TELECOMS
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SS-68BB

USB MINI BUFFER

User Manual

Revision History

Revision 01	Original document	2004
Revision 02	Cosmetic changes	06 December 2007
Revision 03	Add Appendix A	10 December 2008
Revision 04	Added Installation of USB drivers	08 July 2011
Revision 05	Add reinstallation of USB drivers	21 February 2012

CONTENTS

1. INTRODUCTION

The SS-68 USB Buffer is a call logging buffer that is supplied fitted standard with 128 Kbytes of RAM. Battery backup will allow logging in the event of power failure.

2. FEATURES

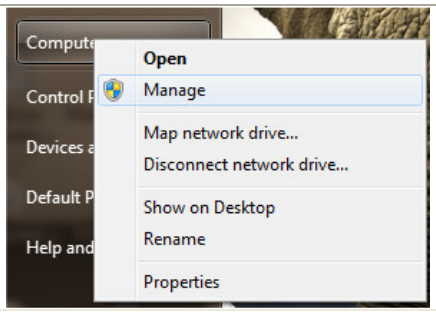
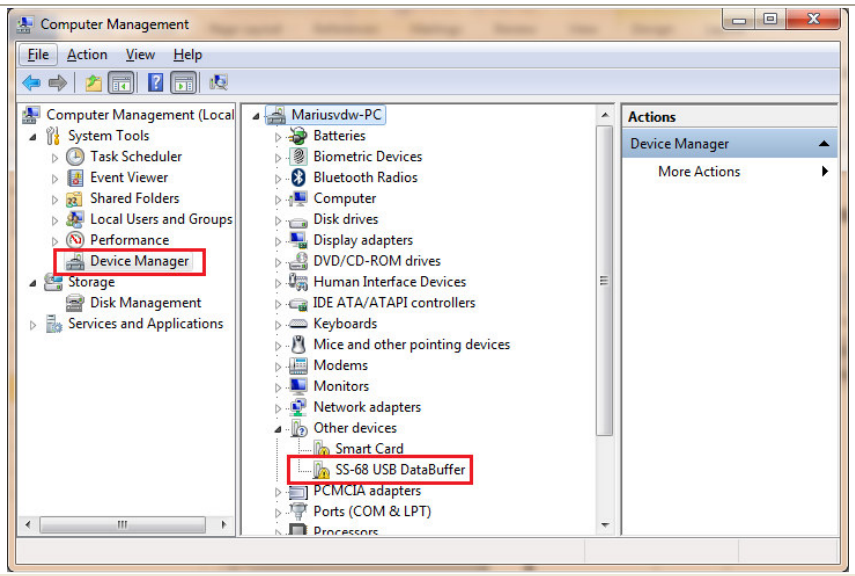
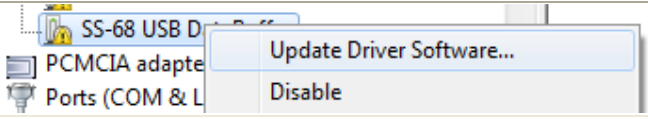
- Line Powered
- PABX connection OPTO-COUPLED
- Battery backed operation
- PABX power used when PC turned off
- Full functionality during battery operation
- Beeper warning when buffer full
- Compact
- Easy installation
- LED buffer status indications

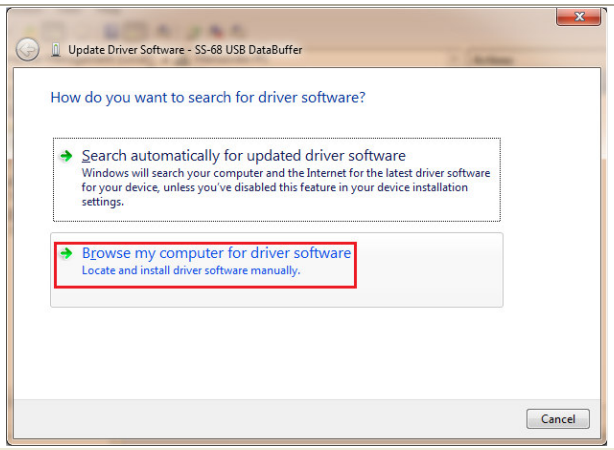
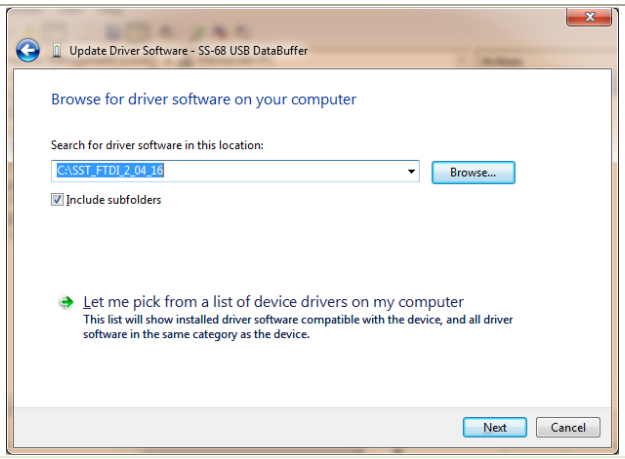
3. CONNECTIONS

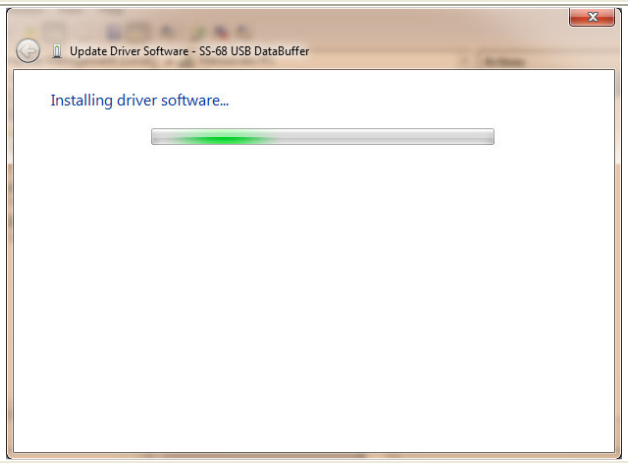
PC Connection
USB PC Connection for programming and collecting of data,

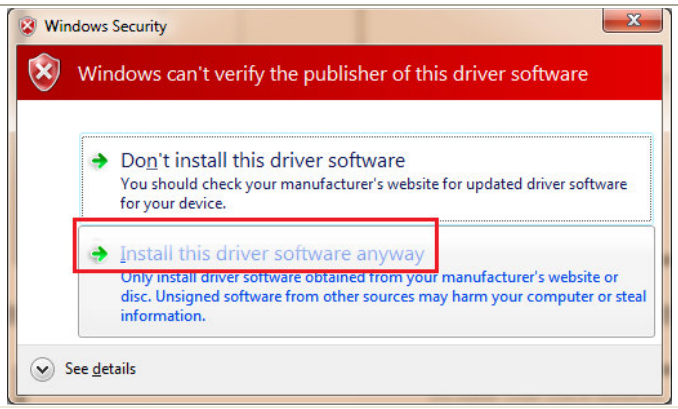
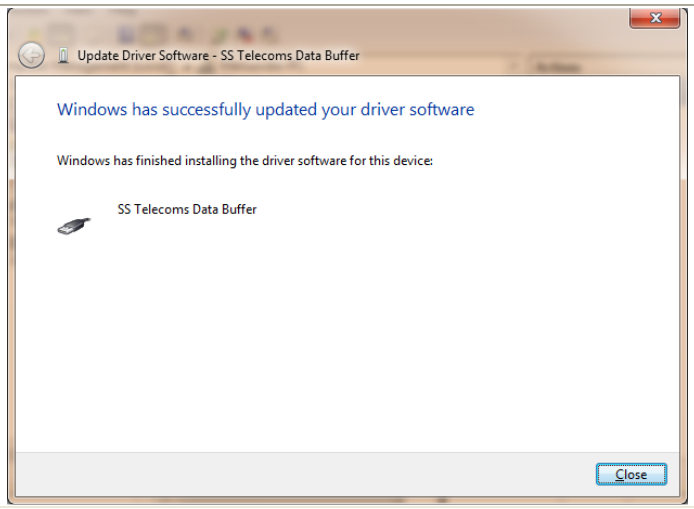
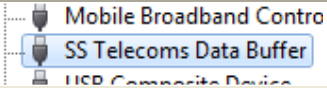

PABX Connection	Pin Number	Pin Description
PABX Connection is by means of a male 9 way 'D' type connector	2	Receive from PABX
	4 & 7	Handshake to PABX
	5	Common 'Ground' signal
	6 & 8	Handshake from PABX

4. INSTALLATION OF USB WINDOWS 7 DRIVES

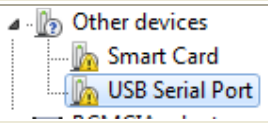
SS-68BB Driver Installation	
Step 1	Connect a USB cable between the PC and the SS-68 BB USB Device.
Step 2	Once the USB cable is connected, windows will try to install the driver. When a window pops up that asks you if you would like to install the drivers go to STEP 6, if not follow the next STEP. If USB cable is plug into a second USB port, reinstall drivers. Go to STEP 6. Note that it will install as a different COM port. **Note:** UAC (User Account Control) must be disabled.
Step 3	On the computer connected to the SS-68, Click on Start then right click on "Computer " and select "Manage". 
Step 4	Select "Device Manager" under Computer Management. 
Step 5	Locate the SS-68 USB Databuffer under "Other devices" and right click and select "Update Driver Software" 

Step 6	The following window appears. Select “Browse my computer for drives”.
	
Step 7	Use the Browse button to locate drivers. Note: The drivers can be downloaded from SS Telecoms web site or given on a CD at special request.
	
Step 8	Select Next and the following window appears indicating that the installation is in progress.

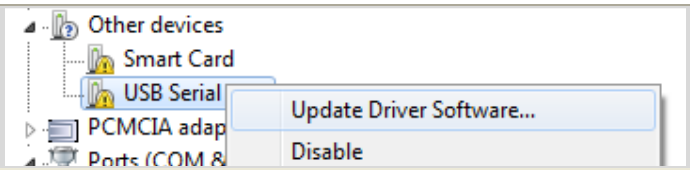


Step 9	When the Windows Security message pops up, choose “Install this driver software anyway”.
	
Step 10	Once the USB driver is installed the following window appears.
	
Step 11	You will notice the SS Telecoms Data Buffer USB device under USB controllers.
	

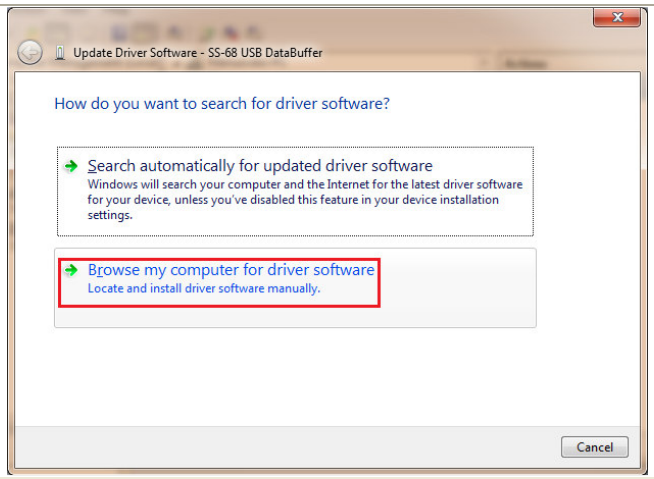
Step 12	Once the USB device is installed, windows will try to install the USB serial driver. When a window pops up that asks you if you would like to install the drivers go to STEP 15 if not follow the next STEP.
Step 13	To get serial communication to the device you need to install the Serial to USB driver. Locate the “USB Serial” under “Other devices”



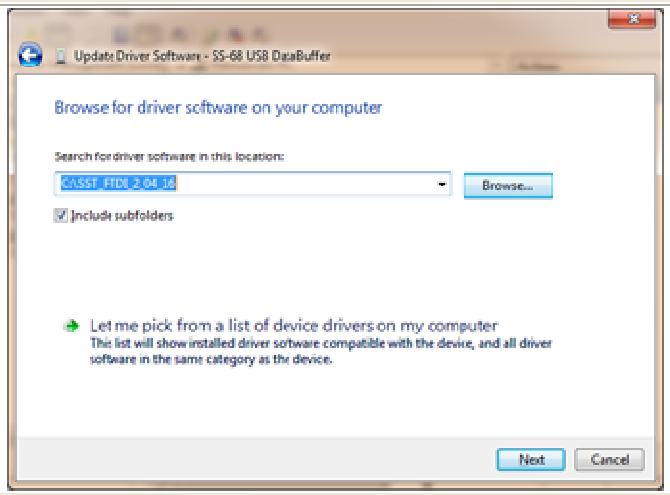
Step 14	Right click and select “Update Driver Software”



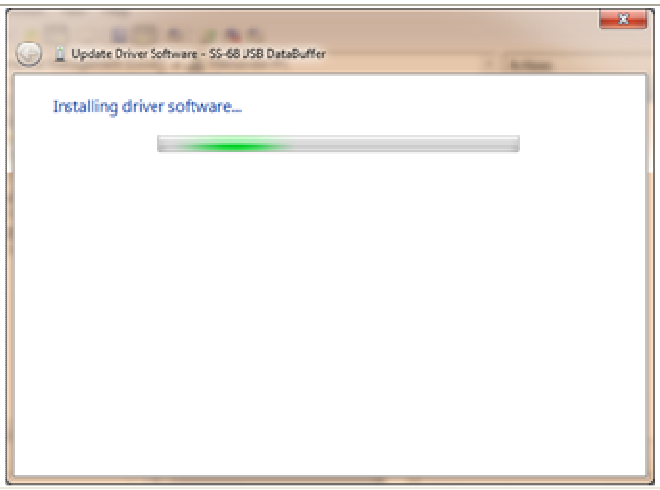
Step 15	The following window appears. Select “Browse my computer for drives”.



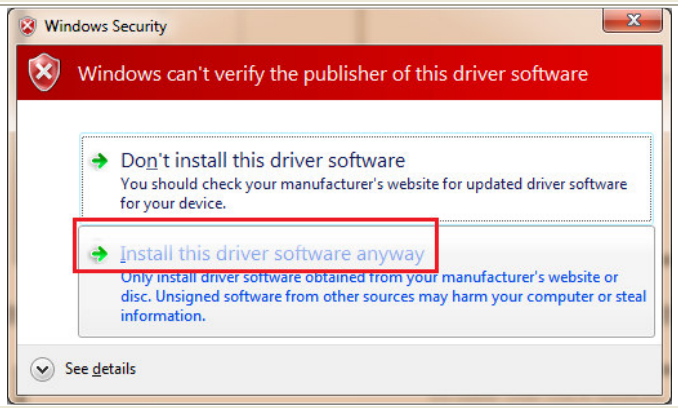
Step 15	Use the Browse button to locate drivers.



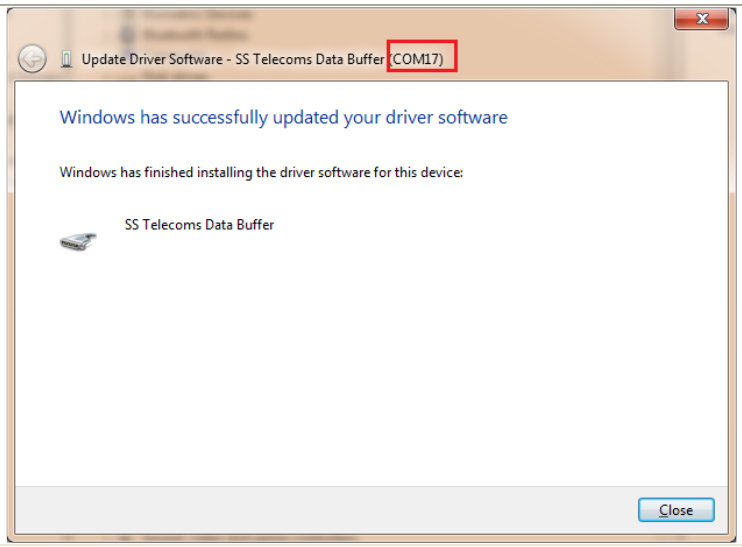
Step 16	Select Next and the following window appears indicating that the installation is in progress.



Step 17	When the Windows Security message pops up, choose “Install this driver software anyway”.



Step 18	Once the USB driver is installed the following window appears. Please make a not note of the COM port number at the top of the page.

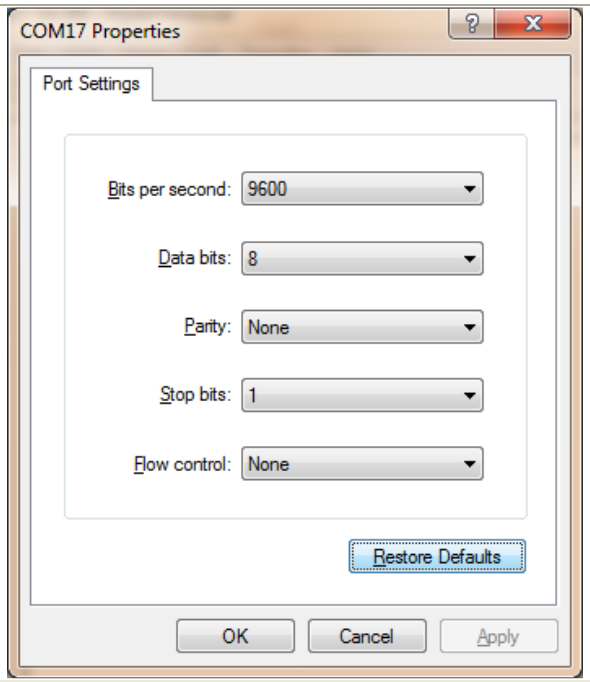


5. CONNECTING TO SS-68 USING HYPERTERMINAL

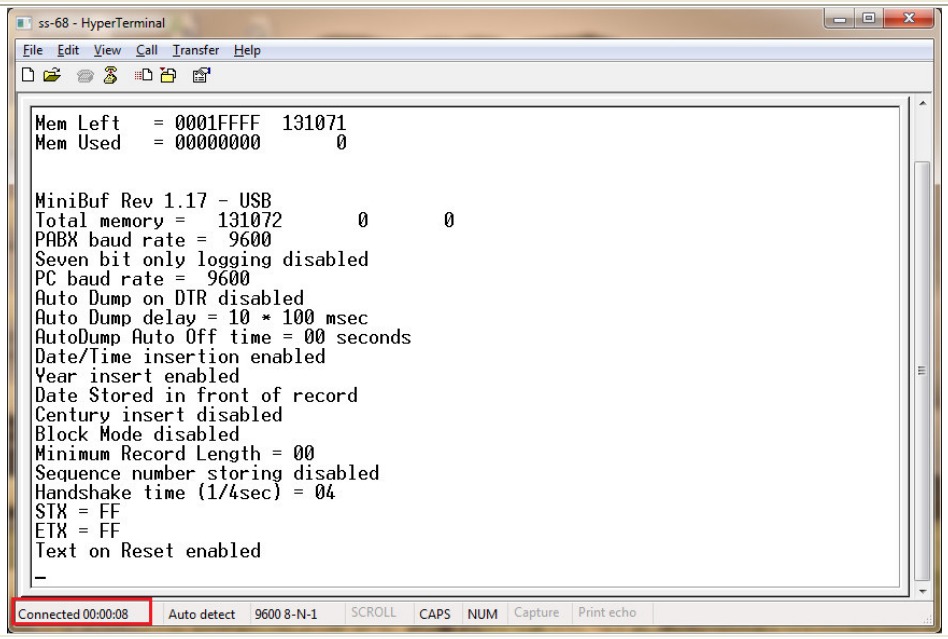
Step 1	Open Hyperterminal and select the Com Port of the SS-68 USB Buffer and click OK. Refer to Section 4 “Installation if USB Drivers “ Step 18

Step 2

Select “Restore Defaults” then click OK



STEP 3	When connected Hyperterminal will show “Connected” at the left bottom corner.



STEP 4	Once connected , you can start sending commands to the unit. Please see Section 6 “Programming Instructions” for a list of commands. Note: Use Upper Case when typing commands.

6. PROGRAMMING INSTRUCTIONS

Instruction	Description
S<enter>	Request a record in ASCII
K<enter>	Request a compressed record
N<enter>	Advance record pointer. (Compressed mode only)
DMP<enter>	Dump all stored data
SC nn<enter>	Set Minimum Record Length. (Default = 0)
S7 n<enter>	7 Bit operation if n = 1. Note: use for 7 bit only operation, do not use for 7 bit with parity.
SB nn<enter>	Set PBX baud rate, where nn represents the first two digits of the baud rate. Max 9600bps
SP nn<enter>	Set PC baud rate, where nn represents the first two digits of the baud rate. Max 28800bps. Note: The new settings will be operational after the buffer is reset.
SD n<enter>	n=1 enable Date/Time insertion n=0 disable Date/Time insertion
YY n<enter>	Store Year if n = 1
YC n<enter>	Store Century if n = 1 and n=1 for YY
T YYMMDDhhmm<enter>	Sets the Time
SA n<enter>	n = 1 Enable AutoDump; n = 0 Disable AutoDump
SAT nn<enter>	Set AutoDump timer to nn*100 milliseconds
CLR<enter>	Clear the memory and reset.
SYS<enter>	Display system information
HI<enter>	Output Product Info, Maximum Memory Capacity, Used Memory and number of lines used.
DR n<enter>	n = 1 Disable text on reset n = 0 Enable text on reset
SQ n<enter>	Enable sequence number storing if n=1
SH nn<enter>	nn = 00 Keep Handshaking on until the buffer is full. (Rev 1.10 and above) nn = 01 to 63 Normal operation were the cycle time is 1 to 63 seconds with a 25% duty factor.
SAO nn<enter>	nn = AutoDump Auto Off Time in seconds When set this will stop response to SA n commands and it will cause the AutoDump mode to be cleared when the handshaking has been off for more than the set time. AutoDump then has to be re-enabled using SA 1.
V<enter>	Display Software Version number
TM<enter>	Do a memory test

7. TECHNICAL SPECIFICATIONS

Housing	Black plastic 130 x 68 x 29 mm
LED indicators	PC Tx & Rx, 80% & 50% buffer full, PABX DATA, Heart beat
Connectors	Connection to PC: 9 way D-type female Connection to PABX: 9 way D-type male
Storage medium	Battery backed RAM buffering
Storage capacity	128K - 4000 call records
Setup storage	Setup data is stored in non-volatile EEPROM
Compatibility	Compatible with most PABX's units
Required voltage	5V to 12V DC from PC handshaking lines
Current consumption	5 mA to 10mA
Battery backup	3.6V 60mA Ni-Cad. Powers unit up to 2 days – Indefinite if PABX supplies power
PABX baud rate	Software settable (Bd) 300, 600., 1200, 2400, 4800, 9600
PC baud rate	Software settable (Bd) 300, 600, 1200, 2400, 4800, 9600,19200
Data storage	Time stamping of call records and events Data compression, typical ratio 2.5:1 Warning beeper at 95% full DTR enabled dumping of records ASCII handshake protocol Fully error corrected proprietary protocol

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APPENDIX A: USING SS—68BB USB AS A SECURITY DONGLE

INTRODUCTION

With the proliferation of software solutions it is becoming commonplace for software to be pirated or used without authorisation.
A fairly standard solution is to provide a 'dongle' (hardware device) that attaches to the PC and the software will not run if the device is not present. This obvious lock is often a source of irritation to the end user.
A more elegant solution is to provide a 'useful' device that acts as the security dongle. The data buffer is an obvious candidate for the task where a Telephone Management System is the application.
SS Telecoms have developed a simple protocol that will allow software to verify that it is attached to a matching buffer.

DISCUSSION ON SECURITY ISSUES

There is a simple level of security provided by having a data buffer in the first place. Pitfalls can be identified such as
Another hardware manufacturer can develop a buffer with a similar protocol. This means that it will be possible to hijack the software package by using these alternate buffers
Another software vendor can adapt his software to work with the buffers and thus take over the installed base of buffers allowing this vendor a much cheaper entry to this customer than the original vendor
Solution to issues
The basic solution to the problems outlined above has already needed addressing in the GSM arena. Authentication of users is vital to ensure that billing is accurate, for example. How do they do this? It is done using a system known as 'Challenge / Response' authentication. This will be outlined briefly below.

Challenge Response Description
The PC software and the Buffer have both loaded with a secret key. This key can be up to 16 characters
The PC sends the buffer a challenge consisting of a short randomly generated message of up to 10 characters.
The Buffer performs a 'hashing' function on this message using the secret key as part of the process. It is not possible using a small number of messages to determine what the key is.
The buffer then sends the result of the 'hashing' function to the PC.
The PC then compares this to the result of internally generating the 'hash' result
If the results match, then the buffer is authenticated and the software will run.

IMPLEMENTATION

Setting the key
Use the command '~ nnkk<enter>' where '~' is the tilde character, followed by a space character and then the 2 digit hexadecimal offset ('nn') for the key character which is also sent hexadecimal ('kk') and <enter> is the Carriage Return character 0x0D. The sequence to set the secret code to 'TEST' is shown below:
~ 0054
~ 0145
~ 0253
~ 0354

The process has been automated and the code can be set and tested using the 'Buffer Lock' tool.

Challenging the buffer

The command to challenge the buffer is: 'CODErrr..rrr<enter>' where 'CODE' is the command, 'rrr..rrr' is the random challenge string up to 10 characters in length and <enter> is the Carriage Return character 0x0D.

Buffer response

The buffer will respond with the following:
CODE: hhhh<enter>
Where 'CODE: ' is the response text and 'hhhh' is a 16 bit CRC for the submitted challenge and the secret key.

Response validation

In the code below the variable CRC is a 16 bit unsigned integer and char is 8 bit. CmdBuf is the input buffer where the string starting with 'CODE: ' is stored and CmdPtr indexes the 1st 'h'.

```
void CalcCrc(unsigned char ser_data)
{
crc  = (unsigned char)(crc >> 8) | (crc << 8);
crc ^= ser_data;
crc ^= (unsigned char)(crc & 0xff) >> 4;
crc ^= (crc << 8) << 4;
crc ^= ((crc & 0xff) << 4) << 1;
crc &= 0xFFFF;
}

void mfCode(void)
{
char * p = &CmdBuf[CmdPtr];
int retCrc = HexToInt(p,4);//convert the hex data to int
crc = 0xFFFF;               //initialise the crc
//======== do the calculation on the challenge =============
for (unsigned int i = 0; i < strlen(test); i++)
{
      CalcCrc(test[i]);
}
//======== do the calculation on the UserKey   =============
for (int i = 0; i < strlen(SecretKey); i++)
{
      CalcCrc(SecretKry[i]);
}
//==== crc should be equal to retCrc if all is well ==========
}
```