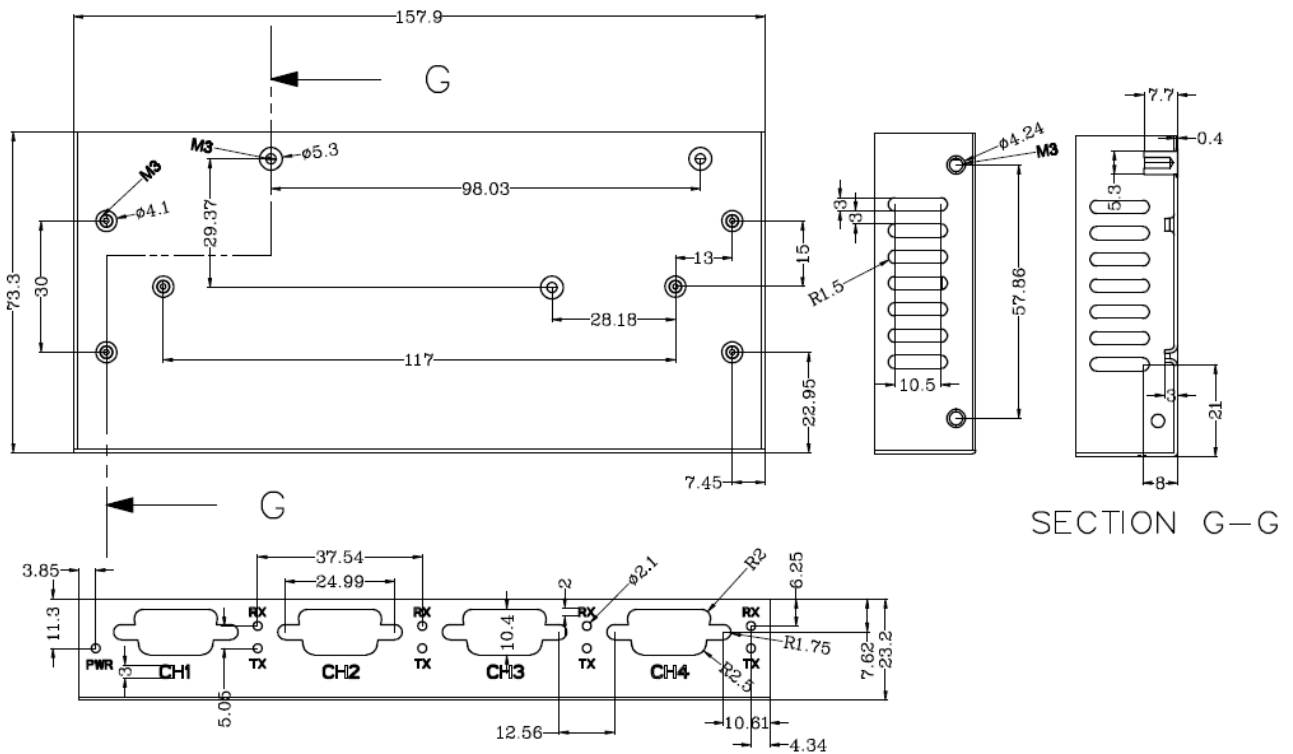
Figure 7.6 - USB2-H-5004-M Bottom Cover of Dimension

7.4 USB2-H-5008-M Dimension
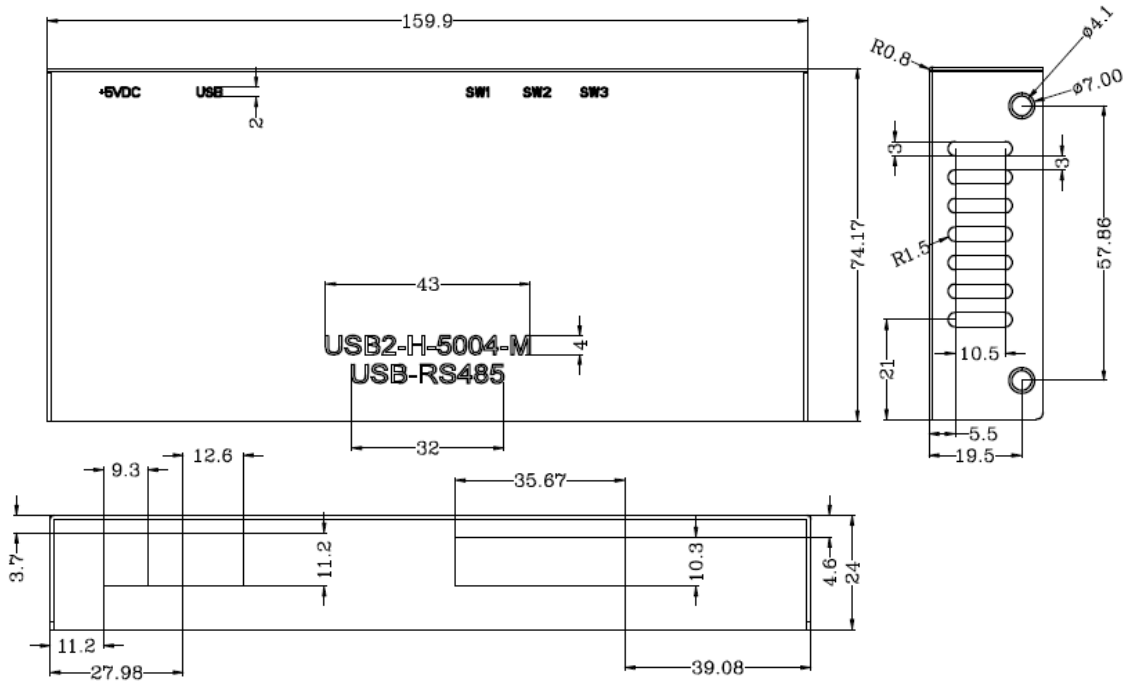
Figure 7.7 - USB2-H-5008-M Top Cover of Dimension
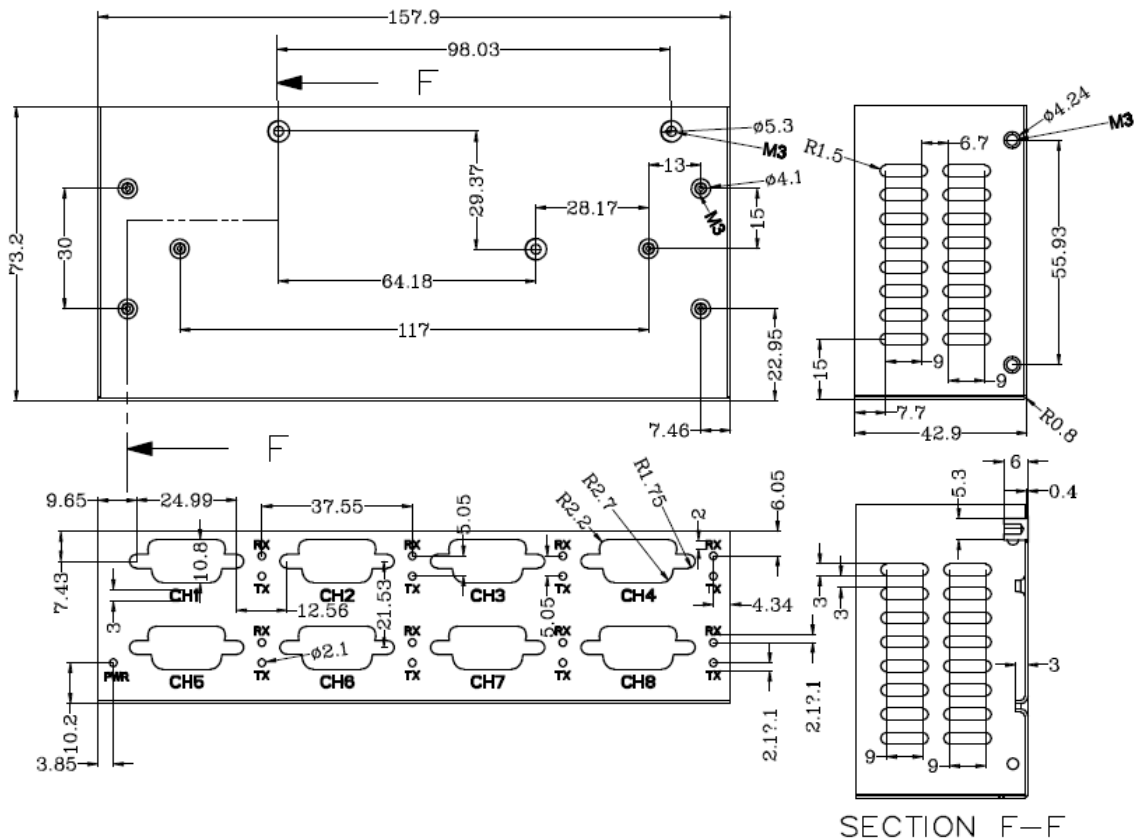
Figure 7.8 - USB2-H-5008-M Bottom Cover of Dimension

7.5 USB2-H-5016-M Dimension
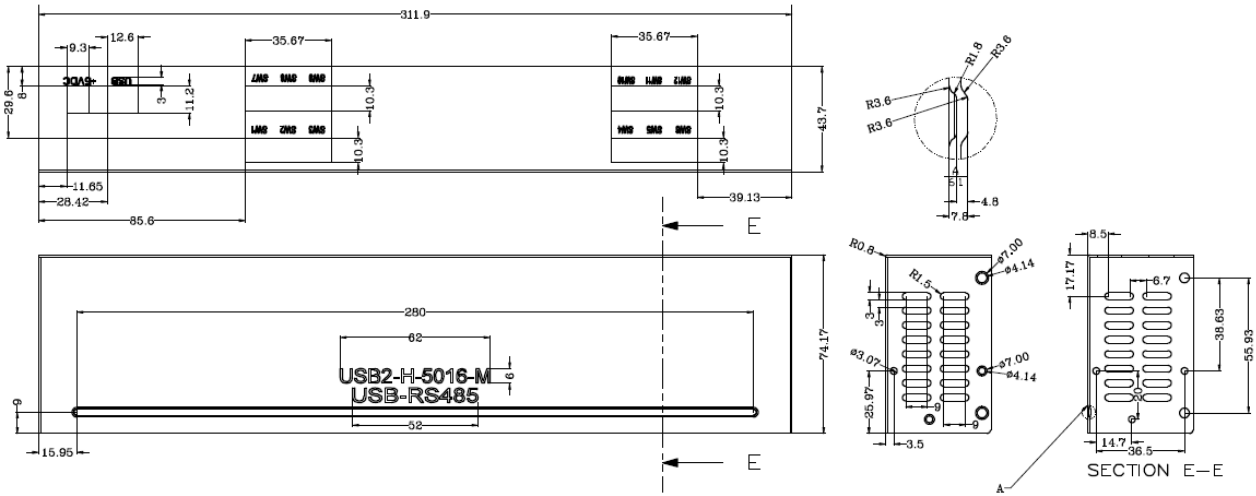
Figure 7.9 - USB2-H-5016-M Top Cover of Dimension
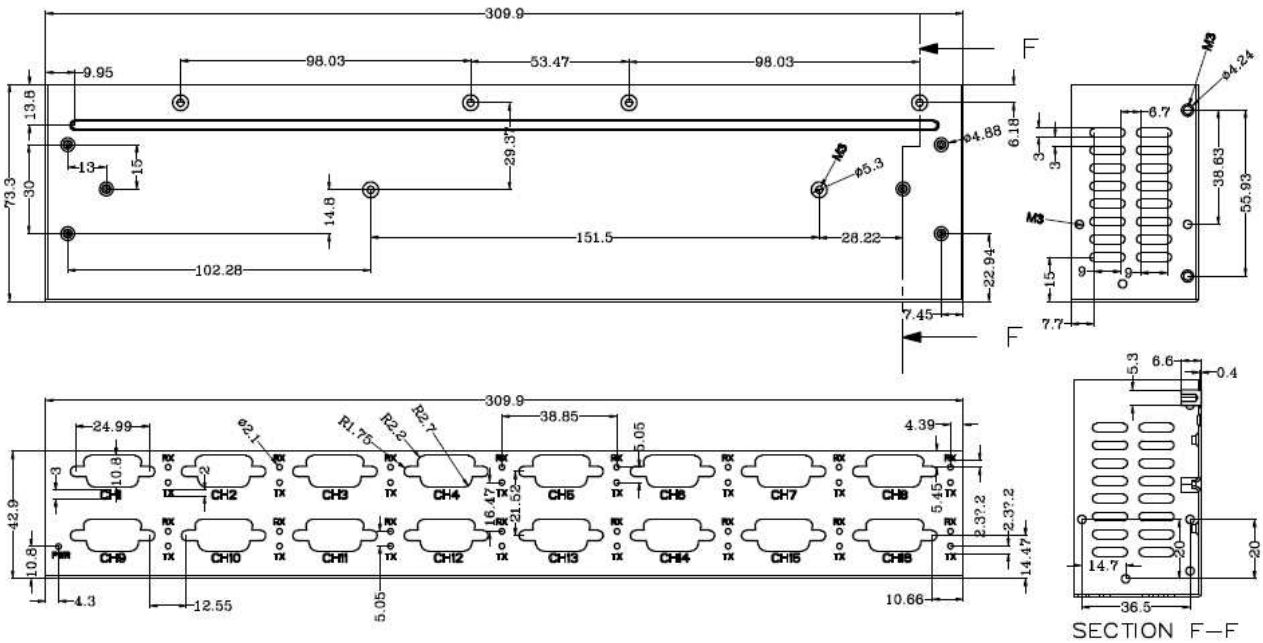
Figure 7.10 - USB2-H-5016-M Bottom Cover of Dimension

8   Environmental Approvals & Declarations

8.1 EMI Compatibility

FCC and CE

The USB2-H-500X-M family have been tested to be compliant with both FCC Part 15 Subpart B and European EMC Directive.

NOTE: This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

8.2 Safety

The USB2-H-500X-M-FAMILY are defined as Limited Power Supply (LPS) device, with operating voltages under 60VDC.

8.3 Environmental

The USB2-H-500X-M family are a lead-free device that complies with the following environmental directives: RoHS, WEEE, REACH, PFOS and DecaBDE.

8.4 Reliability

The USB2-H-500X-M family are designed as a robust USB-Serial module for use in many environments. There are no user-serviceable parts. Any failure will require a replacement of the unit.

8.5 Import / Export Information

Import / Export Information	
Country of Origin	China
Harmonized Code	8471-80-1000
Product Description	USB to RS485 Development Module, Single/Dual/Quad/Eight/Sixteen COM Port
USA ECCN	EAR99 – No License Required

Table 8.1 - Import / Export Information

9 Troubleshooting

9.1 Hardware

Cables are the most common sources of trouble with external devices.

Check the following:

- USB cable is properly inserted at both ends

- Computer power is ON

- Computer is not in Sleep or Standby

- If a USB Hub is used, be sure it is set for "Self-Powered" operation

- If a USB Hub is used, be sure all cables are properly inserted

- If all the above are OK, the Yellow LED should be lit, indicating the device has been recognized by the USB subsystem.

RS485 cables – check the following:

- Check for specific handshake requirements of your RS485 peripheral.

- Because there is not handshake signals, ensure the application is set to "No Hardware Handshake", or equivalent.

- Test the port with a loop-back connector. Connect DATA+ to DATA+, DATA- to DATA-. Use a simple terminal program to check that data is transmitted and received.

- One single port product can enable the Echo function and didn't connect anything that can also verify the RS485 function.

9.2 Device Driver

Ensure the latest device driver is in use. See http://www.easysync-ltd.com/product-downloads.

If other devices with FTDI chips are installed in the system, check with all manufacturers of these devices for the latest device drivers.

See the FTDI installation guides for additional details: http://ftdichip.com/Documents/InstallGuides.htm

Common Windows Device Driver Troubles:

- DEVICE TIMES OUT: The default settings of the device driver assume typical data transfers of hundreds to thousands or more bytes at a given time. Some applications, such as a GPS device, only send data in short packets, often only a few bytes. If this is the case, it may be necessary to adjust the driver buffer size and/or latency timer to smaller values. These values can be adjusted through the Advanced driver options as noted in Figure 2.10. The buffer size can be reduced to 64 bytes. The latency timer can be set as low as 2ms. A setting of 1ms will cause unnecessary USB traffic and could adversely affect data transmission.

- ERRATIC MOUSE POINTER: The device driver defaults to query an attached device to find out whether it is a mouse or modem, consistent with native COM port operation. Some RS485 peripherals constantly send short packets of data, causing the host system to "think" a mouse or modem has been attached. These short packets will interfere with normal mouse operation causing the pointer to jump around the screen. If this happens, disconnect the RS485 device and *uncheck the Serial Enumerator* option, also found on the Advanced driver options screen in Figure 2.10.

- COM PORT IN USE: Windows keeps track of all COM port assignments. If multiple FTDIChip products have been connected to a single system, the COM port number will increase, even if the other devices are not attached. If the higher COM port assignments are not acceptable for the application, known unused COM port numbers should be uninstalled according to the FTDI installation guide: http://ftdichip.com/Documents/InstallGuides.htm.

9.3 Technical Support

Technical support may be obtained from your nearest EasySYNC office. See details below.

E-Mail (Support): support@easysync-ltd.com   Web: http://www.easysync-ltd.com/product-downloads

10 Contact Information

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Web Shop URL	http://easysync-ltd.com

Appendix A – List of Figures and Tables

List of Figures

List of Tables

Appendix B – Revision History

Version draft	First external draft for comment	2010-10-04
Version 1.0	First release	2012-01-19
Version 1.1	Change the SW Position information for 5001 and 5002	2012-06-25