Bluetooth RS232 Serial Adapter

Document Version: 1.2
Firmware Version: 4.52

LM058

Document History

Revision	Date	Name	Description
1.0	13-03-2008	MS	Initial version
1.1	25-03-2010	SV, KS	1. Update the AT Command Set 2. Update snapshot of configuration software
1.2	05-05-2010	SV	Updated AT+BAUD Command. Deleted 460.8 kbps and 921.6 kbps support

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1.   Introduction

Welcome to the LM Technologies Bluetooth RS232 Serial adapter. The LM058 adapter eliminates your conventional RS232 serial cables, providing an easy-to-use, invisible connection with superior freedom of movement. This adaptor allows any device with a standard 9-pin serial port to communicate wirelessly.

You can communicate with another Bluetooth serial adaptor or other Bluetooth enabled devices such as a laptop computer, PDA or mobile phone.

2   Features

Supports Bluetooth Serial port profile and Generic Access profile
No need of external host and software
Ease of installation and use
Supports configuration of the local device
Ease of maintenance
Supports External SMA Antenna
Supports up to 100 meters (open space)

3. Package

Bluetooth serial adaptor
DB9 male to female converter
USB cable for power supply
DC adaptor
User manual

4. General Specification

Specification	Description
Baud Rate	1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2/230.4 Kbps
Coverage	Up to 100 Meters
Connection	Point-to-Point (piconet)
Signal	TxD, RxD, GND, CTS, and RTS
RS-232 Interface	D_SUB 9-pin female
Standard Bluetooth	Specification v2.0+EDR
Frequency	2.400 to 2.4835 GHz
Hopping	1,600/sec, 1MHz channel space
Modulation	GFSK-1 Mbps, DQPSK-2 Mbps, and 8-DPSK-3 Mbps
Tx. power	Max. 18 dBm (Class 1)
Rx. Sensitivity	-86 dBm typical
Antenna	External antenna
Antenna Gain	Max. 1 to 2 dBi
Power Supply	+5 to +6 V DC
Current Consumption	Max. 90 mA
Operation Temperature	-20°C to +75°C
Dimensions	35 mm (W) x 65 mm (D) x 16 mm (H)

5 RS232 Interface

5.1 Pin-out
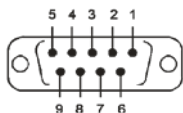
5.2 Signals

Pin	DTE Signal	DTE to DCE Direction	DCE to DTE Direction	Description
1	CD	Input	Output	Not connected
2	RxD	Input	Output	Received data
3	TxD	Output	Input	Transmitted data
4	DTR	Output	Input	Not Connected
5	GND	N/A	N/A	Signal ground
6	DSR	Input	Output	Not Connected
7	RTS	Output	Input	Request to Send
8	CTS	Input	Output	Clear to Send
9	Vcc	Input	Input	Power supply

5.3. Factory Settings

The factory settings of COM port are as follows:
Baud rate: 19200 bps
Data bit: 8
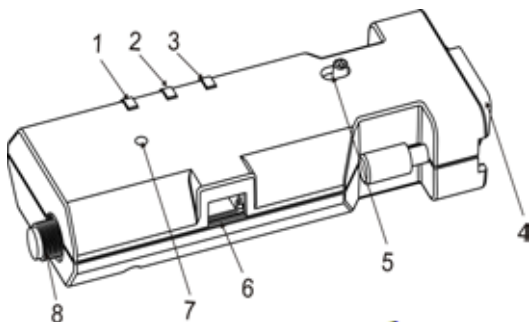Parity: none
Stop bit: 1
Flow control: H/W
Others: please refer to section 7.5 AT Command Set.

6   Installation

6.1   Hardware Structure

The figure below is an outline of the adaptor.

| 1. Power LED | 2. Data LED | 3. Link LED | 4. RS232 connector |
| 5. Slide Switch | 6. Mini USB Connector | 7. Reset Button | 8. Antenna Connector |

6.2   Reset Button

By pressing the Reset button, you can:

Disconnect and reconnect a wireless connection (after a short press).
Restore the factory settings (after over three seconds' press).

6.3   Slide Switch

The slide switch can swap TXD/RXD and CTS/RTS signals.
By switching, you can set the adaptor either as a DTE (towards antenna connector) or a DCE (towards RS232 connector).

6.4 Power Supply

The adaptor can be powered via:
An AC/DC converter (output power: +5 to +6 V DC/300 mA)
A USB cable
Pin 9 of the DB 9-pin connector

6.5 LED Status

The following is LED status information.

Status	Description
All LED on/off three times	Device boot OK.
Power LED on	Transmitting data.
Link LED off	No pairing established.
Link LED fast (0.1 sec) blinking	Pairing
Link LED fast (0.3 sec) blinking	Discoverable and waiting for a connection (slave mode)
Link LED slow (0.9 sec) blinking	Inquiring (master mode).
Link LED very slow (1.2 sec) blinking	Connecting (master mode).
Link LED steadily on	Connection established.

6.6 Installation Procedure

Step 1: If provided with an external antenna, assemble it to the adaptor body.
Step 2: Plug the adaptor into the COM port of device.
Step 3: Adjust the slide switch, depending on whether the device is a DCE or DTE.
Step 4: Power the adaptor on.
Step 5: Configure the adaptor if necessary.

7 Usage

You can reprogram the default settings on the adaptor using HyperTerminal.

7.1 HyperTerminal Settings

Bits per second: 19200 bps (baud rate)
Data bit: 8
Parity: None
Stop bit: 1
Flow control: H/W

7.2 Configuration Start-up

Step 1: Plug the adaptor into a COM port of PC.

Step 2: Power the adaptor on.

Step 3: Create a HyperTerminal file.

Step 4: On the interface of the new Hyper Terminal file, click **Properties Button.**

Step 5: Select the COM port where the adaptor is attached to your PC and set the port properties as described in section 7.1 Hyper Terminal Settings.

Step 6: Input "A" in the file.

If no echo, that is, nothing is displayed when you input "A", it indicates that the baud rate is incorrect. Ensure that the baud rate is 19200 bps.

Step 7: Input "AT", and then press <Enter>. "OK" is displayed.

If necessary, reprogram the configuration of adaptor using AT commands. For related commands, please refer to section 7.5 AT Command Set.

7.3 Master Role Configuration

You can use "AT+ROLEM" to change the adaptor to the master role. When the adaptor is in the master role, you can use "AT+ACON-" to manually set up a connection and "AT+FIND?" to find the device you want to connect.

7.4 Configure Master-Slave adaptor pair

Please refer to configuration utility software (Section 8) to configure a master slave adaptor pair. Once the configuration is done, the pair will connect to each other automatically.

7.5 AT Command Set

The following is the AT command set for the local adaptor in the command mode (that is, the local adaptor is in the disconnection state). All the commands and parameters are case insensitive.

Please note "AT+FIND" command is available only when the adaptor is in the manual master role. In other words, you should send "AT+ROLEM", "AT+ACON-" before sending "AT+FIND command"

Command	Description
+++	Switch the device from online Data mode to online command mode while maintaining the connection to the remote device. The characters should be send with 1000 ms guard time..
AT	Check the serial UART port settings of the adapter.
AT+VER	Inquire the current firmware version
AT+ENQ	Lists all the settings along with their brief description. The settings include serial port, Bluetooth related and other misc settings
AT+ACON	Enable/disable auto-connection feature in master role. Note, it will cause a reboot.
ACON+ (Default)	Automatically connect to the adapter specified in AT+BOND=xxxxxxx. If no device is specified then connect to any device which is ready to accept connection.
ACON-	Disable auto-connection feature. After it is executed, you need to execute "AT+CONN" to manually connect a remote device.
ACON?	Inquire the current setting.
AT+CONN	Establish a connection. It is available only when the adapter is in the manual master role.
AT+CONN	Connect to the specified bonded device. It is available only when AT+BOND=xxxxxxxxxxx is executed where "xxxxxxxxxxxx" is the 12 hex digit string specifying remote device bluetooth address.
AT+CONN=xxxxxxxxxxxx	Connect the adaptor to a specified Bluetooth device. "xxxxxxxxxxxx" is 12 hexadecimal digit string specifying remote device bluetooth address.
AT+CONNn (n=1-8)	Connect the adapter to a device in the neighborhood found through "AT+FIND?"
AT+DROP	Drop the connection when the device is in either master or slave role. It is only allowed when the device is in connected state
AT+ADDR	
AT+ADDR?	Inquire the Bluetooth address of the local adapter.
AT+BOND	For security purpose, this command is used to specify a unique remote Bluetooth serial adapter to be connected. In the master role, the adaptor pairs and connects with the designated remote slave address. In the slave mode, this command is a filter condition to accept the inquiry of the master device.
AT+BOND=xxxxxxxxxxxx	"xxxxxxxxxxxx" is a string of 12 hexadecimal digits specifying the slave Bluetooth Device address.
AT+BOND-	Restore the status in which the adapter can connect with any remote address.
AT+BOND?	Inquire the designated address that can be paired and connected.

Command	Description
AT+FIND	Search for any Bluetooth device in the neighborhood within one minute. If any device is found, its name and address will be listed. The search ends with a message "Inquiry ends. xx device(s) found." This command is available only when the adaptor is in the manual master role.
AT+FIND?	Start the inquiry
AT+FIND-	Cancel the ongoing inquiry
AT+ROLE	Specify whether the adaptor is in the master or slave role. If the device role is changed, the adaptor will reboot and all paired records will be cleared.
AT+ROLEM	Set the adaptor to the master role.
AT+ROLES (default)	Set the adaptor to the slave role.
AT+ROLE?	Inquire the current role of the adaptor.
AT+NAME	Specify a name for the adaptor. You can specify a friendly name using 0 to 9, A to Z, a to z, space and –, which are all valid characters. Note that "first space or -, last space or – isn't permitted". The default name is "Serial Adapter".
AT+NAME=xxxxx	"xxxxx" is a character string with a maximal length of 16.
AT+NAME?	Inquire the name of the local adaptor.
AT+PIN	Specify a PIN. The default PIN is "1234". Paired adaptors should have a same PIN.
AT+PIN=xxxx	"xxxx" is a 4-8 digit string.
AT+PIN-	Cancel authentication by PIN.
AT+PIN?	Inquire the current PIN.
AT+RCFG	Enables/disable remote configuration from a remote device by executing the remote access handshaking protocol.
AT+RCFG+ (Default)	Enables remote configuration.
AT+RCFG-	Enables remote configuration.
AT+RCFG?	Inquire the current setting
AT+DCOV	Specify whether the adapter can bediscovered by remote device.
AT+DCOV+ (Default)	Device is in discoverable state.
AT+DCOV-	Device is non discoverable.
AT+DCOV?	Inquire the current discoverability status.
AT+RESP	Specify whether result messages are prompted when AT commands are executed. The result messages are: OK/ERROR for command execution, or CONNECT/DISCONNECT for connection status.
AT+RESP+ (default)	Prompt result messages.
AT+RESP-	Not prompt result messages.
AT+RESP?	Inquire the current setting.

| Command	Description
AT+FLOW	Enables or disables RTS/CTS signals handshaking of the UART port. Note, the setting will cause a reboot
AT+FLOW-	Disable RTS/CTS flow control
AT+FLOW+ (Default)	Enable RTS/CTS flow control
AT+FLOW?	Inquire the current setting
AT+BAUD	Specify the baud rate of COM port.
AT+BAUD10	1200 bps
AT+BAUD11	2400 bps
AT+BAUD12	4800 bps
AT+BAUD13	9600 bps
AT+BAUD14 (default)	19200 bps
AT+BAUD15	38400 bps
AT+BAUD16	57600 bps
AT+BAUD17	115200 bps
AT+BAUD18	230.4 Kbps
AT+BAUD?	Inquire the current baud rate.
AT+PAR	Specify parity bit setting of COM port.
AT+PAR0(default)	None parity bit.
AT+PAR1	Odd parity.
AT+PAR2	Even parity
AT+PAR?	Inquire the current setting.
AT+SLEEP	Enable/disable auto-power saving feature of RS232 driver
AT+SLEEP- (default)	Disable auto power saving
AT+SLEEP+	Enable auto power saving
AT+SLEEP?	Inquire the current setting.
AT+STOP	Specify one or two stop bits of COM port.
AT+STOP1(default)	One stop bit.
AT+STOP2	Two stop bits.
AT+STOP?	Inquire the current setting.
AT+ESC	Disable/Enable escape sequence "+++" handling.
AT+ESC-	Disable escape sequence handling.
AT+ESC+ (default)	Enable escape sequence handling.
AT+ESC?	Inquire the current setting.

Command		Description
AT+ECHO		Enable/disable echo of command characters from bluetooth device.
	AT+ECHO-	Disable echo
	AT+ECHO+ (default)	Enable echo
	AT+ECHO?	Inquire the current setting
AT+RSSI		Inquire the RSSI value for current bluetooth connection. This command is only available when the device is in connected state.
AT+RESET		Restore the default settings and reboot.

8.   Windows configuration software

The LM149 Configuration Software allows easy setup of LM058 RS232 Bluetooth serial adapters.
To start the configuration software click "Get Device Info" in order to view current settings of LM058 adapter.
Once you have setup the configuration that you require you will then need to click "program Device".
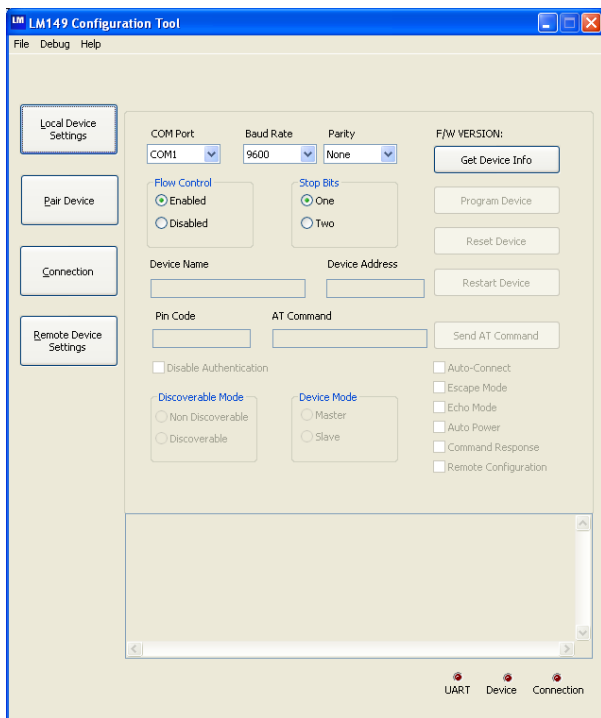
The LM058 can also be paired via the configuration program using the "pair Device" button. It takes you to the page which provides option for pairing/Unpairing adapters.

If you want to set the adapter back to the factory default settings please click the "Reset Device" button.

9.   Warranty and Disposal Notice

One (1) Year International warranty

Your LM Technologies LM058 is warranted by your supplier for a period of one (1) year from the original data of purchase under the terms and conditions of this warranty. This warranty covers materials and manufacturing defects. Your supplier will require proof of purchase before replacing the defective product.

Important Notice

DISPOSAL OF OLD ELECTRICAL AND ELECTRONIC EQUIPMENT

The symbol indicates that this product shall not be mixed with unsorted municipal waste when disposed of. There is separate collection system for waste electrical and electronic equipment. Usually old electrical and electronic equipment can be returned free of charge. For further information please contact the competent municipal authorities or shop where you purchased the product. Correct disposal ensures that waste electrical and electronic Equipment is recycled and reused appropriately. It helps avoid potential damage for the environment and human health and to preserve natural resources.