



Configuration Menus and Interface Protocol

V2.03



1. CONFIGURATION

The EasiSMS provides an embedded setup program. In order to operate this program a VGA monitor and PS/2 keyboard is required. This is a "once of" task and when complete the monitor and keyboard are no longer required. The configuration is stored in non-volatile flash memory.

During the Power Up Sequence the EasiSMS hardware is interrogated in order to determine the current hardware configuration. When detected that hardware undergoes an internal selftest.

Hardware is available if it is both present and has successfully completed the selftest. Available hardware is presented as an option in the setup program.

To invoke the EasiSMS configuration program the LEFT SHIFT and RIGHT SHIFT keys are pressed simultaneously.

Using the Configuration Program

The configuration program uses an intuitive menu driven point and pick user interface. Navigation through the setup options is by use of the keyboard arrow keys. In order to alter parameters the required pull-down menu must be activated. This is done by pressing the ENTER key.

Parameters are set by toggling options on or off and by incrementing (+) or decrementing (-) preset values

Setup required for EasiSMS PC DEMO Software

System1 > EasiSMS Function > Rx Client
System2 > SIM PIN Code > xxxx
System2 > Auto Connect Rx Client > OFF

Protocol Menu

Protocol	System1	System2	Consol	Telemetry
GSM Port				
Serial 2				
Network				
Sockets				
Ports				

Serial2 Parameters

Baud Rate	9600
Data Length	8
Stop Bits	1
Parity	None
Handshake	Xon/Xoff
Comms	FDX

Default Configuration

Serial2	Parameter	Explanation
	Baud Rate	Rate at which serial data is transmitted and received is Baud.
		9600, 19200, 38400, 57600, 76800, 115.2K, 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200
	Data Length	Receive and transmit with
		8-bit data.
		7-bit data.
	Stop Bits	Receive and transmit data with
		1 stop bit.
		2 stop bits.
	Parity	Receive and transmit with
		No parity.
		Odd parity.
		Even parity.
		Mark parity.
		Space parity.

Handshake	Control the receipt of data with
Xon/Xoff	Xon/Xoff or XPC software handshaking.
DTR/DSR DTR+Xoff	DTR hardware handshaking. Both hardware and software handshaking.
RTS/CTS None	RTS hardware handshaking. No handshaking.
Comms	Communication mode is
FDX	Full duplex.
HDX	Half duplex.
LOCAL	Internal loopback transmit to receive.
BLOCK	Block.

Network Parameters

Connection can be made from any Remote IP address or may be limited to any one of six Remote IP addresses.

Should any one of the Remote IP addresses be configured to a non-zero value, the TCP/IP source address of all received packets will be verified against the list of valid Remote IP addresses.

The MAC address should only be altered if it is set to the default value.

EasiSMS IP	0.0.0.0
Remote IP 1	0.0.0.0
Remote IP 2	0.0.0.0
Remote IP 3	0.0.0.0
Remote IP 4	0.0.0.0
Remote IP 5	0.0.0.0
Remote IP 6	0.0.0.0
Subnet Mask	0.0.0.0
Gateway IP	0.0.0.0
MAC Address	FF:FF:FF:FF:FF:FF

Default Configuration

Network	Parameter	Explanation
	EasiSMS IP	4 octet IP address of the EasSMS device
	Remote IP 1	IP address of a Remote Host for Rx client
	Remote IP 2	N/A
	Remote IP 3	N/A
	Remote IP 4	N/A
	Remote IP 5	N/A
	Remote IP 6	N/A
	Subnet Mask	Mask resolves data destination as subnet or gateway
	Gateway IP	IP address of gateway
	MAC address	Ethernet Address

Socket Parameters

The terminal's serial and parallel port can be assigned to a TCP/IP socket. Data sent to these sockets are transferred out of the assigned serial or parallel port. Data received by the serial port can be read from the assigned TCP/IP socket.

GSM Modem :	Rawport [10]
Comms 2 :	Disabled
LPT 1 :	Disabled

Default Configuration

Sockets	Parameter	Explanation
	GSM Modem	TCP/IP socket port number assigned to the GSM Modem is
	Rawport [portno]	User Defined.

Ports

When the EasiSMS is configured as an SMS Receive Client and Auto connection is enabled, incoming SMS data can be forwarded to a specified port number at Remote Server 1.

Remote Server 1 :	10
Remote Server 2 :	N/A
Remote Server 3 :	N/A
Remote Server 4 :	N/A
Remote Server 5 :	N/A
Remote Server 6 :	N/A
Remote Server 7 :	N/A
Remote Server 8 :	N/A

Default Configuration

System1 Menu

Protocol	System1	System2	Consol	Telemetry
	Communication Port		Ethernet	
	Socket Inactive Timeout		60 Secs	
	GSM Network Timeout		40 Secs	
	Max Phone Number Length		Undefined	
	Event Print Log Lpt1		OFF	
	Reply String Format		Binary LF	
	Transmit Handshake COM2		None	
	GSM Hardware		Falcom A2D	
	Keyboard Commands		OFF	
	Console Display TX SMS		OFF	
	Console Display RX SMS		OFF	
	EasiSMS Function		Tx Server	

Default Configuration

System1

Parameter	Explanation
Communication Port	Communications with the Remote Server is
Ethernet	TCP/IP.
Serial 2	Serial Comm2.
Socket Inactive Timeout	Inactivity timeout period for each open TCP/IP socket is
60,70,80,90,100,110,120,INFINITE	Seconds.
GSM Network Timeout	Each SMS message that is communicated through the GSM network is acknowledged the timeout period for this acknowledgement is
30,35,40,45,50,55,60,75,90,120	Seconds.
Max Phone Number Length	Maximum allowable length of each phone number is
10,11,12,13,14,15,16,Undefined	Digits.

Event Print Log Lpt1	For data logging purposes each transaction is
ON	Printed through Lpt1.
OFF	Not Printed.
Reply String Format	Communication protocol reply string terminator <i>and</i> acknowledgment / error messaging is configured as
Binary LF	LF (0x0a) <i>and</i> Binary + LF.
Binary CR	CR (0x0d) <i>and</i> Binary + CR.
Binary	ACK (0x06) <i>and</i> Binary.
ASCII LF	LF (0x0a) <i>and</i> ASCII + LF.
Transmit Handshake COM2	When transmitting data to a device connected to Comm2
None	Ignore all incoming handshaking.
Xon/Xoff	Respond to Xon/Xoff handshaking.
DSR	Respond to DSR hardware.
GSM Hardware	The EasiSMS currently supports
Falcom A2D	Falcom hardware.
Motorola D15	Motorola hardware.
Keyboard Commands	Keystrokes available for user testing and debugging are
OFF	Disabled.
ON	Enabled.
Console Display TX SMS	During SMS transmission
OFF	Console dialogue is limited.
ON	Console dialogue is verbose.
Console Display RX SMS	During SMS reception
OFF	Console dialogue is limited.
ON	Console dialogue is verbose.
EasiSMS Function	The primary function of the EasiSMS is
Tx Server	A SMS transmit Server.
Rx Client	A SMS receive Client.

System2 Menu

Protocol	System1	System2	Consol	Telemetry
		Change Password	RETAIN	
		SIM PIN Code	DEFAULT	
		Organisation Name	DEFAULT	
		LPD Queue Name	DEFAULT	
		Alternate SCA	DEFAULT	
		Auto Connect Rx Client	ON	
		Socket open timeout	15 Secs	
		Socket open retry	5 Secs	

Default Configuration

System2	Parameter	Explanation
	Change Password	The default password "UNITERM" which enables access to the Setup menu is
	RETAIN	Retained.
	CHANGED	Modified.
	SIM PIN Code	Access to the GSM Network Requires a valid PIN code the PIN code is
	DEFAULT	Null.
	Pin Number	User Configuration.
	Organisation Name	Organisation name displayed on the video consol is
	DEFAULT	"Press Left and Right Shift keys to run Setup".
	Organisation Name	User Configuration.
	LPD Queue Name	LPD queue name replied to by an "lpstat" query from a Remote Host is
	DEFAULT	"EasiQ".
	LPD Printer Name	User Configuration.
	Alternate SCA	SMS Service Centre Address is
	DEFAULT	Retrieved automatically from the SIM card at boot time.
	SCA number	User Configuration.

Auto Connect Rx Client	When the EasiSMS is configured as a Rx Client
ON	Incoming SMS data is automatically forwarded to the communication port. Remote Server 1port at Remote IP 1 for TCP/IP or Comm2 for RS232.
OFF	Incoming SMS data is cached until read by the Server.
Socket open timeout	When the EasiSMS is configured as a Rx Client and TCP/IP is enabled. Arrival of SMS data establishes a TCP/IP connection with the server. The timeout on establishing this connection is
15,10,20,30,40,50,60	Seconds.
Socket open retry	When the EasiSMS is configured as a Rx Client and TCP/IP is enabled, should the transfer of SMS data to the Server for any reason not succeed a connection retry will be attempted every
5,1,2,10,15,20,25,30	Seconds.

Consol Menu

This menu option deals specifically with options pertaining to the video consol configuration and setup.

Protocol	System	General	Consol	Telemetry
		Columns	80	
		Monitor	Colour	
		Fore Colour OverRide	OFF	
		Back Colour OverRide	OFF	
		Cursor Shape	Underline	
		Cursor Colour	Lgrey	
Default Configuration				

Console	Parameter	Explanation
	Columns	The video text display is red
	80	80 column wide.
	132	132 column wide.
	Monitor	Character attributes are optimised for a
	Colour	Colour VGA monitor.
	Mono	Mono VGA monitor.
L is light	Fore Colour	Character foreground colour attribute override is
	OFF	Off.
	Black, Blue, Green, Cyan, Red, Purple, Brown, LGrey, Grey, LBlue, Lgreen, LCyan, LRed, LPurple, Yellow, White	Set to one of these colours.
	Back Colour	Character background colour attribute override is
	OFF	Off.
	Black, Blue, Green, Cyan, Red, Purple, Brown, LGrey, Grey, LBlue, Lgreen, LCyan, LRed, LPurple, Yellow, White	Set to one of these colours.

Cursor Shape	The cursor Shape is
Underline	An underscore.
OFF	Invisible.
Block	A solid block.
Cursor Colour	The cursor colour is
OFF	Set to default of Light Grey.
Black, Blue, Green, Cyan, Red, Purple, Brown, LGrey, Grey, LBlue, Lgreen, LCyan, LRed, LPurple, Yellow, White	Set to one of these colours.

2. INTERFACE PROTOCOL

The EasiSMS greatly simplifies the software interface requirement between user application software and the GSM Network. All GSM Modem and GSM Network criteria necessary to transmit and receive Short Message Service are administered by the EasiSMS firmware.

A simple Interface protocol exists. Message content and phone numbers require no encoding and are transported as plain ASCII text characters. ASCII characters of value less than 32 decimal are components of the instruction protocol and the reply protocol.

The nomenclature used to depict hexadecimal values in this document is the same as that employed by the "C" programming language. For example the decimal value of 32 is depicted as hexadecimal 0x20. In the examples that follow spaces have been used for illustration purposes only and do not form part on the interface protocol.

Mode Configuration

The EasiSMS state machine can be configured to run one of the two following modes:

Tx Server

Transmission of SMS data is the primary function. Receive SMS data is stored in and retrieved from the SIM.

Rx Client

Reception of SMS data is the primary function. Received SMS data is not stored in the SIM. The Rx client state can be configured to run in Auto Connect Rx mode, whereby received SMS data is immediately forwarded to a Remote Server. With Auto Connect Rx set to off, received SMS data will be cached in a 32Kb (volatile) buffer. The receive cache is accessible from the Remote Server.

Voice Call Forwarding

In order to optimise the throughput of SMS data it is advisable to divert incoming voice calls to an alternate telephone number. Registering and De-Registering the forwarding number, Enabling and Disabling the forwarding process is a function of the GSM network. The EasiSMS relays call forwarding parameters to and configuration information from the GSM network.

With call forwarding inactive an incoming voice call will result in the following.

Tx Server Mode: A GSM network generated message will be stored in the SIM.

Rx Client Mode: The EasiSMS will announce a ring tone and a flashing message "Incoming Voice Call !" will be displayed on the console.

Instruction and Control Codes

Each instruction issued to the EasiSMS is replied to. Error codes and instruction acknowledgments can be in Binary or ASCII form. See Reply String Format in Chapter1 System1 Menu for reply string termination characters *and* acknowledge / error string formatting detail.

Instructions to the EasiSMS do not require a string termination character.

Received messages stored in the SIM non-volatile memory should be deleted regularly in order to provide memory space for incoming messages.

Depending on the EasiSMS Mode Configuration certain instructions may not be applicable. Where instructions are only applicable to Tx Server mode (T) is written alongside the instruction and where only applicable to Rx Server mode (R) is written.

EasiSMS Status 0x01

This instruction tests the GSM network radio frequency signal strength if the current signal strength is acceptable the test proceeds to test the SIM Card availability if both these tests prove successful the status is OK.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Status OK	0x06	OK
Modem replies Error	0x08	008:Modem Error
No Signal	0x0A	010:Signal
SIM not available	0x0B	011:SIM Not Available
Modem command timeout	0x0E	014:Command Timeout

SMS Initialisation 0x02

This instruction resets the EasiSMS transmit state machine. The console displayed batch number is incremented and the sequence number is reset. This instruction must be issued prior to a batch or individual messages being sent.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Initialised OK	0x06	OK

Phone Number 0x03

The phone number the following message content is sent to.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Not in transmit state	0x03	003:Service Not Set

Message Content 0x04

Up to 160 printable ASCII text characters in the range 0x20 to 0x7F comprise the body of the message.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Not in transmit state	0x03	003:Service Not Set
Instruction Sequence Error	0x04	004:Protocol Sequence

End of Message 0x05

The message is terminated with this character. On receipt of this character the message content is transferred to the requested phone number through the GSM Network.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Transmission OK	0x06	OK
Instruction Sequence Error	0x04	004:Protocol Sequence
Data Range Error	0x05	005:Data Range
Radio Error (Motorola only)	0x07	007:GSM Radio
GSM Modem Reports Error	0x08	008:Modem Reports Error
GSM Network Timeout	0x09	009:GSM Net Timeout
Modem command timeout	0x0E	014:Command Timeout

Received Message Registers 0x06 (T)

A list of all valid received message register locations is retrieved from the SIM and uploaded to the Server. Register index numbers are delimited with a 0xBA character.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Upload register list	-	1 0xBA...21 0xBA (example)
No messages received	0x0C	012:No Rx SMS
Modem command timeout	0x0E	014:Command Timeout

Received Message Index 0x07 (T)

Index the contents of a SIM message register. The register number follows this instruction. Trailing zeros (0x30) may be omitted.

Retrieve Received Message 0x08 (T)

The contents of this received message register is retrieved from the SIM and uploaded to the Server. The received message string includes the source call center address, source phone number, date and time of message. These data fields are delimited with a 0xBA character and the string is terminated with the configured Reply String termination character.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Upload message	-	Call Center 0xBA Source Phone 0xBA Date 0xBA Time 0xBA Received Message
Register Empty	0x0C	012:No Rx SMS

Delete Received Message 0x09 (T)

Delete the contents of this SIM message register.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Register deleted	0x06	OK
Register is empty	0x0C	012:No Rx SMS
Modem command timeout	0x0E	014:Command Timeout

Receive Cache Query 0x0A (R)

Report Receive Cache Status.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Cache has data	0x06	OK
Cache is empty	0x0C	012:No Rx SMS

Retrieve Cached Message 0x0B (R)

Upload the next message pending from the Cache to the Server. Messages are popped from the Cache on a FIFO basis.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Upload Message	-	Call Center 0xBA Source Phone 0xBA Date 0xBA Time 0xBA Received Message
Cache is empty	0x0C	012:No Rx SMS

Voice Forwarding Number 0x0C

Incoming voice calls can be forwarded to an alternate phone number. The number can be an international or a local number, GSM or landline. A maximum of 15 digits are allowed including a plus (+) character when used. Various phone number formats may be used, examples of are as follows:

0891234567	GSM Phone Number
+27891234567	International GSM Phone
0114564567	Landline Number
+27114564567	International Landline Number

Register Voice Forwarding Number 0x12

The number string placed between the 0x0C instruction and this (0x12) instruction is relayed to the GSM network. On acceptance of this instruction all incoming voice calls will be forwarded to this number and call forwarding is automatically enabled. It is not necessary to De-Register an existing number prior to configuration of a new number.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Registration OK	0x06	OK
GSM Modem Reports Error	0x08	008:Modem Reports Error
Modem command timeout	0x0E	014:Command Timeout

Disable Voice Forwarding 0x0E

Voice forwarding is disabled, the forwarding number remains registered on the GSM network.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Forwarding Disabled OK	0x06	OK
GSM Modem Reports Error	0x08	008:Modem Reports Error
Modem command timeout	0x0E	014:Command Timeout

Enable Voice Forwarding 0x0F

The voice forwarding number previously registered on the GSM network is enabled. If no forwarding number has been registered an error will be reported.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Forwarding Enabled OK	0x06	OK
GSM Modem Reports Error	0x08	008:Modem Reports Error
Modem command timeout	0x0E	014:Command Timeout

Query Voice Forwarding 0x10

Voice forwarding status is uploaded from the GSM network. When a forwarding phone number is registered the status and phone number is returned in international phone number format.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Number Registered status ON	-	N 0xBA Phone Number
Number Registered status OFF	-	F 0xBA Phone Number
No Forwarding Capability	0x03	003:Service Not Set
GSM Modem Reports Error	0x08	008:Modem Reports Error
Modem command timeout	0x0E	014:Command Timeout
No Number Registered	0x15	021:NAK

De-Register Voice Forwarding 0x11

Voice forwarding is disabled and the registered number is removed from the GSM network.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
De-Registered OK	0x06	OK
GSM Modem Reports Error	0x08	008:Modem Reports Error
Modem command timeout	0x0E	014:Command Timeout

Reset GSM Modem 0x1F

A hardware reset is issued to the internal GSM Modem. The reset cycle time can take tens of seconds.

<i>Response</i>	<i>Binary</i>	<i>ASCII</i>
Modem has Reset	0x06	OK
Modem is not available	0x0B	011:SIM Not Available

Interface Examples without error (Binary)

The following examples depict data flow between the Remote Server and the EasiSMS using Binary Error Code format. TX is transmission from the host computer and RX is transmission from the EasiSMS.

Transmit a single message

```
TX: 0x02
RX: 0x06
TX: 0x03 0891234567 0x04 test message 0x05
RX: 0x06
```

Transmit a batch of 3 messages

```
TX: 0x02
RX: 0x06
TX: 0x03 0891234567 0x04 test message1 0x05
RX: 0x06
TX: 0x03 0892234567 0x04 test message2 0x05
RX: 0x06
TX: 0x03 0893234567 0x04 test message3 0x05
RX: 0x06
```

Upload a list of valid receive message registers

```
TX: 0x06
RX: 1 0xBA 2 0xBA 3 0xBA 4 0x06
```

Upload a received message register 21

```
TX: 0x07 21 0x08
RX: 27125916 0xBA 270891234567 0xBA 160401 0xBA
175751 0xBA received message 0x06
```

Delete received message register 1

```
TX: 0x07 001 0x09
RX: 0x06
```

Interface Example with error (Binary)

Transmit a single message

```
TX: 0x02
RX: 0x06
TX: 0x03 0891234567 0x04 test message 0x05
RX: 0x08
```

Upload a list of valid receive message registers

```
TX: 0x06
RX: 0x0C
```

Interface Examples without error (Binary LF)

The following examples depict data flow between the Remote Server and the EasiSMS using Binary Error Code format and a Line Feed terminator. TX is transmission from the host computer and RX is transmission from the EasiSMS.

Transmit a single message

```
TX: 0x02
RX: 0x06 0x0A
TX: 0x03 0891234567 0x04 test message 0x05
RX: 0x06 0x0A
```

Transmit a batch of 3 messages

```
TX: 0x02
RX: 0x06 0x0A
TX: 0x03 0891234567 0x04 test message1 0x05
RX: 0x06 0x0A
TX: 0x03 0892234567 0x04 test message2 0x05
RX: 0x06 0x0A
TX: 0x03 0893234567 0x04 test message3 0x05
RX: 0x06 0x0A
```

Upload a list of valid receive message registers

```
TX: 0x06
RX: 1 0xBA 2 0xBA 3 0xBA 4 0x0A
```

Upload a received message register 1

```
TX: 0x07 1 0x08
RX: 27125916 0xBA 270891234567 0xBA 160401 0xBA
175751 0xBA received message 0x0A
```

Retrieve cached message

```
TX: 0x0B
RX: 27125916 0xBA 270891234567 0xBA 160401 0xBA
175751 0xBA received message 0x0A
```

Interface Examples without error (ASCII LF)

The following examples depict data flow between the Remote Server and the EasiSMS using ASCII Error Code format and a Line Feed terminator. TX is transmission from the host computer and RX is transmission from the EasiSMS.

Transmit a single message

```
TX: 0x02
RX: OK 0x0A
TX: 0x03 0891234567 0x04 test message 0x05
RX: OK 0x0A
```

Interface Example with error (ASCII LF)

Transmit a single message

```
TX: 0x02
RX: OK 0x0A
TX: 0x03 0891234567 0x04 test message 0x05
RX: 008:Modem Error 0x0A
```

Upload a list of valid receive message registers

```
TX: 0x06
RX: 012:No Rx SMS 0x0A
```

Call Forwarding (Binary CR)

Register a call forwarding Phone Number

```
TX: 0x0C 0114564567 0x12
RX: 0x06 0x0D
```

Query Status

```
TX: 0x10
RX: N 0xBA +27114564567 0x0D
```

Disable Forwarding

```
TX: 0x0E
RX: 0x06 0x0D
```

Enable Forwarding

```
TX: 0x0F
RX: 0x06 0x0D
```