Vanguard 3000™
Multicarrier 3G Cellular Router

SMS Interface
PN 009-0000-236 Rev 0
October 2012

REVISION HISTORY

REV	DATE	REVISION DETAILS
0	Oct 2012	Initial Version of P/N 009-0000-236

IMPORTANT NOTICE

Because of the nature of wireless communication, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors), or be totally lost. Significant delays or losses of data are rare when wireless devices such as the Vanguard 3000 are used in a normal manner with a well-constructed network. Vanguard 3000 should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. CalAmp accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using Vanguard 3000, or for the failure of Vanguard 3000 to transmit or receive such data.

DOCUMENT STATEMENT

Every effort is taken to provide accurate, timely product information in this user document. Product updates may result in differences between the information provided herein and the product shipped. The information in this document is subject to change without notice.

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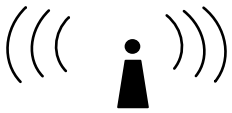
RF EXPOSURE COMPLIANCE REQUIREMENTS



RF Exposure **Please read and understand the important regulatory and safety information contained in the Vanguard 3000 user manual (P/N 001-7300-100) before commissioning Vanguard 3000.**

The manual will state if CalAmp recommends / requires that Vanguard 3000 be professionally installed and that a minimum separation distance between the radiating structure and any person be respected.

TABLE OF CONTENTS

1 DOCUMENT OVERVIEW

For specific details on how to configure the Vanguard 3000, please refer to the Vanguard 3000 user manual (P/N 001-7300-100).

2 Audience

This document can be used as a technical reference for developers using, and system administrators installing, Vanguard 3000.

2.1 ABBREVIATIONS AND ACRONYMS

Acronym	Description
NMEA	National Marine Electronics Association

2.2 REFERENCED DOCUMENTS

ID	Description
1	NMEA 0183 Standard For Interfacing Marine Electronic Devices / Version 2.30 / March 1, 1998

3 Introduction

The Vanguard 3000 has the capability to receive and send SMS messages. This document describes how this feature is implemented.

Note: The current SMS implementation only supports 7-bit data, consisting of a subset of the standard ASCII characters (160 characters max). Future versions may add raw binary 8-bit data (which also may limit payload to 140 characters max).

4 SMS Message Routing

The Vanguard 3000 may have more than one SMS client internally. Unlike IP, SMS messages are not easily routable. (Although SMS does have a UDH (user-data header), the Vanguard 3000 does not make use of this since it makes the sending of messages significantly more complex.)

4.1 SMS MESSAGE PREFIX, OUTGOING

Outgoing SMS messages are directed according to the phone number supplied by the client. The SMS Manager places no restrictions on the contents of the outgoing message body, although a prefix scheme similar to the one used for Incoming messages could be implemented if the customer's Host application needed to receive SMS messages from multiple applications.

4.2 SMS MESSAGE PREFIX, INCOMING

CalAmp's SMS Manager makes use of message prefixes to route incoming messages to client applications. Each client registers a unique prefix string. The SMS Manager inspects all incoming messages for these prefixes and routes the message to the appropriate client.

For example, if the client registers "MY_CLIENT" and the host wishes to send a command "GETSTATUS", it must be sent as follows:

```
MY_CLIENTGETSTATUS
```

Note that the client will receive the complete message, including the prefix.

If a client attempts to register a prefix which is already registered by another client, the request will be refused and an error message will be returned.

Note that a client may at any time re-register using another unique prefix string. In order to un-register, a client must disconnect from the SMS server.

4.3 BLANK PREFIX

A client may register a blank string as the prefix. The client will receive all messages with prefixes not matching any of the other registered client prefix strings. Note that, as with a non-blank prefix, only one client my register a blank prefix.

4.4 RECEIVE ALL MODE

The Receive All Mode allows a client to receive a copy of ALL incoming SMS messages, even those sent to another client. This promiscuous mode overwrites any previous registration made by this client. So, to revert to a normal mode, the client must re-issue the register message.

4.5 PREFIX MATCHING

The SMS Manager performs a case sensitive, longest-first match when determining the proper destination for an incoming message. For example, given the following registrations:

Client A = "CLIENTA"

Client B = "CLIENT"

Client C = "CL"

Client D = ""

Incoming message	Destination
"CLIENTAabcde"	Client A
"CLIENTabcde"	Client B
"CLabcde"	Client C
"Oabcde"	Client D
"ABCDE"	Client D

Figure 1 Example of Routing by Prefix

5 Client Interface

This section describes the SMS client interface.

5.1 TCP

The client connects to the SMS Manager via a TCP socket on port 6290. The socket will not deliver received messages until a prefix string has been registered. If the socket is closed and re-opened, the prefix string must be re-registered.

5.2 CLIENT MESSAGE FORMAT

The format of commands, responses and data messages is loosely based on the NMEA 0183 messages format, using the $P "proprietary" message type with a CalAmp "CAL" vendor identifier.

The SMS client interface uses the following message format:

```
$PCALx[y],<message body>\n
```

where x is a command letter and y is an optional feature to control message responses from the SMS Manager. In the absence of the optional response control character, the manager will default to respond to the command.

All messages are delimited by the first occurrence of a carriage-return (\r, 0x0D) or newline (\n, 0x0A) character. Any trailing characters, such as the \n in a \r\n pair, are (or should be) ignored until the dollar-sign, $, that starts a new message is seen.

5.2.1 Message Length and Concatenated Messages

The SMS Manager can accept message payloads up to 1000 bytes in length. The SMS Manager does not currently support Concatenated SMS, either on transmit or receive. Although it will break up sent messages greater than 160 characters into individual 160-byte messages for transmission, it will not make use of the UDH feature to enable the receiving end to properly reassemble the parts in order.

It is strongly recommended that all messages remain within the 160 character length.

5.2.2 Success or Fail Response Message

In cases where the manager sends a command response to the client, the following is returned:

Command Letter: **R**

Option: NONE

Command Syntax:

```
$PCALR,<response message>\n
```

where the response message is:

+OK (command successful)

-ERR<sp><optional text> (command failed, with possible descriptive text)

5.2.3 Data Message

Use to send outgoing SMS messages or deliver incoming SMS messages to the client.

Command letter: **D**

Option: **X** = Do not respond

(default: Respond with success or failure)

Command syntax, Manager → Client: (SMS message received)

```
$PCALD, <sender's phone number>,<yy-mm-dd>,<hh:mm:ss>,<SMS message text>\n
```

Command syntax, Manager ← Client: (send an SMS message)

```
$PCALD[X], <destination's phone number>,<SMS message text>\n
```

5.2.4 Send Test Message

Use to send a predefined test SMS message.

Command letter: **T**

Option: **X** = Do not respond

(default: Respond with success or failure)

Command syntax, Client → Manager: (send a Test SMS message)

```
$PCALD[X], <destination phone number>,x\n
```

where x is the message number.

Message Number	Message
1	"#\"%&'( )*+,-.!/\n0...9\n:;<=>?\nA...Z\na...z"

Figure 2 Canned Test Messages

5.2.5 Register Prefix Message

After opening a TCP socket to the manager, the client MUST issue this command to register its message prefix string:

Command letter: **P**

Option: **X** = Do not respond

(default: Respond with success or failure)

Command syntax, Client to Manager:

```
$PCALP[X], <prefix string>\n
```

Note that there is no un-register command. A client wishing to do so must first disconnect from the SMS server, then reconnect and issue a new register command.

A client may register a blank prefix (**$PCALP[X],\n)**. The client will therefore receive all unmatched messages.

5.2.6 Receive All Messages

After opening a TCP socket to the manager, the client can issue this command to receive a copy of all incoming SMS messages:

Command letter: **A**

Option: **X** = Do not respond

(default: Respond with success or failure)

Command syntax, Client to Manager:

```
$PCALA[X], \n
```

A client may disable this receiving all messages by registering a prefix (P command).

5.2.7 Status Message

The status message may be used for debugging SMS clients. An application may use it to determine which prefixes are currently registered.

Command letter: **S**

Command syntax, Client to Manager:

```
$PCALS,[<Response Format>]\n
```

Response Format: <TBD>

5.3 SMS MESSAGE TEXT FORMAT

5.3.1 Text Coding

Due to the way in which the cellular carriers perform character translation of standard ASCII characters, users are strongly urged to limit themselves to following character set:

```
!#%&'()*+,-./0...9:;<=>?A...Za...z

SPACE

" (\")

LF (\n)

CR (\r)
```

These characters are guaranteed to arrive at the destination unaltered, even to a mobile device.

5.3.2 Character Translation

Received SMS messages will have escape sequences inserted. Sent messages will be translated as follows:

- Text is sent starting at the first character after the comma, up to and not including a CR or LF, unless the first character is a double-quote.
- If the first character after the comma is a double-quote, then the text will be translated according to the following rules:
    - A small subset of standard escape characters are translated into their ASCII equivalent. (See Figure 3 SMS Escape Sequences)
    - Double-quote must be escaped (\")
    - The message text ends with a trailing double-quote.

Escape Sequence	ASCII out	HEX out
\n	LF	0A
\r	CR	0D
\"	"	22

Figure 3 SMS Escape Sequences

About CalAmp

CalAmp develops and markets wireless communications solutions that deliver data, voice and video for critical networked communications and other applications. CalAmp's two business segments are Wireless DataCom, which serves utility, governmental and enterprise customers, and Satellite, which focuses on the North American Direct Broadcast Satellite (DBS) market. For additional information, please visit the Company's website at www.CalAmp.com.