

USER MANUAL & DATASHEET SME29X – Serial Ethernet Family

- Connects any serial device to LAN/WAN/Internet
- True Serial-Ethernet Conversion. **No Control Mechanism** is required.
- Plug & Play, no need for initializations in run-time.
- Based on UDP protocol, 10BaseT
- Wide input voltage range. On Board 5V regulator (SME291)
- Serial/UART Interface up to 115200bps (57600bps Default)
- One Static IP
- Two type hardware alternatives: Ethernet Module with RJ45 Connector or without RJ45 Connector
- Configurable thru UART/RS232 or Ethernet (LAN)
- Upgradeable with encrypted ROM images
- Ideal for embedded applications
- Ideal for existing serial devices



SME290-Mini



SME291

1. INTRODUCTION	
2. PINOUT INFORMATION	
2.1 SME290-Mini Ethernet Module 2.1.1 SME290-Mini-EK Evaluation Kit Pinout View	4
2.2.1 SME291-EK Evaluation Kit Pinout View	
3. SYSTEM CONNECTION ALTERNATIVES	
3.1 Network Connections Alternatives 3.1.1 Crossover Cable Connection 3.1.2 Standard Network Connection	10 10
4. CONFIGURATION & SOFTWARE TOOLS	
4.1 SMUDP Search Software	
4.2 SMSerial Configurator Software	
4.3 UDP Data Terminal Software 4.3.1 Example Configuration	16
5. MECHANICAL DRAWINGS & DIMENSIONS	
5.1 SME290-Mini Ethernet Module	
5.2 SME291 Ethernet Module	
5.3 SME2029C Connection Board	
6. DC & ELECTRICAL CHARACTERISTICS ABSOLUTE MAXIMUM RATINGS DC CHARACTERISTICS OPERATING TEMPERATURE SPECIFICATIONS	21 21 21 21 21 21 21 21
7. SALES AND SERVICE INFORMATION	

1. INTRODUCTION

This document gives detailed descriptions and instructions to use "Serial -Ethernet" Module, Evaluation kit, and the Software tools based on "Serial 1.0" firmware version. For rapid development please go over this document carefully.

SME290/291 Ethernet module is a true Serial-to-Ethernet converter that connects a serial device to the LAN/WAN or internet based on UDP protocol. Connection alternatives, depending on the software and hardware of the system, are listed in <u>Chapter 3</u>.

SME290/291 does not require any external microcontroller or PC to be controlled; it simply translates Ethernet and Serial data to each other with the minimum latency.

SME290/291 Ethernet module can be used with existing serial devices without any design change in hardware.

SME290/291 is very simple to use after getting know few main parameters of the Ethernet network. The basic knowledge of Ethernet is described in the following chapters.

SME290/291 is a very effective design that does not require any design obstacles, and a serial device can be connected to the world just in minutes.

SME290-Mini-EK / SME291-EK

Evaluation Kit for SME290/SME291 Ethernet Module

For rapid prototyping, demonstration or application development we recommend you to buy a low cost evaluation kit from our online store at <u>www.sonmicro.com/shop/shop3.php</u>



SME291-EK – Evaluation Kit

Revision A.2

2. PINOUT INFORMATION

There are two hardware options are available for the Serial Ethernet Module. Both versions programmed with the same firmware version.

2.1 SME290-Mini Ethernet Module

SME290-Mini is a DIP (2mm pin pitch) type module that can be plugged into the PCB and is not integrated with RJ45 connector.

Please notice that:

SME290-Mini Modules **can only work** with **LF1S022** RJ45 connectors. LF1S022 is a RJ45 type Ethernet connector integrated with filters.

Designers can select this module if the Ethernet module is going to be used on his/her Printed Circuit Board and the RJ45 connector will be used in different place on the board. This is the **flexible** option.



SME290-Mini Ethernet Module PinOut View

PIN NUMBER	ASSIGNMENT	ELECTRICAL TYPE	DEFINITION
1	RXD	INPUT	UART / Serial Receive (0 -5V CMOS)
2	TXD	OUTPUT	UART / Serial Transmit (0 -5V CMOS)
3-5-12-16-22	GND	POWER	Ground connections (all connected on module internally)
4-11-17-25	VCC	POWER	Supply voltage (5V) (all connected on module internally)
6	LED2	OUTPUT	Ethernet Transmit data status led
7	LED1	OUTPUT	Ethernet Receive data status led
8	LED0	OUTPUT	Ethernet Link or Collision status led
9	TPIN+	INPUT	Positive line of the differential input signal pair
10	TPIN-	INPUT	Negative line of the differential input signal pair
13	TPOUT-	OUTPUT	Negative line of the differential output signal pair
14	TPOUT+	OUTPUT	Positive line of the differential output signal pair
15-18-19-20- 21-23-24-26-27	NC		No connection
28	RST	INPUT	Reset, (Active High)

SME290-Mini Pin Information

2.1.1 SME290-Mini-EK Evaluation Kit Pinout View



SME290-Mini-EK Front View



SME290-Mini-EK Layout View

```
SonMicro Electronics
```

Revision A.2

2.2 SME291 Ethernet Module

SME291 is a compact module integrated with 5V regulator circuit and the LF1S022 RJ45 Ethernet connector. SME291 module may be used apart from the device or PCB. It requires only Power Supply pins and UART TX/RX pins to the main device or circuit. This is the more practical option if compared with SME290 module. SME291 can be used inside the product enclosure or can be connected externally.



SME291 – Ethernet Module Pinout View

2.2.1 SME291-EK Evaluation Kit Pinout View

Please note that SME291 module and connection board can easily be separated from each other by removing jumpers shown in the figure. Connection Board includes MAX232/ST232 level converter chip and DC adapter input for easy connection with PC or external device over RS232 bus.



SME291-EK – Evaluation Kit Pinout View

3. SYSTEM CONNECTION ALTERNATIVES

SME290/291 Ethernet module with "Serial 1.0" firmware version uses UDP protocol as main Ethernet protocol.

For new software designs; using a UDP socket or SonMicro UDP ActiveX Control is recommended.

For existing RS232 software, 3Rd party UDP Redirector software tools can be used, or another Ethernet module can be used in PC side for UDP to Serial conversion.

Software Development Kit, **SDK**, is available with **deluxe** version of the Ethernet Evaluation Kits. SDK includes example code written in Delphi, Visual Basic, C #.Net and comes with UDP ActiveX Control to simplify software writing.



Basic Ethernet Connection System

In the below alternative connection diagram, there is no need to use Ethernet communication in the software. Both devices can communicate each other with serial/RS232 protocol.



Alternative Connection System (PC can be replaced with a serial device)

3.1 Network Connections Alternatives

Before starting with the communication examples, network should be properly setup. There are two alternatives to connect your device to LAN; connecting the SME290-Mini-EK / SME291-EK Kit PC with crossover cable or the existing Hub/Router with a standard RJ-45 Ethernet cable.

3.1.1 Crossover Cable Connection

The following figure is a crossover cable connection diagram. If you don't have a Hub and want to connect your device to LAN thru your PC, you need a crossover cable.



Crossover Cable

Please notice that:

Standard RJ-45 Ethernet cable connection is used only to connect SME290-Mini-EK / SME291-EK Kit to a Hub/Ethernet switch or Router device. For direct PC connection only crossover cable will work.

Following is the connection of SME290-EK Development Kit to the PC with crossover cable.



Direct PC Connection with Crossover Cable

3.1.2 Standard Network Connection

Local Area Networks consist of Routers/Hubs to connect multiple devices in the LAN. To connect SME290-Mini-EK / SME291-EK Kit to the Hub, standard RJ-45 Ethernet Data cable is required. Connecting the Ethernet Kit to the Hub with Crossover Cable will not work.



Standard RJ-45 Ethernet Cable

SonMicro Electronics

Revision A.2

Followings are the connection diagrams of SME290-EK Development kit to the Hub or Wireless router. Note that serial connection can be made to a PC or external MCU with UART pins. PC does not need to be connected to the LAN, it can only control module to send data to another device in the LAN or Internet.



Standard Network Connection Example with Router/Hub





4. CONFIGURATION & SOFTWARE TOOLS

SME290-Mini / SME291 Ethernet module can be configured thru serial port or remotely configured thru UDP in the LAN.

Once the configuration is done, Ethernet module will be ready for Ethernet-serial translation. In run time changing network parameters is possible by external microcontroller. This can be used to change remote IP, Remote Port parameters for the Ethernet module to connect another device.

4.1 SMUDP Search Software

SMUDP Search software is used to detect all SonMicro Ethernet modules in the same LAN and allow changing configuration parameters of the modules.

Configuration by UDP is very useful when the module is integrated with the customer product and it is hard to configure each module by RS232.

S	MUDP Search - R	emote Configura	ition				
	MAC	IP	PORT	REMOTE IP	REMOTE PORT	Parameters	
	0.0.83.79.78.222	192.168.1.101	6666	192.168.1.23	7557	GATEWAY IP	192.168.1.1
	0.0.83./9./8.2	192.168.1.101	6000	192.168.1.23	/000	SUBNETMASK	255.255.255.0
						MODULE MAC	0.0.83.79.78.2
						MODULE IP	192.168.1.101
						MODULE PORT	6000
						REMOTE IP	192.168.1.23
						REMOTE PORT	7000
						PASSWORD	*SONMicro*
						BAUDRATE	57600bps 💌
	15					FIRMWARE :	Serial 1.02 0706
	<				>		clear
	Search Devices						PARAMETERS

SMUDP Search Software Snapshot

To search for the available SonMicro Ethernet Modules in the LAN click on the Search Device button. It may be necessary to try few times. Selected Ethernet module parameters will be available in the Parameters section.

After changing parameters if required, SET PARAMETERS button should be clicked to apply the changes.

SonMicro	Electropics
2011/01/01	Electionics

Revision A.2

Gateway IP: GATEWAY IP Address is the IP address of the router or device that connects your network devices to Wide Area Network or Internet. It is a gate/door that opens into WAN or another LAN. When sending data to devices in WAN or Internet, you need GATEWAY IP address to exit from Local Area Network.

Subnet Mask: This should be same SUBNET MASK used in the LAN. Check the Router's or Gateway's configuration to get the SUBNET MASK used. Most LANs uses 255.255.255.0 for SUBNET MASK. By this way 255 devices can be connected to one LAN. If SUBNET MASK is 255.255.0.0 it means 255*255(65025) device can be connected to the same LAN. If the Subnet Mask of the network and the device does not match then connection may not be established with that device.

Module IP: This is the Local IP address of the module. The IP number entered into this field should be unique in the LAN otherwise communicating with the device may not be possible. IP address of the module should consistent with the LAN properties. For example, when the Gateway IP address is 192.168.1.1 and the subnet is 255.255.255.0, then the Module IP address must be within 192.168.1.2 – 192.168.1.255

Module Port: This is the UDP port of the module is listening to. Remote device will connect to this port. If Ethernet Module is going to be accessed outside of the LAN and if there is a firewall or router in the LAN, this port should be directed to Module IP address in the security / virtual server settings of the Gateway /firewall device. Otherwise incoming data packets from WAN/Internet will not rout to the Ethernet module. In this situation, where there are incoming data packets outside of the LAN, if there are multiple modules, every module should have different port number so that firewall/gateway can route the incoming data packets to the right device. Module port number can be between 0 – 65535.

Remote IP: This is the IP address of the remote device to which module will send data. If the remote device is outside of the LAN, then gateway setting should be adjusted properly.

Remote Port: This is the UDP port number of the remote device to which module will send data. If the remote device is outside of the LAN, then gateway setting should be adjusted properly. Remote Port and module port can be the same. Remote port number can be between 0-65535.

Password/Key: This is a 10 digit special key used to put the module into configuration mode. When this key is sent to the module over UART module will enter into configuration mode thus this data will not be transmitted over Ethernet. Default password/key is "*SONMicro*"

Baudrate: Serial Baud rate of the device can be changed. Available alternatives are 9600bps, 19200bps, 57600bps, 115200bps, N, 8,1 Custom baud rates are available upon request.

4.2 SMSerial Configurator Software

SMSerial Configurator software is used to configure Ethernet module over RS232/serial bus.

COMPORT	BAUDRATE	_	PASSWORD	FIRMWARE VERSION		
СОМ5	• 57600bps •]	*SONMicro*	Serial 1.02 0706		
clo	SE COMPORT		ENTER CONFIGURATION			
Parameters			*****DEFAULT C	ONFIGURATION*****		
GATEWAY IP	192.168.1.1		GATEWAY IP	: 192, 168, 1, 1		
SUBNETMASK	255.255.255.0		SUBNETMASK	:255.255.255.0		
MODULE MAC	0.0.83.79.78.2		HOST PORT	:6000		
MODULE IP	192.168.1.102		REMOTE PORT	:192.168.1.22		
MODULE PORT	6000		BAUDRATE	:*SONMicro* :57600bps		
REMOTE IP	192.168.1.22		MAC ADDRESS	:0.0.83.79.78.2		
REMOTE PORT	7000					
PASSWORD	*SONMicro*					
BAUDRATE	57600bps	-				
SET	I PARAMETERS		GE	T PARAMETERS		

SMSerial Configurator Snapshot

Before reading/changing parameters, module needs to be put into configuration mode. This is done by clicking on Enter Configuration button. This button will simply send the PASSWORD/KEY to the module. This special 10 digit character set, will put the module into configuration mode.

4.3 UDP Data Terminal Software

This software is a basic UDP Data terminal. You can send and receive UDP data packets. It is a useful tool to test the communication, or establish communication with the remote device. For example if you have a serial device to control, you can send data or commands from UDP Terminal then the Ethernet module will convert UDP data to serial.

IDP	DETAILS
Remote IP 192.168.1.102	
Remote UDP Port 6000	
Host UDP Port 7000	
UPEN ODP PORT	
HEX Data Entry window	
Block # 00 01 02 03 04 05 06 07	
00	
01	
02	
03	
04	
05	
10	
11	
12	
~	
	<
SEND DATA	CI FAR
10.	LITNET - TD Cardest data transmission datails aither in her as in part format

UDP Data Terminal Software Snapshot

Remote IP: This is the IP address of the remote device to which data is send. If communicating with a serial device with Ethernet module is connected then the Remote IP should be the IP address of the module.

Remote UDP Port: This is the UDP port number of the remote device to which data is send. If communicating with a serial device with Ethernet module is connected then the Remote Port should be the Port number of the Ethernet Module.

Host UDP Port: This is the UDP port number of the PC/Host listening. Remote device need to send data packets to this port. In our case, Remote Port of the Ethernet Module should be Host UDP Port so that module can send data to this port and PC listens at this port.

4.3.1 Example Configuration



Example Settings

5. MECHANICAL DRAWINGS & DIMENSIONS

All dimensions are in millimeters (mm) with ± 0.3mm tolerance

5.1 SME290-Mini Ethernet Module





Dimensions in millimeters

5.2 SME291 Ethernet Module







Dimensions in millimeters

SonMicro Electronics

Revision A.2

May, 2008

5.3 SME2029C Connection Board



Dimensions in millimeters

6. DC & ELECTRICAL CHARACTERISTICS

Symbol	Description	Min	Тур	Max	Units	Notes
Tstg	Storage Temperature	-55	-	100	°C	Higher storage temperatures will reduce data retention time
T _A	Ambient Temperature	0	-	70	°C	
VCC	Supply Voltage	-0.5	5	5.5	V	9-12VDC available at different input pins for SME291. (On board 5V regulator)
Імю	Maximum Current into any Port Pin	-25	-	25	mA	
ESD	Electro Static Discharge Voltage	2000	-	-	V	Human Body Model ESD

ABSOLUTE MAXIMUM RATINGS

DC CHARACTERISTICS

Symbol	Description	Min	Тур	Max	Units	Notes
VCC	Supply Voltage	4.75	5.00	5.25	\vee	9-12VDC available at different input pin for SME291. (On board 5V regulator)
lo	Supply Current	20	30	80	mA	

Table 3 – DC Characteristics

OPERATING TEMPERATURE

Symbol	Description	Min	Тур	Ma x	Unit s	Notes
TA	Ambient Temperature	0	-	70	°C	
TJ	Junction Temperature	0	-	85	°C	

SPECIFICATIONS

Parameter	Notes
Ethernet interface	10BaseT Ethernet
Serial interface	CMOS-level; TX, RX, and GND
Serial communication speed	9600 bps, 19200 bps, 57600 bps,115200 bps
Maximum Data buffer for each Ethernet data segment	726 Bytes at one time

Ξ

7. SALES AND SERVICE INFORMATION

To obtain information about SonMicro Electronics products and technical support, reference the following information.



SonMicro Electronics LTD. Cankaya M. Soguksu C. Aslihan Ishani 2/15 Mersin, 33070 TURKIYE

 Phone:
 +90 324 237 21 28

 Facsimile:
 +90 324 237 21 86

 Email:
 info@sonmicro.co

 Web Site:
 http://www.sonm

info@sonmicro.com http://www.sonmicro.com Sales Support Documents & Software User Forums

http://www.sonmicro.com/sales.php http://www.sonmicro.com/contact.php http://www.sonmicro.com/eth/deth.php http://www.sonmicro.com/forums/