SMTP Virtual Peripheral Implementation

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1.0   Introduction

This application note describes an implementation of the Simple Mail Transfer Protocol (SMTP) for the Scenix SX communications controller.

SMTP is the protocol most commonly used for sending mail messages across the Internet. It is a client-server protocol, the client usually being a desktop email program and the server is the company or ISP SMTP server. The SX implementation is an SMTP client. This means that it can send email messages to any SMTP server, and thus to any Internet email address.

The SMTP Virtual Peripheral requires the transmission control protocol (TCP) and TCP/IP stack described in application notes AN27 (TCP Virtual Peripheral Implementation) and AN23 (UDP/PPP Virtual Peripheral Implementation).

2.0   SMTP Demonstration

The Simple Mail Transfer Protocol (SMTP) is the standard protocol for sending email to another TCP/IP capable device. It is a text-based protocol designed around a simple command-response language. SMTP is described in RFC 821. The following example illustrates how SMTP works. The commands sent from the SMTP server are in bold, the replies from the SX are in italics:

```
220 smtp2.ihug.co.nz ESMTP Sendmail
8.9.3/8.9.3/Debian/GNU…
HELO CELSIUS.CO.NZ
250 smtp2.ihug.co.nz Hello
p84-max14.akl.ihug.co.nz
MAIL FROM:<SX@CELSIUS.CO.NZ>
250 <SX@CELSIUS.CO.NZ>... Sender ok
RCPT TO:<TEST@CELSIUS.CO.NZ>
250 <TEST@CELSIUS.CO.NZ>... Recipient ok
DATA
354 Enter mail, end with "." on a line by it
self
Subject: Simple SX message
The temperature is now 28 degrees.
.
250 OAA09988 Message accepted for delivery
QUIT
```

The connection is initiated by the client, in this case the SX. Each message from the server starts with a number indicating the status. The text following the number is just for information and is ignored by the SX.

If the SX receives any reply codes that it is not expecting it aborts the transaction. The most common source of error is an SMTP server which will not relay.

The source code contains a simple example which can be enabled or disabled using the ADCDemo define at the top of the file. In this example an email is transmitted when an external analog value exceeds a threshold.

3.0   Implementation

So that the data can be transferred in segments larger than the available RAM, the SMTP implementation uses the event driven architecture described in application note AN27 (TCP/IP Virtual Peripheral Implementation).

Messages from the SMTP server are completely described by the first two digits of the three digit reply code. As each byte is received the AppRxByte routine parses the segment, extracting the first two digits and creating a single BCD byte.

This byte is decoded by the AppPacketOK routine which uses a jump table to decide which message to send in reply. The transmit routines simply use counters to step through each canned packet which is stored in program memory. The `AppTxByte` routine could be easily modified to send data that was generated on the fly rather than stored in program memory (Flash/EEPROM).

It is the RCPT TO field which specifies the recipient of the message. Fields such as the subject and CC line are transmitted within the data of the message, rather than as distinct fields. A period on a line by itself ends the message text.

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4.0   Email Send Demo

The SMTP code contains a simple demonstration application. It can be configured to send an email in two situations: in response to a ping packet, or depending on the value of an external sensor monitored with a A/D converter. The A/D demo is enabled using the ADCDEMO define, otherwise an email will be sent in response to every ping packet.

For the demo the email addresses are stored in the program memory. To change the recipient of the message alter the _SMTPRCPT constant in the code.

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For the latest contact and support information on SX devices, please visit the Scenix Semiconductor website at www.scenix.com. The site contains technical literature, local sales contacts, tech support and many other features.

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