generic

LARM/MODEMPOOL

TJÄNSTEBESKRIVNING
Version 2.5
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Preface

This Guide is intended for those who want to develop applications for Generic Mobile's service, Messit™ Larm/Modempool.

In addition to the informaton provided in this Developer's Guide, you may also need the UCP specification, ETS 300 133-3 by ETSI, which may be downloaded from http://www.etsi.org.

Structure of the document

Introduction	contains a short introduction to the two services.
SMS	describes the features of the SMS (Short Message Service) service and the various options available.
Minicall™	describes the features of the Minicall service and the various options available.
The UCP protocol	describes the message construction for operations and results.
Operations available in SMS	describes in detail the operations supported in SMS, the various parameters used and the possible results of these operations.
Operations available in Minicall™	describes in detail the operations supported in Minicall, the various parameters used and the possible results of these operations.
Glossary of terms	contains explanations of terms used throughout this Guide.
Error codes	describes possible error codes for the various operations.

Typographical conventions

Formatting convention	Type of information
Courier	is the font used for examples.
Bold	is used for parameters and error codes.
Italic	is used for full text explanation to abbreviations in the Glossary of terms and for some text or error messages generated by the system.
Arial	is the font used to produce compact text in some tables.

Table of contents

1   Introduction

This document contains information about Generic Mobile's service Messit^{TM} Larm/Modempool. The purpose of the document is to provide the required information to those who wish to develop applications around this service.

GSM stands for Global System for Mobile Communication and is the name of the digital mobile telephone system for Europe which also exists in other countries outside Europe. SMS is a service which has been operational in Sweden since May 1994.

Minicall is a pager service which has been in use since 1985. Minicall with Text function was introduced to the public in 1988. Generic Mobile acquire the Minicall paging system from Telia 2002. Generic Mobile has developed the service and today it includes a web-interface with many new features.

SMS and Minicall are useful in various business applications where there is a need to send short text messages to mobile terminals. One useful application may be the sending of messages, via a switchboard operator at the office, to a person who has been asked for but is not immediately accessible. Another application could be the sending of a text message to someone who has a pending fax or e-mail. Automatic sending of messages from alarm centers or supervisory locations is another possible application.

Both SMS and Minicall are based on the same data protocol called UCP (Universal Computer Protocol).

If you want more information about Messit^{TM} Larm/Modempool please contact Generic Mobile's Customer Services on kund@genericmobile.se or +46 8 601 66 66

2   SMS

The SMS service makes it possible to send textual or numerical messages to GSM Mobile Stations (MS). When a message reaches an MS it can be read on its display. The maximum length of a message is 160 characters. It is possible for the message sender to receive a notification as to whether or not the message has reached the recipient.

SMS gives the GSM subscribers the possibility to receive SMS messages. There is no extra charge for this service. This means that all GSM subscribers using Mobile Stations with SMS-functionality, can receive SMS.

2.1   Notifications

When the sender submits a message he can ask for notification. There are three forms of notification:

Delivered   The MS message has reached its destination.

Generated message:
1 Meddelande till (abonnentnr): Mottaget[1]

Buffered   The MS is not accessible. The message is buffered and will be automatically resent.

The MS is not accessible when it is turned off or when it is not located within the area covered. The message will be stored in the SMSC (Short Message Service Centre) for a maximum of 72 hours – after which it will be deleted. As long as the message is stored, SMSC will automatically try to resend it.

Generated message:
2 Meddelande till (abonnentnr): Lagrat[2]

Can not be delivered   The MS message can not be delivered due to (specified reason).

Generated message:
3 Meddelande till (abonnentnr): Kan ej skicka p.g.a fel[3]

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[1]   1 Message to (subscriber no.): Received

[2]   2 Message to (subscriber no.): Stored

[3]   3 Message to (subscriber no.): Cannot be sent owing to fault

In order to get a common interface, Generic Mobile recommends that the above notification texts are shown by the applications.

2.2 Deferred delivery

The message sender can specify a desired time of delivery (DDMMYYhhmm), i.e. when SMSC should send the message to the MS. The point of time, which is given in absolute format, can be set to a maximum of seven days ahead of the moment when the message is sent to SMSC.

2.3 Access to SMS

Text messages can be sent from a computer to a MS with SMS functionality. The computer is using an application based on the UCP protocol and a connection to a SMSC, you may send freely composed messages containing a maximum of 160 characters. For computer access, see section Send messages from your own computer

2.3.1 Send messages from your own computer

It is possible to send GSM Text messages from a computer with appropriate software. Please see figure Sending SMS from a computer for a schematic description. The software must be based on the Universal Computer Protocol (UCP), which is described in section 5 in this manual. Messit^{TM} Larm/Modempools access provides via a dialled PSTN connection.
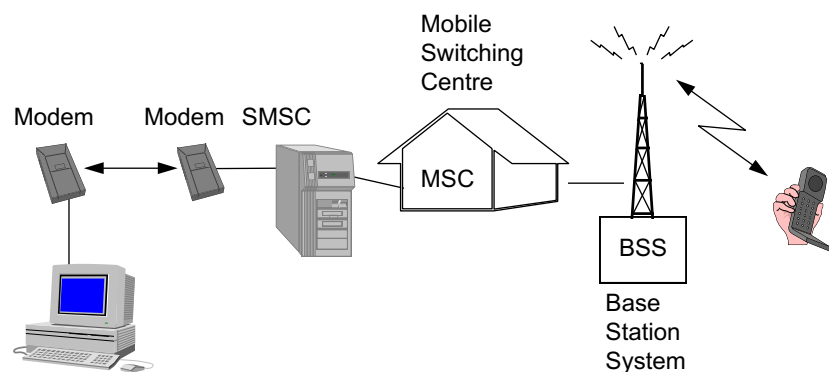
Sending SMS from a computer

In order to use dialled connections within the public network you need a subscription and a modem. The choice of subscription may, for example, depend on the quantity of outgoing messages.

Depending on the costumers needs there is nine different telephone numbers for dialled PSTN connection with different fee. In the table below shows a summary:

Index	Access	Number	Baudrate	Price	SMS/ session
1	PSTN/ Modem	+46 740 90 00 00	1.2K – 56K	SEK 80	15
1	PSTN/ Modem	+46 740 91 00 00	1.2K – 56K	SEK 80	15
1	PSTN/ Modem	+46 740 92 00 00	1.2K – 56K	SEK 80	40
2	PSTN/ Modem	+46 740 91 00 90	1.2K – 56K	SEK 80	15
2	PSTN/ Modem	+46 740 93 00 00	1.2K – 56K	SEK 50	15
2	PSTN/ Modem	+46 740 93 01 00	1.2K – 56K	SEK 80	15
2	PSTN/ Modem	+46 740 93 02 00	1.2K – 56K	SEK 80	15
2	PSTN/ Modem	+46 740 93 10 00	1.2K – 56K	SEK 80	15

Table 1, Phone number for SMS

[4] Note

The sender will get a discount if using the special numbers when sending multiple messages. The application could thus minimize the costs by selecting the appropriate telephone number based upon the number of messages to be sent.

Telephone numbers with index 2 also have web interface for spreading messages to e-mail, Minicall or SMS. This allows the user to configure the message routing from time to time and also change the message type. It is possible to choose one of these configuration types:
- 2 Minicall messages
- 1 Minicall message and 5 SMS/e-mail messages
- 15 SMS/e-mail messages

It is also possible via the web interface to schedule when and to who the messages are going to be sent.

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[4] There is also three phone numbers (+46 939 105 60 00, (+46 939 105 61 00, (+46 939 105 62) that can be used. These numbers are old numbers from the former Telia Modempool. These numbers are going to be phased out and we recommend the users changes to a suitable number in table 1

3   Minicall

There are different types of Minicall subscriptions depending on the type of paging to be received (e.g. numerical and textual) and any additional service (e.g. message storage) that is to be included.

Minicall Privat is a subscription-free numerical service, which is available from Generic Mobile.

3.1   Access to Minicall

MessitTM Larm/Modempool offers one way to send Minicall messages via the PSTN network and that is via a computer.
The computer must use an application based on the data protocol UCP and a connection to Generic Mobile's Minicall switch, you can send freely composed messages containing a maximum of 400 characters. For computer access, see section send messages from your own computer

3.1.1   Send messages from your own computer

It is possible to send Minicall messages from a computer with appropriate software. This software must be based on the data protocol UCP. Access is provided via dialled connections within the public telephone.

In order to use dialled connections you will need a subscription and a modem.
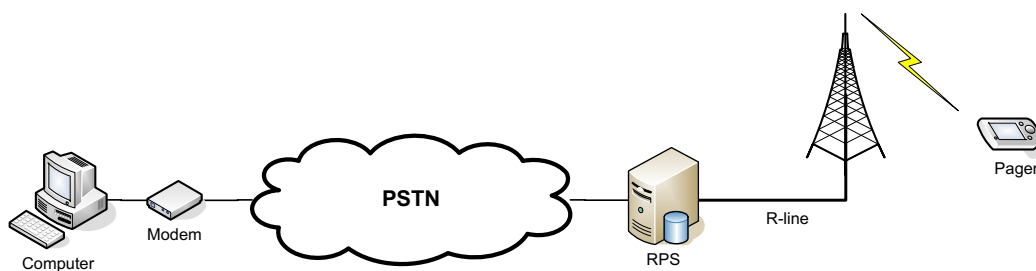
Valid telephone numbers for dialled PSTN connection are as follows:

Access	Number	Baudrate	Price	Minicall/ session
Modem/ PSTN	+46 740 96 00 00	1.2K - 56K	SEK 20	1
Modem/ PSTN	+46 740 91 00 91	1.2K - 56K	SEK 80	2
PSTN/ Modem	+46 740 93 00 00	1.2K – 56K	SEK 80	2
PSTN/ Modem	+46 740 93 01 00	1.2K – 56K	SEK 80	2
PSTN/ Modem	+46 740 93 02 00	1.2K – 56K	SEK 80	2
PSTN/ Modem	+46 740 93 10 00	1.2K – 56K	SEK 80	2

Table 2, Phone number for Minicall

4   Messit™ Larm/Modempool web application

It is possible to access Messit™ Larm/Modempool web application via the internet (http://www.genericmobile.se/messit__larm__modempool.aspx) where the customer can administrate how, when and to who the message shall be sent to. The service is free and it is possible for the user to create an account on Generic Mobile home page (www.genericmobile.se). The registration is being carried out under "Företag -> Messit™ meddelandetjänster -> Messit™ Larm/Modempool -> Tilläggstjänster". The web application can only be used on the phone numbers marked with index 2 in table on page 7 above.

After the user has logged in a page like this shall appear in the internet browser.

To use the services in Messit™ Larm/Modempool web application the following step has to be done.

1. First an alarm device has to be added under "Lägg till ny larmsändare". Here must the transmitter device phone number be added together with all the phone numbers that the device shall send the SMS/Minical to. This information must be exactly the same as the information configured in the alarm device.

2. Under "Ange mottagare" shall all the recipients for the web application be added. The user can choose between SMS, e-mail and Minicall recipients. The maximum amount of recipients configured is depending on the amount of recipients configured under paragraph one. The total amount of messages that can be sent including the phone numbers configured in the alarm device and from the web application are any of these three combinations:
    a. 2 Minicall messages
    b. 1 Minicall message and 5 SMS/e-mail messages
    c. 15 SMS/e-mail messages

3. It is also possible to configure when a message shall be sent to a recipient, for example only during office time. This feature is called duty planning (Jourplanering). It is also possible to configure a recipient for "vacation" and during that time period the recipient won't receive any messages or vice versa. This feature is found under "Jourplanering"

5   The UCP protocol

The UCP (Universal Computer Protocol) specifies the application layer[5] between a computer running a SMS application and SMSC or a Minicall application and System T. In addition to the application, a simple packet structure including error correction is part of the protocol. UCP is useful in different public data networks e.g. in Unidata Datapak and on dialled PSTN connections.

This chapter describes the structure of the protocol and the supported operations and results for SMS. UCP for SMS is a subset of UCP specified by ETSI with some extended functionality. The data protocol UCP is part of the European pager/paging standard ERMES (protocol ETS 300 133). The ETSI UCP specification can be downloaded from http://www.etsi.org.

☞ Note! If there are any discrepancies between the UCP description in this document and that in and the ETCI UCP specification, the latter will be valid.

☞ Note! Operation 30, "SMS Message Transfer" operation, is addition to UCP supported by SMSC. These operation is therefore only described in this manual and not in the ETSI UCP specification.

5.1   Operations and results

Communication on the application level is based on transactions. One transaction consists of one operation and the corresponding result. To separate various transactions and to avoid duplication of operations in case of communication errors, every operation must contain a transaction number. The number of the operation will also be part of the corresponding result. The purpose of the transaction number is to combine one result with its corresponding operation.

A transaction sequence is initiated by the computer sending an operation (e.g. a SMS message). The sender then awaits a result from the receiver, i.e. SMSC in this case. SMSC in supposed to accept or reject the received message. After controlling the semantics, the checksum and the syntax of the message, SMSC will return a result containing the same transaction number.

The result of an accepted operation varies depending on the type of operation. The result of a rejected operation is a result containing the appropriate error information.

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[5] The application layer is layer number seven of the ISO OSI model.

The result must also be accepted. Semantics, checksum and syntax are therefore verified. A communication failure may cause a checksum error or a time-out. In such a case the operation or result should be retransmitted with the same transaction number. Even if a checksum error occurs in the result, the operation may still have arrived correctly.

An ordinary transaction sequence is illustrated in the following figure. The computer sends an operation (30) with a SMS message requesting an acknowledgement. The acknowledgement should indicate the outcome of the transfer. SMSC returns a result telling that the message (i.e. the operation) has arrived. After this, SMSC will send an operation (01) containing the appropriate acknowledgement. The sender of the original message should respond to SMSC with a result (ACK or NAK).

Transaction sequence

Sending computer

SMSC

Communication net

30 SMS Message transfer operation
Message+GSM number
Request for ACK (YES)
Request for deferred delivery (NO)

**30 SMS Message transfer operation
(positive result)**
ACK

01 Call input operation
Acknowledgement indicating
what happened to the message

**01 Call input operation
(positive result)**
ACK

Exchange of operations and results
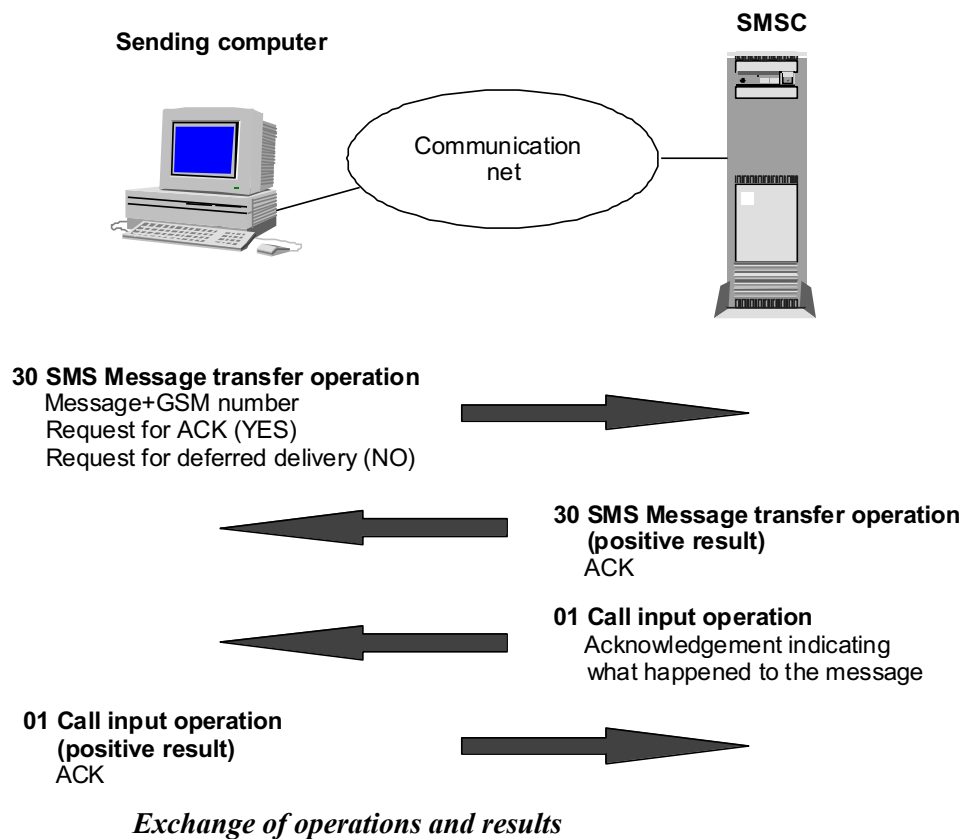
Transaction sequence Minicall

Sending computer

RPS

Communication net

01 Call input operation
 AdC + MT
 Request for ACK (YES)

**ACK positiv acknowledgement
(positive result)**
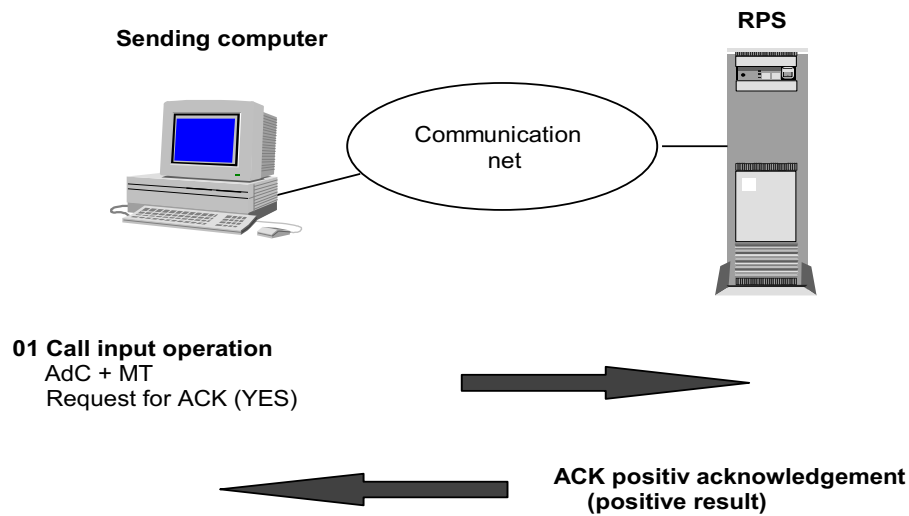
5.2   Message format description

Every message (i.e. operation or result) must consist of:

START   HEADER   DATA   CHECKSUM   STOP

The start character shall be "STX" (02 hex)

The stop character shall be "ETX" (03 hex)

The header and data field consist of parameters terminated by the character '/' (2F hex).

A parameter may consist of list of items. The items shall then be separated by a character ',' (2C hex).

No parameter terminator shall be sent between the STX and the header, or between the checksum and ETX.

The two separators, '/' and ',' are not allowed in the content of a parameter.

Non-printable characters, e.g. control characters, are not allowed in the header or in the data field.

The checksum is described in paragraph checksum.

5.2.1 Header

The header must comprise four fixed length parameters. The parameters should be separated by the character '/' (2F hex).

☞ Note! All parameters described are mandatory and a value must be assigned to each of them.

Parameter	Type	Description
TRN	2 num. char.	Transaction number
LEN	5 num. char.	Total number of IA5 characters between STX and ETX. The length shall be right justified with leading zeros.
O/R	'O' or 'R'	'O' indicates operation and 'R' indicates result
OT	2 num. char.	Operation type as defined in paragraph operations.

5.2.2 Operations

UCP for SMS consists of the following operations:

01 Call input operation

03 Call input operation with supplementary service operation

30 SMS message transfer operation

Operations 01 and 03 are identical to those of UCP specified for ERMES (by ETSI). Not all parameters in the operations are relevant to SMS. Operation 30 is additional and allows the sender to request an acknowledgement when the message reaches the receiving Mobile Station.

All other operations (00, 02, 04-21) will generate a result with error code 03, "Operation not supported by system".

5.2.3 Data field

The data field varies in format and length depending on the operation or result specified in the message header. The data field consists of a number of parameters separated by the character '/' (2F hex).

A parameter may contain a list of items. The items shall be separated by the character ',' (2C hex).

An essential parameter (E) must have a value.

An optional parameter (O) may or may not have a value. If it has no value the parameter is empty. Only the separator ('/') is put in that parameter's position.

Unsupported parameters (see the examples below) are treated as empty optional parameters.

Example

Operation 30, "SMS message transfer operation" looks like this:

Parameter	Type	Description
AdC	String of num. char.	*Address code of recipient.* GSM number of the message receiver
OAdC	String of num.char.	*Address code of originator.* GSM number of the message sender. Depending on the implementation in the MS of the receiver, this number may appear on the display.
AC	empty	Not supported
NRq	empty, '0' or '1'	*Notification Request.* Flag indicating request for acknowledgement. '/' or '0' indicates no acknowledgement, '1' indicates acknowledgement requested.
NAd	empty	Not supported
NPID	empty	Not supported
DD	empty, '0' or '1'	*Deferred delivery request.* Flag indicating request for deferred delivery. '/' or '0' indicates no delay, '1' indicates deferred delivery requested.
DDT	DDMMYY HHmm	*Deferred delivery time.* Time when deferred delivery is desired. This parameter is mandatory when DD is equal to '1'.

VP	DDMMYY HHmm	*Valid period.* Specifies how long the message should be stored in SMSC. This parameter should indicate the absolute time when the message should be purged. No relative time setting is allowed. Default and max. time are currently 72 h.
AMsg	1-160 characters	*Alphanumeric Message.* Text message to be sent. It should be coded according to the conversion table for IA5 characters.[6]

Example

The text "Hello" should be sent in parameter AMsg (See **conversion table for ia5 characters** below for references.):

a) Character 'H' should be translated to IA5. Look for 'H' in IA5 table.

b) Convert 'H' to 7 bit code. The result is (b7-b1): "100 1000".

c) The 7 bit code is made into hexadecimal characters. "100 1000" gives "48".

d) Convert the rest of the text, i.e. "ello", in the same way.

e) The text message "Hello" will become "48656C6C6F" These are the characters to be sent to SMSC in the AMsg field.

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[6] Note that a IA5 table is not identical to an ASCII table, even if there are many similarities.

Conversion table for IA5 characters

				b7	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7
0	0	0	0	0	@	Δ	<sp>	0	¡	P	¿	p
0	0	0	1	1	£	<dc1>	!	1	A	Q	a	q
0	0	1	0	2	$	Φ	"	2	B	R	b	r
0	0	1	1	3	¥	Γ	#	3	C	S	c	s
0	1	0	0	4	è	Λ	¤	4	D	T	d	t
0	1	0	1	5	é	Ω	%	5	E	U	e	u
0	1	1	0	6	ù	Π	&	6	F	V	f	v
0	1	1	1	7	ì	Ψ	'	7	G	W	g	w
1	0	0	0	8	ò	Σ	(	8	H	X	h	x
1	0	0	1	9	Ç	Θ	)	9	I	Y	i	y
1	0	1	0	10	<lf>	Ξ	*	:	J	Z	j	z
1	0	1	1	11	Ø	<esc>	+	;	K	Ä	k	ä
1	1	0	0	12	ø	Æ	,	<	L	Ö	l	ö
1	1	0	1	13	<cr>	æ	-	=	M	Ñ	m	ñ
1	1	1	0	14	Å	ß	.	>	N	Ü	n	ü
1	1	1	1	15	å	É	/	?	O	§	o	à

5.2.4   Checksum

The checksum shall be derived by the addition of all bytes of the header and the data fields (including separators). The eight Least Significant Bits of the result are then represented as two printable characters. For example, if the checksum is 13A hex, then the '1' is

dropped and the remaining characters are sent as characters '3' (33 hex) and 'A' (41 hex) with the most significant character sent first.

Note! The checksum is calculated when the message (AMsg) has been converted to hexadecimal code.

The checksum can be calculated using the following algorithm described in programme language C notation:

```
--------------------------------------------------------------------------------
function CheckSum(s : string) : integer;

var

        ptr         : integer;

        ChkSum      : integer;

begin

        Chksum:=0;

        for ptr:=1 to Length(s) do

        begin

        ChkSum:=(ChkSum + ord(s[ptr])) mod 256;

        end;

        CheckSum:=ChkSum;

end;
--------------------------------------------------------------------------------
```

The hex codes for each character of the operation or result are added modulo 256. The sum is then converted to hexadecimal code and this value is inserted in the checksum field.

6   Valid operations for SMS

UCP as specified by ETSI, consists of a total of 22 operations (ETS 300 133-3:1992). However only certain parts are offered. For SMS some additional operations have been specified, namely operation 30.

Operations

UCP/UCP+ for GSM Text consists of 3 operations:

01 Call input operation
03 Call input with supplementary services
30 SMS Message Transfer Operation

6.1   5.1. Description of valid operations, SMS

This section gives a detailed description of the functionality for UCP-operations allowed in SMS.

All other operations that are specified for UCP by ETSI, will give error code 03, "Operation not supported by system".

6.1.1   Operations 01, 03 and 30

See list **operational parameters op. 01, 03, 30** for parameter descriptions. Results are described in Positive result descriptions op. 01, 03, 30 and Negative result descriptions op. 01, 03, 30.

See Valid operations matrix for op. 01, 03, 30 for which parameters (in the data-field) that are part of the operations.

Possible results per operation are shown in tables Positive results and Negative results respectively.

6.1.2   Call input (01)

SMSC uses this operation to send a confirmation that it has received a message. The operation may also be used to send messages without a request for notification or for deferred transmission.

6.1.3   Call input with supplementary services operation (03)

SMSC uses this operation to send a message with deferred transmission. The operation can also be carried out by operation 30. No notification is given for this operation.

6.1.4   SMS Message Transfer operation (30)

SMSC uses this operation to send a message together with a request for notification. Notification is returned as soon as the message has been transmitted. Deferred delivery messages are possible.

Operational parameters op. 01, 03, 30

Parameter	Description
AdC	Address code, recipient, 10-15 digits. Mandatory parameter.
OAdC	Address Code, originator.
NRq	Flag indicating if notification is requested. Set to '1' if notification is requested, otherwise '/' or '0'.
DD	Deferred delivery request. Set to '1'.
DDT	Deferred delivery time, DDMMYYhhmm. Not more than seven days (168h) forward. Mandatory parameter if DD is set to '1'.
VP	Validity period DMMYYhhmm. Maximum 3 days (72h), same as default value.
MT	Message type. Type 2 (numeric) and type 3 (alphanumeric) are supported. Mandatory parameter.
NMsg	Numeric message. Not recommended since numeric messages are more easily sent as alphanumeric.
AMsg	Alphanumeric message, 1-160 characters long.

Positive result descriptions op. 01, 03, 30

Parameter	Description
ACK	Positive notification, always represented by character 'A'.
MVP	Modified Validity Period DDMMYYhhmm. Reply if VP is specified to above maximum.
SM	System Message. In this field, the unique time-stamp for the message is replied as follows: "0705XXXXXX:DDMMYYhhmmss".

Negative result descriptions op. 01, 03, 30

Parameter	Description
NAC	Negative notification, always represented by the character 'N'.
EC	Error Code, see table *Error codes applicable to each operation*.
SM	Not applicable!

Valid operations matrix for 01, 03 and 30

Parameter	Operation			Comments
	01	03	30	
AdC	E	E	E	
OAdc	O	O	O	
NRq			O	
NPL				Always "0" if operation 03 is used
DD		O	O	
DDT		E	E	Mandatory parameter if DD is set to "1".
VP			O	
MT	E	E		
NMsg	O	O		Not recommended
AMsg	O	O	O	See Note for operation 01 below

E = Essential, O = Optional, empty box = not supported.

☞   Note for operation 01.

AMsg may have a length of 1–160 characters, if the operation is used for transmission of messages.

If used for notifications, any of the following three messages (hex-code), may be received from SMSC:
Delivered: "1 Meddelande till (abonnentnr): Mottaget"
Buffered: "2 Meddelande till (abonnentnr): Lagrat"
Can not be sent: "3 Meddelande till (abonnentnr): Kan ej skicka p.g.a. fel"

Notification messages begin with a digit. This digit will not be altered in future versions. The message text may change, however. Generic Mobile's recommendation is that the notification messages be fully displayed as transmitted from SMSC. The maximum length for a notification message is one hundred and sixty (160) positions, i. e. as for a regular AMsg.

Examples of reason for error:

Wrong GSM mobile station number.

The subscriber equipment lacks the necessary functionality.

Positive result

Parameter	Operations			Comments
	01	03	30	
ACK	x	x	x	
MVP			x	
SM	x	x	x	

Negative result

Parameter	Operations			Comments
	01	03	30	
EC	x	x	x	
NAC	x	x	x	

6.2 SMS Message Transfer operation (30) example

This example illustrate a string containing operation 30. A demonstration telephone number has been used (0739094960). This number may be used for test purposes, by application developers. Kindly note that the number given is not associated with any GSM mobile station, which implies that the response will be as follows:

2 Meddelande till (abonnentnr): Lagrat[7]

The example string looks like this, when it is transmitted to SMSC (the message "Test n" in hex-code):

<stx>01/00058/O/30/0739094960/060123456//1///////54657374206E/33<etx>

Parameter	Description
<stx>	Start character (02 hex) not calculated into the checksum.
01/	Transaction reference number (TRN).
00058/	total number of IA5 characters between <stx> and <etx> (LEN).
O/	Denotes operation (O/R).
30/	Operation type (OT).
0739094960/	Address code, recipient (AdC).
060123456/	Address code, originator (OAdC).
/	Empty parameter, not applicable (AC).
1/	Flag indicating that notification is requested (NRq).
/	Empty parameter, not applicable (NAd).
/	Empty parameter, not applicable (NPID).
/	Empty parameter (DD). Indicates request for deferred delivery when initiated.

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[7]   2 Message to (subscriber no.): Stored

/	Empty parameter (DDT). Indicates deferred delivery time.
/	Empty parameter (VP). Validity period DDMMYYhhmmss.
54657374206E/	The message "Test n" translated to hex-code (AMsg).
33	Checksum.
<etx>	Stop character (03 hex) not calculated into the checksum.

We transmitted the sample string to SMSC at 7.02.15 Dec. 13 1994, and received the following correct communication:

First, a positive result from SMSC on SMS Message transfer operation (30):

<stx>00/00042/R/30/A//739094960:131294070215/11<etx>

Parameter	Description
`<stx>`	Start character (02 hex) not calculated into the checksum.
`00/`	Transaction reference number (TRN).
`00042/`	Total number of IA5 characters between <stx> and <etx> (LEN).
`R/`	Denotes result (O/R).
`30/`	Operation type (OT).
`A/`	Notification, positive result (ACK).
`/`	Empty parameter since Validity Period has not been modified by SMSC (MVP).
`739094960:131294070215/`	System message with the unique time-stamp for the message (SM).
`11`	Checksum.
`<etx>`	Stop character (03 hex) not calculated into the checksum.

Thereafter 01 Call input operation is received, containing notification 2 (hex-code), from SMSC:

<stx>00/00290/O/01/60123456///3/322047534D2D61626F6E6E656E74656E2030
3730353930303030031207B7220696E746520616E74727B66666261722C206D656E20
6D656464656C616E646574206861722073706172617473206F6368206E796120667C
72737C6B2061747420736B69636B61206D656464656C616E64657420677C72612061
75746F6D617469736B74/82<etx>

Parameter	Description
`<stx>`	Start character (02 hex) not calculated into the checksum.
`00/`	Transaction reference number (TRN).
`00290/`	Total number of IA5 characters between <stx> and <etx> (LEN).
`O/`	Denotes operation (O/R).
`01/`	Operation type (OT).
`60123456/`	Address code, recipient of notification (AdC).
`/`	Empty parameter (Oadc). Indicates address code of originator, when initiated.
`/`	Empty parameter, not applicable (AC).
`3/`	Message type (MT).
322047534D2D61 626F6E6E656E74 656E2030373035 39303030303120 7B7220696E7465 20616E74727B66 666261722C206D 656E206D656464 656C616E646574 20686172207370 6172617473206F 6368206E796120 667C72737C6B20 61747420736B69 636B61206D6564 64656C616E6465 7420677C726120 6175746F6D6174 69736B74/	Alphanumeric (text) message in hex-code containing notification 2 since the recipient is not available.
`82`	Checksum.
`<etx>`	Stop character (03 hex) not calculated into the checksum.

Finally, the originator transmits a 01 Call input operation, positive result to SMSC:

<stx>01/00019/R/01/A//69<etx>

Parameter	Description
<stx>	start character (02 hex) not calculated into the checksum.
01/	Transaction reference number (TRN).
00019/	Total number of IA5 characters between <stx> and <etx> (LEN).
R/	Denotes result (O/R).
01/	Operation type (OT).
A/	Notification, positive result (ACK).
/	Empty parameter since the originator is not sending a system message (SM).
69	Checksum.
<etx>	Stop character (03 hex) not calculated into the checksum.

...end of communication

<stx>01/00019/R/01/A//69<etx>

7 Valid operations for Minicall

UCP as specified by ETSI, consists of a total of 22 operations (ETS 300 133-3:1992). However only certain parts are offered. Users with a send or a receive subscription are allowed to send or receive messages containing up to 400 characters respectively.

UCP for Minicall message consists of 4 operations:

00 Enquiry operation
01 Call input operation
07 Password management
14 Message retrieval

7.1 Description of valid operations, Minicall

All other operations will be responded to by the error code 03 "Operation not supported by system".

7.1.1 Enquiry operation (00)

This operation is used by a calling party to obtain the status of and features related to subscribers.

See list **operational parameters** for parameter description. Results are described in **positive result descriptions** and

negative result descriptions.

7.1.2 Call input operation (01)

This operation is used for call input when no supplementary service is requested.

See list **operational parameters** for parameter description. Results are described in **positive result descriptions** and

negative result descriptions.

7.1.3 Password management operation (07)

This operation is used by subscribers in order to change their access code. The parameter AC is the same as the password. See list **operational parameters** for parameter description. Results are described in **positive result descriptions** and
negative result descriptions.

7.1.4   Message retrieval operation (14)

This operation is used by MS to retrieve stored messages.

See list **operational parameters** for parameter description. Results are described in **positive result descriptions** and

negative result descriptions.

Operational parameters

Parameter	Description
AdC	Address code, recipient (including area code). Indicates to which MS receiver the text message shall be sent.
OAdC	Address code, originator. Indicates from whom the text message has been sent.
AC	Authentication code for sender subscription or for receiver.
LAC	Legitimisation code for special operations.
L1P	New legitimisation code for level 1 priority.
L3P	New legitimisation code for level 3 priority.
LUM	New legitimisation code for urgent message acceptance. (Not supported by Generic Mobile)
MT	Message type. 1 = tone only, 2 = numeric message, 3 = alphanumeric message , 4 = transparent data[8].
Nmsg	Numeric message. The parameter length has a max. of 20 digits.
Amsg	Alphanumeric message. The parameter length is max. 400 characters encoded according to the Conversion table for IA5 characters.
NAC	New Authentication code.
Mno	Message number to be transmitted or the first and last message numbers (i.e. the message interval) to be retrieved.

Positive result descriptions

Parameter	Description
ACK	Positive acknowledgement represented by 'A'.

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[8] Transparent data not supported

| Msg:s | List of parameters. Each parameter consists of 4 items separated by ','. |

| **Msg:s** **MN** | Message number of the retrieved message. |

| **Msg:s** **MT** | Message type. |

| **Msg:s** **SDT** | Stored date and time (DDMMYYhhmm). |

| **Msg:s** **MP** | Message part encoded according to the type of message. |

| **SM** | System message. |

Negative result descriptions

Parameter	Description
NAC	1) Negative acknowledgement represented by 'N'.
EC	Error code see table Error codes applicable to each operation in appendix B.
SM	System message.

Valid operations matrix for Minicall

Parameter	Operations				Comments
	00	01	07	14	
AdC	E	E	E	E	
OAdC	O	O			
AC	O	O	E	E	
MT		E			
NPL					
RAd:s					
A/D					
NAC			E		New AC
LAC					
L1P					
L3P					
Mno				E	
R/T				E	

E = Essential, O = Optional, empty box = not supported.

Positive result

Parameter	Operations				Comments
	00	01	07	14	
ACK	E	E	E	E	
NPL				E	
RAd:s					
Msg:s				O	
Msg:s MN				O	If Msg:s available
Msg:s MT				O	If Msg:s available
Msg:s SDT				O	If Msg:s available
Msg:s MP				O	If Msg:s available
RT		E			
SM			O	O	O	

Negative result

Parameter	Operations			
	00	01	07	14
NAC	E	E	E	E
EC	E	E	E	E
SM	O	O	O	O

7.2   Description of parameters in each valid operation

This example illustrates strings that contain valid operations.

7.2.1   Call input operation (01)

The example string looks like this, when it is transmitted to the Minicall system (the message " Test n " in hex-code):

<stx>01/00044/O/01/0746000000///3/54657374206E/5A<etx>

Parameter	Description
<stx>	Start character (02 hex) not calculated into the checksum.
01/	Transaction reference number (TRN).
00044/	total number of IA5 characters between <stx> and <etx> (LEN).
O/	Denotes operation (O/R).
01/	Operation type (OT).
0746000000/	Address code, recipient (AdC).
3/	Message type. 1= tone only, 2= numeric message, 3= alphanumeric message (MT).
54657374206E/	The message "Test n" translated to hex-code (Amsg).
5A	Checksum
<etx>	Stop character (03 hex) not calculated into the checksum.

Appendix A. Glossary of terms

CEPT	European Conference of Postal and Telecommunications Administrations.
DTMF	*Dual Tone Multifrequency Signaling.* Basis for operation of pushbutton telephone sets. A method of signaling in which a matrix combination of two frequencies, each from a group of four, is used to transmit numerical address information.
ERMES	*EuRopean MEssage System* is a programme sponsored by the Commission of the European Communities for a Pan-European radio(-paging) message system.
ETSI	*European Telecommunications Standards Institute.* The European standards organisation for telecommunication.
GSM	*Global System for Mobile communications.* Originally this abbreviation was used for the Technical Committee responsible to the European Telecommunications Standards Institute (ETSI), which is elaborating the standard.
ISO	*International Organisation for Standardisation.* Technical agency of the United Nations concerned with international standardisation in a broad range of industries. ISO's Open Systems Interconnection (OSI) Reference Model establishes guidelines for network architectures.
Minicall	The name of Generic Mobile's paging system which allows tone, numeric and text paging.
OSI	*Open Systems Interconnection.* ISO's Reference Model for a seven-layer network architecture used for the definition of network protocol standards enabling all OSI-compliant computers or devices to communicate with each other.
PSTN	*Public Switched Telephone Network.* The ordinary telephone network.

SIS   *Subscriber Identification Security number.* A unique security code for each telephone equipment. The authentication procedure between an exchange and a mobile station (at call origination) uses the SIS number.

SME   *Short Message Entity.* An entity which may send or receive messages. The SME may be located in a fixed network, a mobile network or a service centre.

SMS   *Short Message Service.* The name of a GSM service allowing short messages (max. 160 characters) being sent to GSM phones.

SMSC   *Short Message Service Centre.* A node in the GSM network providing the SMS service.

System T   A node in the Minicall network providing the Minicall text service.

UCP   *Universal Computer Protocol.* Part of the European paging standard ERMES (ETS 300 133), provided by ETSI.

Appendix B. Error codes

Error code descriptions

01 Checksum error
02 Syntax error
03 Operation not supported by system
04 Operation not allowed
05 Call barring active
06 AdC not valid
07 Authentication failure
08 Legitimisation code for all calls, failure
09 GA not valid
10 Repetition not allowed
11 Legitimisation code for repetition, failure
12 Priority call not allowed
13 Legitimisation code for priority call, failure
14 Urgent message not allowed
15 Legitimisation code for urgent message, failure
16 Reverse charging not allowed
17 Legitimisation code for reverse charging, failure
18 Deferred delivery not allowed
19 New AC not valid
20 New legitimisation code not valid
21 Standard text not valid
22 Time period not valid
23 Message type not supported by system

24 Message too long

25 Requested standard text not valid
26 Message type not valid for the pager type
27 Message not found in SMSC
30 Subscriber hang-up
31 Fax group not supported
32 Fax message type not supported

Error codes applicable to each operation in SMS

Error Code	Operations		
	01	03	30
01	x	x	x
02	x	x	x
04	x	x	x
05	x	x	x
06	x	x	x
09		x	
10		x	
12		x	
14		x	
16		x	
22		x	x
23	x	x	
24	x	x	x

Error codes applicable to each operation in Minicall

Error Code	Operations			
	00	01	07	14
01	x	x	x	x
02	x	x	x	x
03	x		x	x
04	x		x	x
05		x		
06	x	x	x	x
07	x	x	x	x
08		x		
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19			x	
20				
21				
22				
23				
24	x			
25				
26	x			