☰scannexⅢ

ModemBuffer Quick Start

Line   Power

modem**buffer**

○ Connected
○ Activity

○ Data
○ Status

Serial Port
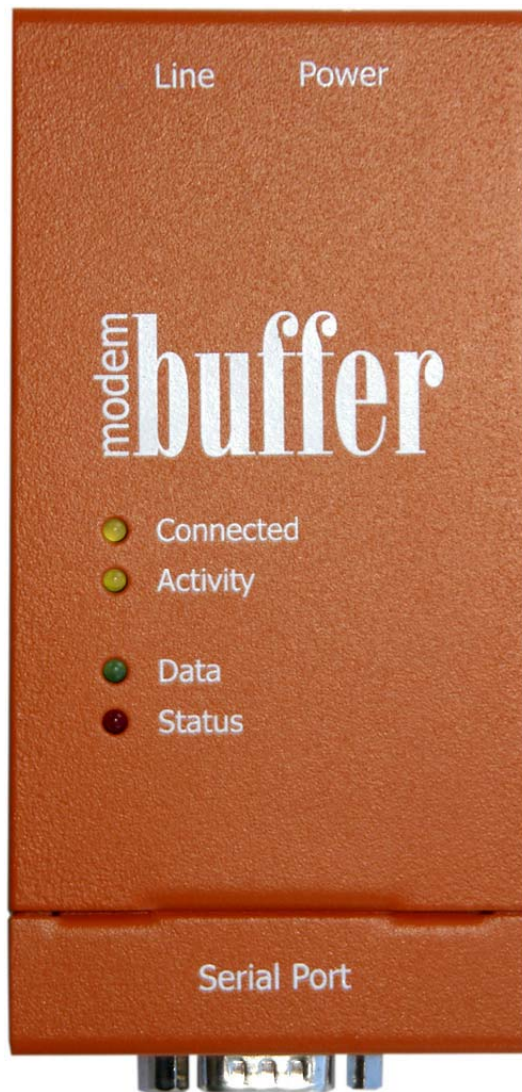
Preliminary 19th December 2003

Safety Warnings

For North America and Canada use this product only with the provided UL-Listed and CUL-Listed NEC Class II power supply. Elsewhere use this product only with the provided power supply evaluated to Limited Power Source (LPS)

- Never install phone wiring during a lightning storm
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations
- Never touch uninsulated phone wires or terminals unless the phone line has been disconnected at the network interface
- Use caution when installing or modifying phone lines
- Avoid contact with the ModemBuffer or ancillary equipment during an electrical storm; there is a risk of electrical shock
- Do not use the equipment in the vicinity of a gas leak
- To reduce risk of fire, use only 26AWG or larger telephone line cord
- Avoid contact with liquids and do not use if suspected damp
- Do not open the unit, no user serviceable parts inside
- Use indoors only

Note: Use of a DC power supply other than the one supplied with the ModemBuffer voids the warranty and can damage the ModemBuffer.

A note about Power Connection, Surge Protectors, and lightning.

Power surges on power lines, such as those caused by lightning strikes, can destroy or damage the ModemBuffer. Therefore, we recommend that the DC Power supply and telephone line interfaces are connected via surge protectors.

Deutsch

Diese Endeinrichtung ist in Konformität EMC-Richtlinien 89/336/EEC und 93/68/EEC

Diese Modem-Karte ist als Endeinrichtung vorgesehen und muss an ein TAE mit F-Kodierung angeschlossen warden

Sicherheitshinweise

- Benutzen Sie dieses Produkt nur mit dem zur Verfügung gestellten Netzgerät, das zu begrenzter Energiequelle (LPS) ausgewertet wird
- Telefonleitungen niemals während Gewittern verlegen.
- Telefonbuchsen nicht in Naßbereichen installieren, es sei denn, die Buchse ist dafür speziell geeignet.
- unisolierte Telefondrähte und Klemmen niemals anfassen, wenn sie am Verteiler angeschlossen sind.
- Beim Verlegen oder Ändern von Telefonleitungen vorsichtig vorgehen.
- Während Gewittern nicht telefonieren (ausgenommen schnurlose Telefone). Es besteht ein geringes Risiko eines Blitzschlages.
- Bei austretendem Gas kein Telefon in der Nähe der Austrittsstelle benutzen.
- Um die Gefahr des Feuers zu verringern, benutzen Sie 26 AWG oder größeres Telephonleitung kabel
- Vermeiden Kontakt mit Flüssigkefiten
- Öffnen Sie nicht die Maßeinheit
- Nicht im Freien verwenden

Introduction

The ModemBuffer provides the same set of delivery options as the NetBuffer, but across a PPP connected link. As with the NetBuffer the ModemBuffer can be programmed to dial out to either the internet or into a private RAS server and deliver email or TCP data.

An extension has been added to the TCP2 options to allow timed and percentage full pushing. Also, there is an option to just send the data that is in the flash memory then close the TCP socket. This is especially helpful in remote systems.

For additional security, there is a unique mode called "RADiO" - **R**ing **A**nd **Di**al **O**ut". In this mode the ModemBuffer will *never* answer the phone. If an incoming call makes the line ring, the ModemBuffer will wait until the ringing stops, pause a random time (between 8 and 15 seconds) then dial out to the RADiO number and log in. This mode gives no indication to possible hackers that there is a even device there.

The TCP sockets are also automatically firewalled when dialling out to provide further protection. Listening sockets, such as FTP, engineer access, and TCP2 listen, are only active when connected to a "trusted" site. That is when a PC dials in, or when the ModemBuffer dials out to the RADiO site.

There are three sets of telephone numbers: a primary dial out, a secondary dial out, and the RADiO number. There are four sets of username/password authentications: dial-in, primary and secondary dial out, and RADiO.

Unlike most modem connected devices, the ModemBuffer will automatically obtain it IP address from the other PPP side. When the ModemBuffer dials out, it normally will be given its IP (for instance, when you dial through an ISP). However, when dialling into the ModemBuffer it will assume the next IP address up from the other side, unless the other side provides a specific address.

Under Linux you can specify the IP address for each side of the link, but under Windows you can only specify the PC side. In this case, or when Linux is set to automatic IP, having the ModemBuffer assume its IP is very useful. You can change the dial out IP assignments at the PC end without having to reconfigure the ModemBuffer.

Unlike the NetBuffer, there is no web server. All configuration options and diagnostic features are performed through a telnet session on port 6024. For further diagnostic and debugging, a serial port access can be activated.

LED flashings

Data

Data solid = Data stored

Data blinking = Data arriving

Status

These may change...

Status on solid = Source not connected, destination not connected

Status blinking on every two seconds = Destination not connected, source ok

Status blinking off every two seconds = Source not connected, destination connected

Status off = Source connected, destination connected

On Boot

Rapid blink on Status + Data = scanning flash memory

Rapid blink on Status = erasing flash memory

Special

Alternate flashes on Data and Status = Debug serial mode

Modem

Alternate flashes on Connected and Activity = Ringing in RADiO mode. Waiting for the ringing to stop.

Connected and Activity blinking together = Ringing and answering

Connect off, Activity solid = Dialling out

Connect solid, Activity off = Modems connected (but not PPP)

Connect solid, Activity solid = Connected and established PPP

Connect blink off = data from the remote end is being output to the serial port (during connected)

Activity blink off = data from the flash memory is being sent to the remote end (during connected)

Note: While the modem is in the idle state, the Connect and Activity LEDs blink on for 500ms every 8 seconds.

Entering Debug Mode

- Power up the ModemBuffer.

- Connect a straight-through cable from a PC to the serial port (with just a gender changer).

- Run a terminal up at 115200 baud (such as Hyper Terminal or TeraTerm Pro)

- Wait for the LEDs to stabilise.

- Short the two pins on the programming connector:

```
              .-----------.
Serial Port < | o o o o o | > Telephone Line
              | o o o o o |
              |___.    .___|
```
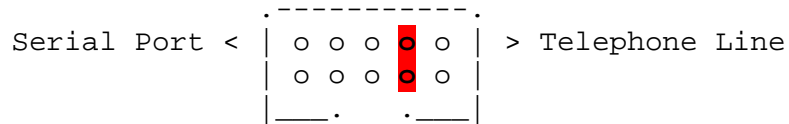
- The Data and Status LEDs should blink alternately

- You should see a prompt message "<ModemBuffer-MB123456>" appear. If not, press Return.

You can quit the debug mode by rebooting the ModemBuffer, or typing "BYE", "EXIT", or "QUIT" in the terminal. The debug mode will time out after 5 minutes of inactivity. The LEDs will revert back to their standard behaviour.

To reset all parameters, enter the command:

```
_SETDEFAULTS [return]
```
The ModemBuffer will reset its parameter list and reboot.

Terminal and Debug Commands

The terminal commands are the same whether connected through the debug serial mode, or via telnet across a dial up link. A few commands can only be performed through the debug serial link.

Live debug notifications

In addition, the debug serial link will show live events from various subsections of the code:

```
M:     Modem
P:     PPP layer
PAP:   PPP/PAP authentication layer
T:     TCP
E:     Email
F:     FTP
```

Commands

?	Show a help page
AUTOBAUD	Force the autobauding to start
BYE	Quit the terminal or debug mode
CMF	Clear memory status flags
DIAG	Show diagnostic information about the sockets, application, memory, etc
DIAL	Dial out to the RADiO number (if programmed)
DIAL1	Dial out to Telephone 1 (if programmed)
DIAL2	Dial out to Telephone 2 (if programmed)
DOR	Dial Out Reset - resets the flags and timers used for dial-out delivery.
EMAIL	Start the email process. It will start the dial out process if not already online. Useful for debugging.
EXIT	Quit the terminal or debug mode.
HANGUP	Hangup the connection.
HELP	Show a help page
K2	Kill the TCP2 socket.
KF	Kill the FTP connection.
KL	Kill the live engineer access socket.
LIVE	Activate the engineer access socket on port 87, inbound.
QUIT	Quit the terminal or debug mode.
REBOOT	Reboot the ModemBuffer (this will hangup the connection and reset the terminal or debug mode).
RTS=nnn	Pulse the RTS output line for nnn x 50ms.

_SETDEFAULTS   Reset all parameters to factory defaults.

WIPE   Request to wipe all data. You must then type the WIPE=nnnnn as displayed in response to perform the erase.

R?   Query all registers

R??   Query all registers with descriptions

I?   Query all info registers

I??   Query all info register with descriptions

Rnnn?   Report the value of register nnn

Rnnn??   Report the value and description of register nnn

Innn?   Report the value of info register nnn

Innn??   Report the value of info register nnn

Rnnn=xxx   Set register nnn to integer value xxx

Rnnn="sss"   Set register nnn to string sss

Register Listing

Default settings are shown in italic with a grey background.

Read/Write Registers

r100   ModemBuffer Name

"MB000000", 16 character string

The textual name of the device. This also forms part of the email from address.

r101   Terminal password

"secret", 16 character string

The password required to access the terminal from the modem (the ModemBuffer does not ask for a password in the debug serial mode).

r112   Primary DNS

0.0.0.0

Leave this value at zero to use the address given by PPP. You should only need to set this under special circumstances.

r113   Secondary DNS

0.0.0.0

Leave this value at zero to use the address given by PPP. You should only need to set this under special circumstances.

r119   Modem country code

B5

Sets the socket modem country code. This is applied on boot up only. The actual code needed depends on the modem model (see i908) and the required country. For i908= "P2109-V34", the setting of "B5" covers most countries.

See the Appendix C for applicable country codes.

r120   Modem Initialisation String

""

If blank, the string "ATZ" is sent to the modem. To output other, more complex, strings you can use the C-style "\x**nn**" where **nn** is a two digit hex value.

e.g. "ATS32=0\x0d"

r121   CHAP only

1

For incoming, answered calls, should only CHAP/MD5 be negotiated? If one then PAP, which sends the username and password 'in the clear' will not be negotiated. In this case, if the calling system cannot or will not support CHAP/MD5 the connection is dropped.

If zero, then CHAP is requested first. If the client will not accept CHAP, then PAP will be used.

r122   Answer time limit

60 seconds

The time, in seconds, to wait for the carrier signal when answering. If the carrier is not detected in this time, the ModemBuffer resets the modem and reverts to the idle state.

r123   Connect time limit

60 seconds

The time, in seconds, to wait for the carrier signal when dialling out. If the carrier is not detected in this time, the ModemBuffer resets the modem and reverts to the idle state.

r124   Redial interval time

240 seconds

The time to pause after an unsuccessful dial out.

r125   Redial retry limit

5 times

The number of times to try dialling out before holding off. (see r124 and r126)

r126   Redial holdoff time

1800 seconds (30 minutes)

The time, in seconds, to pause after trying to dial out r125 times. The sequence is:

```
WHILE forever
 FOR i FROM 1 to r125
  DIAL r140 or r150, TIMEOUT r123
  IF success QUIT
  WAIT r124
 NEXT i
 WAIT r126
ENDWHILE
```

r127   Idle timeout

240 seconds (3 minutes)

If no 'real' traffic is passed across the modem during this time, the connection is dropped.

r130   Dial-in Username

"user"

The username for in bound connections.

Note that this will not be used if the RADiO telephone number (r160) is set.

r131   Dial-in Password

"password"

The password for in bound connections.

Note that this will not be used if the RADiO telephone number (r160) is set.

r140   Primary Telephone Number

" "

The primary telephone used for dialling out - for email and TCP2 pushed delivery. Prefix the number with "T" to use tone dialling, e.g. "T01273123456".

r141   Primary Username

"user"

The username for the primary dial up connection.

r142   Primary Password

"password"

The password for the primary dial up connection.

r150   Secondary Telephone Number

" "

The secondary telephone number for dialling out - for email and TCP2 pushed delivery.

r151   Secondary Username

"user"

The username for the secondary dial up connection.

r152   Secondary Password

"password"

The password for the secondary dial up connection.

r160   RADiO Telephone Number

" "

The telephone number for RADiO (Ring And Dialout Only).

r161   RADiO Username

"user"

The username for the RADiO dial out.

r162   RADiO Password

"password"

The password for the RADiO dial out.

r200   Encryption Level

0

Sets the encryption level.

0 = None

1 = Authenticate only

2 = Authenticate and encrypt data

Requires the encryption key to be set (r201).

r201   Encryption Key

"123456789abcdef0"

The encryption key, or private secret, that forms the basis for encryption and authentication. The key may be up to 24-hex-digits long (4x24 = 96bits).

This value is **write-only** (for obvious reasons).

r210   Delivery Mode

"F"

Sets the delivery mode:

"F" = FTP server

"E" = Email data delivery

"T" = TCP2 delivery

r211   Datapause

0

Sets the number of 50ms counts before 'sealing' the incoming data for delivery.

r212   Bidirectional

0

0 = input only, 1 = bidirectional

Specifies whether it is possible to output to the serial port.

r213   ASCII/Binary

1

0 = ASCII only, 1 = Binary

If set to 0, the top bit of data is stripped, logging only 7 bits of ASCII data.

r214   Forced Linear

0

0 = circular, 1 = forced linear.

Decides what happens when the memory becomes full. When 1, forced linear, the ModemBuffer will always lose new data when the destination/delivery channel is not open. When 0, circular, the ModemBuffer will lose the oldest data if the delivery channel is not open.

Note that when the delivery channel is open, the memory mode is always linear.

r220   TCP2 Address

""

Enter an IP address, or a name.

Leave blank to allow any inbound access. Access is only allowed when using RADiO or dial-in.

Prefix with a # character to limit incoming IP address.

Only used when r210 = "T"

r221   TCP2 Port

0

Enter a valid port when using the "T" delivery mode (r210).

r222   TCP2 Deliver Memory Limit

0 percent

Enter a percentage limit. If the delivery mode is "T" (r210), and this memory limit is exceeded, the ModemBuffer will dial out and attempt to deliver the data.

Zero disables the feature.

r223   TCP2 Deliver When

0 minutes

The number of minutes between attempts to dial out and deliver data by TCP. If there is no data to deliver, the ModemBuffer will not dial out.

This is only applicable if the delivery mode is "T" (r210).

Zero disables the feature.

r224   TCP2 Continuous

0

Specifies how much data is delivered when TCP2 connects.

0 = only deliver what is "frozen" when TCP2 connects. The ModemBuffer closes the TCP socket when that frozen data has been delivered.

1 = continuous delivery. New data will be presented to TCP2 as it arrives (after the Datapause, r211).

r230   Serial Receive pin

0

0 = Auto sense pin

2 = Receive data on pin 2 only

3 = Receive data on pin 3 only

r231   Serial Baud rate

19200

Available baud rates are: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200.

r232   Serial Protocol

"7E"

Available protocols are "7E", "7O", "8N", "8E", and "8O".

r233   Serial Autobaud enabled

1

0 = autobauding disabled

1 = autobauding enabled

r300   FTP Port

21

The port number for the FTP server.

r301   FTP Username

"user"

The username for validating FTP access.

r302   FTP Password

"password"

The password for validating FTP access.

r303   FTP/Email filename

"download.dat"

The data filename used for FTP collection and email delivery.

r330   SMTP Server

""

The IP address, or name, of the SMTP server to send emails to.

r331   SMTP Port

25

The port number for the SMTP service. When bridging across some ISPs they snaffle all SMTP/port25 traffic. In order to push email traffic directly into a central office SMTP machine, you will need to set your server to a different port (such as 20025) and set this value.

r332   SMTP Domain

" "

The domain that is used to log onto the SMTP server, as well as the domain part of the email-from address.

e.g. "test.scannex.co.uk"

r333   SMTP Username

" "

For SMTP servers that require authentication, this is the username.

r334   SMPT Password

" "

For SMTP servers that require authentication, this is the password.

r335   Email to

" "

The full email address to send the alerts, and data.

r336   Limit Email Size

0 kbytes

The maximum amount of data to send attached to one email. If there is more data to send, the ModemBuffer will keep sending emails until the whole data has been output.

r337   Append ID

1

0 = Do not append ID to the filename.

1 = Append an eight digit hex extension to the filename.

This is only applicable when data is sent with the email (i.e. when r210 = "E")

r350   Email every

0 minutes

The time interval to send email alerts/data.

r351 …if data

0

0 = Always send an email on the "every" interval (r350).

1 = Only send an email if there is data.

r352 Email when

0 percent

0 = disabled

1 = When any data arrives

2-100 = Send an email alert/data when the memory becomes that full.

r353 Email when quiet

0 minutes

If there has been no data received within n-minutes, an email is sent.

r354 Email critical events

1

0 = Don't email on critical events

1 = Email on critical events.

Critical events are: power-up, data source disconnected, data source reconnected.

Read Only Registers

i900 Parameter list version

"0.10"

i901 Serial Number

The unique serial number of the ModemBuffer.

i902 Firmware version

The date and level of firmware.

i903 Manufacture date

When the device was manufactured.

i904 Device name

Read only version of r100.

i908 Modem Model Number

Identifies the internal socket modem. ("P2109-V34" or "CX81802-V34")

i909 Modem Country Code

Reports the country code as reported by the modem (two digit hex).

i910   Input millivolts

An indication of the state of the input power (note: this value may fluctuate).

i911   Reboot count

Number of times rebooted correctly.

i912   Brown out count

Number of times power blipped out.

i913   Trap count

Number of time the firmware was unexpectedly reset.

i914   Event log

Shows the last 16 events, in reverse chorological order.

r = rebooted

b = brownout

t = crash

T = severe crash

i920   Encryption Enabled

"" = no encryption

"Authenticated" = authenticated only, with plain text data

"Encrypted" = authenticated and encrypted

i930   Total Bytes

The total capacity of the ModemBuffer.

i931   User Bytes

The number of used bytes.

i932   Frozen Bytes

The number of bytes frozen, or locked, to go out to the destination.

i933   Memory Status

Text string containing any of the following strings:

L = Linear

C = Circular

W = Wrapped

O = Overfull

i940   Time since data

The time since data was received, in the form D-HH:MM:SS

i941   Time alive

The time since power up, in the form D-HH:MM:SS

i942   Time to deliver

The time to deliver an email, in the form D-HH:MM:SS

i950   Serial port status

"Okay"

"Autobauding" = currently finding baud rate and protocol

"*UNPLUGGED*" = no receive pin sensed

"*Handshake off*" = plugged in, but handshake lines indicate busy.

i951   Receive pin

The pin to receive on: 0, 2, 3, ?

? = both

i952   Detected receive pin

0 = open

1 = receiving on pin 2

2 = receiving on pin 3

? = data appears to be on both 2 and 3

i953   DSR line status

0 = unasserted/error

1 = asserted/okay

i954   CTS line status

0 = unasserted/error

1 = asserted/okay

i955   Autobauding

1 = currently autobauding

i956   Baud rate

i957   Protocol

i960   TCP2 Active

1 = TCP2 connected and live

i961   TCP2 Actual IP

The IP address of the remote end.

i962   TCP2 Actual Port

The port number of the remote end.

i963   TCP2 Encryption State

Blank = none

"Both" = encryption both ways

"Out" = output only encryption

"In" = input only encryption

"Error" = configuration error or secret mismatch

i970   Live mode active

1 = Engineer live mode active

i971   FTP in use

1 = FTP is being used by a client

i972   SMTP active

1 = an email is being sent.

i973   SMTP Server Used

The IP address of the email server last used, or currently being used.

Useful in checking DNS resolutions for email server.

i974   SMTP Last Error

The SMTP error code last received from the server. RFC codes apply, except 529 = no socket error. 250 = okay.

i975   SMTP Last Stage

The description of the last stage the ModemBuffer got to in sending an email.

i980   Local IP

The IP address of the ModemBuffer while online.

i981   Remote IP

The IP address of the remote PPP connection while online.

i982   Primary DNS

The IP address of the DNS server while online.

i983   Secondary DNS

The IP address of the DNS server while online.

i990   Last Dial Out state

Records the highest state for a dialout. The value is a 4-digit hex value with the following meaning:

```
1---   Telephone 1 used
2---   Telephone 2 used
3---   RADiO used

-1--   Waiting
-2--   Modem connected
-3--   PPP:LCP was negotiated
-4--   PPP:PAP/CHAP was negotiated
-5--   PPP:IPCP was negotiated
```

For example, if the figure shown was 3300 it indicates that the RADiO number was dialled, the modems connected at the data level, and that PPP's LCP layer was successfully negotiated. Consequently, it shows that the PAP/CHAP layer did *not* negotiate, and probably the wrong username and/or password was used.

i991   Last Dial In state

The last state when a dial in was initiated. (See i990 for details)

i3001   SMTP bytes sent

i3002   SMTP subject flags

i3003   SMTP "Next Part"

i3004   SMTP ID

The next ID number. It is possible to write to r3004 to set the value (e.g. r3004="1234abcd"

Automatic Firewall

The ModemBuffer has been coded to provide strong firewall facilities while on-line. The rules take the stand that Dial-in and RADiO are considered "trusted", while Telephone 1 and Telephone 2 are "untrusted" (because Telephone 1 & 2 are general over a third-party ISP, whereas dial-in and RADiO are between known machines).

- The Email socket will only be opened only when connected to Telephone1 or Telephone2.
- The FTP, and Terminal sockets are enabled only when Dialled-in or RADiO connected. (Both are listening sockets.)
- If r223 or r224 are non-zero (TCP2 push is enabled), the TCP2 socket will only be opened when connected to Telephone1 or Telephone2. In addition, anonymous listens are not allowed. It is most practical to set a specific IP or name in r220.
- If r223 and r224 are zero, the TCP2 socket will only be opened when Dialled-in or RADiO connected. Anonymous listen is permitted, as are specific listens and specific opens.

Step-by-step Guide

Instructions: follow this guide to decide which registers need setting up for your particular application.

Modem

1. If the ModemBuffer will be connected to a PSTN (ie public telephone network), which country will it be in?

    a. Query **i908** to find the modem model

    b. Use Appendix C and register **r119** to specify the modem's characteristics.

    c. To check, reboot the ModemBuffer and query **i909** to check whether the modem accepted the r119 value.

2. When I call the ModemBuffer, do I want it ultra-secure?

    a. No - I am happy for the ModemBuffer to answer the calls (or RADiO is not appropriate)

        i. Adjust **r122** to specify the time limit to answer (or use the default)

        ii. Set **r130** and **r131** to specify the username and password that will be required to dial into the ModemBuffer.

        iii. Set **r121** - CHAP only. If all your calling systems can support CHAP (which is highly likely), set this to **r121=1**

        iv. Enter a terminal password in **r101** to restrict administration activity. A system may need to dial in to collect data, but should be prevented from making changes to the ModemBuffer setup.

    b. Yes - I want to use RADiO mode and will have the ModemBuffer(s) call-back into one central place.

        i. Adjust **r123** to specify the time limit to connect into your system (or use the default).

        ii. Enter the telephone number **r160** (e.g. "T01273123456") The telephone number should be a permanent one, otherwise you will have problems contacting the ModemBuffer if it changes!

        iii. Enter the username and password you want the ModemBuffer to use when it connects into your system. Put these in **r161** and **r162**.

        iv. You may wish to enter a terminal password in **r101** (or clear this if everything is managed from the RADiO location).

3. Will the ModemBuffer be sending email alerts, email data, or pushing TCP2 traffic on percentage full or timed?

    a. Yes - I need the ModemBuffer to be able to call into a managed system, or across an ISP

        i. Adjust **r123** to specify the time limit to connect into your system (or use the default).

        ii. Adjust registers **r124** (interval time), **r125** (retry limit), and **r126** (long hold off time) to control the behaviour of retries when a dial out fails.

        iii. Enter the primary telephone number in **r140**.

        iv. Enter the primary username and password in **r141** and **r142**.

        v. Do you need to use a backup ISP or location?

            1. Yes - enter it's number in **r150**, and the username and password in **r151** and **r152**

            2. No - clear **r150** so it is not used.

    b. No - I only want to call into the ModemBuffer or have it use RADiO mode.

        i. Clear registers **r140** and **r150** so it cannot dial out.

        ii. You can choose to clear **r141**, **r142**, **r151**, and **r152** or leave them with standard username/passwords (if you use standard ISPs for example).

Privacy and Security

4. Do I require the data traffic to be encrypted?

    a. Yes - I want to use the Scannex encryption technology.

        i. Set **r200** to 1 or 2. 1 will provide only authentication but no encryption, and 2 will provide full authentication *and* encryption.

        ii. Generate a hexadecimal private secret. For the strongest security, this value should be unique for each ModemBuffer that is deployed - then compromising one unit does not compromise the rest.

        iii. Enter the secret in **r201** (it is write-only).

Serial Port

5.   What features do I need on the serial port?

a. Is the ModemBuffer "Y-leaded" with another piece of equipment?

    i. Set **r230=0** first to enable the pin detection.

    ii. Temporarily disconnect the other collection equipment so as not to confuse the ModemBuffer, but leave the ModemBuffer connected to the equipment through the "Y-lead".

    iii. Read the register **i952** - this is the detected pin

    iv. Enter the value from **i952** into **r230**.

b. You can choose to set up **r231** and **r232** to the device's baud rate and protocol so that no data is missed. If the device sends very infrequent data (or none), you may consider disabling AutoBauding by setting **r233=0**.

c. Will the ModemBuffer be used for collecting data, or will it be used only for sending data into the device?

    i. Sending only

        1. Set **r230=0** first to make use of the auto pin detection.

        2. Now Check **i952**?

            a. **i952=0**. Set **r230=2** or **r230=3** to specify the receive pin. The transmit pin will use the other pin.

            b. **i952=2** or **i952=3**. Leave **r230=0**

        3. Set **r212=1** - this enable bidirectional support, and allows the ModemBuffer to transmit.

    ii. Collecting only

        1. Set **r230=0** to enable auto pin detection

        2. Set **r212=0** - this prevents any data being transmitted from the ModemBuffer into the connected device.

    iii. Sending and Collecting

        1. Set **r230=0** to enable auto pin detection

        2. Set **r212=1** to enable the ModemBuffer to transmit back to the device.

d. Does the device send binary style data, or is it text only?

    i. Binary

        1. Set **r213=1** to allow all eight bits of data

    ii. Text (or ASCII)

        1. Set **r213=0**

Email

6.   Will I be sending email notifications, or email data?

a.   Make sure you have setup the modem correctly as outlined above.

b.   Enter the name or IP of the SMTP server in **r330**

c.   Enter the port to use in **r331**. If you are using ISPs and need to deliver directly into a managed system, it is suggested you use a non-standard port (e.g. r331=20025) and configure your SMTP server appropriately (or install TCP port forwarding facilities to route incoming port 20025 to internal port 25).

d.   Enter the domain in **r332**. If unsure, you can use "localhost". Some servers require this value to reflect the originating domain, as registered on their system.

e.   Does the email server need SMTP authentication?

   i.   Yes - enter the username and password in **r333** and **r334**

   ii.   No - **r333**="" and **r334**="".

f.   Enter the destination email address in **r335**. e.g. r335="datacentre@mydomain.com"

g.   When should emails be sent?

   i.   Periodically: set **r350** to the number of minutes between emails.

   ii.   When full: set **r352** to the percentage trigger value

   iii.   When no data is received: set **r353** to the time, in minutes.

   iv.   After a power failure, or when someone disconnects the data source: set **r354=1**. (Otherwise set **r354=0**)

Data Transfer

7. Should the data be neatly 'sliced' into records (by time only)?

    a. Set **r211** to the pause time in 50ms increments. e.g. r211=20 will 'seal' the data after a one second pause in transmission.

    b. If not, set **r211=0**.

    Note: r211 also affects when dial outs are made for both TCP2 and email dial out. In the case of a system that delivers infrequent data, r211 can be used to collect the whole message before delivery waiting 15 seconds, for example, before dialling and delivering (r211=300).

8. How will the data be transferred from the ModemBuffer?

    a. I want to dial in, or use RADiO mode and collect with FTP

        i.   Set **r210="F"**

        ii. Set **r300** to the port you wish to communicate (normally 21 for the FTP service)

        iii. Enter the username and password in **r301** and **r302**

        iv. Enter the filename for the data in **r303**.

        v.   Consider setting up notification emails…

    b. I want to dial in and collect the data using raw TCP/IP sockets

        i.   Set **r210="T"**

        ii. Set **r220=""** to allow any incoming IP to connect, or **r220="#192.168.0.100"** to restrict the allowable incoming IP

        iii. Set **r221** to the port number you want to use (e.g. r221=1001)

        iv. Set **r223=0** and **r224=0** to disable the TCP2 push feature.

        v.   Consider setting up notification emails…

    c. I want to use RADiO and get the ModemBuffer to deliver by raw TCP/IP

        i.   Set **r210="T"**

        ii. Set **r220** to the name or dotted-IP of the machine that is listening for TCP/IP traffic, e.g. r220="collectserver.domain.co.uk"

        iii. Set **r221** to the port that the machine will be listening on, e.g. r221=1001

        iv. Set **r223=0** and **r224=0** to disable the TCP2 push feature.

        v.   Consider setting up notification emails…

    d. I want the ModemBuffer to dial out and deliver data by raw TCP/IP socket

        i.   Set **r210="T"**

ii. Set **r220** to the name or dotted-IP of the machine that is listening for TCP/IP traffic.

iii. Set **r221** to the port the machine is listening on.

iv. For delivery at a certain percentage full, set **r222** to the required value. e.g. r222=20 (for 20%)

v. For regular timed delivery (e.g. every day), set **r223=minutes**. For 24 hours r223=1440, for weekly r223=10080.

e. I want the ModemBuffer to deliver the data by email

i. Set **r210="E"**

ii. If the SMTP server limits the email size, set a value in **r335**. e.g. r335=1000 (limit to under 1Mb). Otherwise set r335=0

iii. If **r350** is set to a non-zero value (i.e. you want to send data at regular intervals), set **r351=1** if you only want an email when there is data.

iv. Set **r337** (AppendID) according to your processing needs.

Appendix A

Setting up a dialup connection on a PC

Ensure the modem is correctly installed and recognised by Windows (use the control panel's "Phone and Modem Options").

Windows 2000

- Start up the Control Panel

- Select "Network and Dial-up Connections"

- Select "Make New Connection"

- Select "Dial-up to private network", click Next

- Enter the phone number, e.g. "1234", click Next

- Choose whether this is available to all users or not, and click Next

- Name the connection "ModemBuffer"

- Now right click the connection icon, and select Properties.

- On the "Options" tab page, ensure "Redial if line is dropped" is **not** checked.

- On the "Networking" tab page, make sure "Internet Protocol (TCP/IP) is selected, and press the Properties button.

- Select the option "Use the following IP address" and enter an IP
  e.g. 192.168.234.1
  The ModemBuffer will assume the next IP (e.g. 192.168.234.2) when connected.

- Click Ok, then Ok on the "ModemBuffer (Dial-up) Properties" dialog

- Double click the "ModemBuffer" connection icon.

- Provide the username and password (as entered in R130 and R131 registers) and dial away!

Windows XP

- Start up the Control Panel

- Select "Network Connections"

- Select the task "Create a new connection", click Next

- Select "Connect to the network at my workplace", click Next

- Select "Dial-up connection", click Next

- Type in the connection name, e.g. "ModemBuffer", click Next

- Enter the phone number, e.g. "1234", click Next

- Click Finish

- The "Connect ModemBuffer (Dial-up)" dialog will appear. (If it does not, right click on the ModemBuffer icon.)

- Select Properties

- On the "Options" tab page, ensure "Redial if line is dropped" is **not** checked.

- On the "Networking" tab page, make sure "Internet Protocol (TCP/IP) is selected, and press the Properties button.

- Select the option "Use the following IP address" and enter an IP
  e.g. 192.168.234.1
  The ModemBuffer will assume the next IP (e.g. 192.168.234.2) when connected.

- Click Ok, then Ok on the "ModemBuffer (Dial-up) Properties" dialog

- Provide the username and password (as entered in R130 and R131 registers) and dial away**!**

Setting up dial in access
Windows 2000

- Start up the Control Panel

- Select "Network and Dial-up Connections"

- Select "Make New Connection"

- Select "Accept incoming connections", click Next

- Tick the one modem you wish to use for answering (make sure the "Communications cable between two computers" and "Direct Parallel" are unticked!), click Next

- Select "Do not allow virtual private connections", click Next

- You will probably want to add a new user at this stage

  o Select "Add"

  o Type in the username, e.g. "ModemBuffer", or "user"

  o Fill in the full name (for displaying on the PC)

  o Enter a password

  o Click Ok

  o Now *uncheck* your own PC username so that only the ModemBuffer user is ticked.

- After choosing which users can connect, click Next

- Ensure "Internet Protocol (TCP/IP)" is selected, and click "Properties"

- Select "Specify TCP/IP addresses:"

  o From: 192.168.235.1

  o To: 192.168.235.2

  o (This will allow one ModemBuffer to dial in and always have a fixed IP. If you have several modems you want to answer calls, you need to enter a larger range and in that case the ModemBuffers will be given IP addresses in turn - this is most useful when ModemBuffers need to dial in to delivery emails.)

- Click Ok on the "Incoming TCP/IP Properties"

- Click Next on the "New Connection Wizard"

- Name the incoming connections, and click Finish

Windows XP

- Start up the Control Panel

- Select "Network Connections"

- Select the task "Create a new connection", click Next

- Select "Set up an advanced connection", click Next

- Select "Accept incoming connections", click Next

- Tick the one modem you wish to use for answering (make sure the "Communications cable between two computers" and "Direct Parallel" are unticked!), click Next

- Select "Do not allow virtual private connections", click Next

- You will probably want to add a new user at this stage

  o Select "Add"

  o Type in the username, e.g. "ModemBuffer", or "user"

  o Fill in the full name (for displaying on the PC)

  o Enter a password

  o Click Ok

  o Now *uncheck* your own PC username so that only the ModemBuffer user is ticked.

- After choosing which users can connect, click Next

- Ensure "Internet Protocol (TCP/IP)" is selected, and click "Properties"

- Select "Specify TCP/IP addresses:"

  o From: 192.168.235.1

  o To: 192.168.235.2

  o (This will allow one ModemBuffer to dial in and always have a fixed IP. If you have several modems you want to answer calls, you need to enter a larger range and in that case the ModemBuffers will be given IP addresses in turn - this is most useful when ModemBuffers need to dial in to delivery emails.)

- Click Ok on the "Incoming TCP/IP Properties"

- Click Next on the "New Connection Wizard"

- Click Finish

As ModemBuffers dial in and connect, you should see icons appear by the "Incoming Connections" icon in the Network Connection explorer view.

Appendix B

Command line dialup under Windows

Assuming the dialup connection is called "ModemBuffer"…

Dialling in

```
RASDIAL ModemBuffer username password
```

Hanging up

```
RASDIAL ModemBuffer /disconnect
```

Useful commands

```
ROUTE PRINT
PING remoteip
TELNET remoteip 6024
```

Accessing the ModemBuffer

- Disconnect the serial cable

- Reboot the ModemBuffer

- Dial into the ModemBuffer

- Run TELNET *remoteip* 6024

In this state, the ModemBuffer will accept incoming calls with any PPP username and password combination for 10 minutes. After that time it reverts back to normal behaviour.

Appendix C

Modem Country Codes

Country	P2109-xx	Approvals	(CX81802-xx	Approval
Argentina	01	X	07	X
Australia	09	X	09	X
Austria	B5	Y	FD	Y
Belgium	B5	Y	FD	Y
Brazil	B5	X	16/99/B5/FD(?)	X
Canada	B5	Y	B5	Y
Chile	B5	X	99/B5/FD(?)	X
China	B5	X	B5	X
Cyprus	B5	P	FD	P
Czech Republic	--	P	FD	P
Denmark	B5	Y	FD	Y
Estonia	B5	X	--	X
Finland	--	Y	FD	Y
France	B5	Y	FD	Y
Germany	B5	Y	FD	Y
Greece	B5	Y	FD	Y
Hong Kong	--	X	99	X
Hungary	--	P	FD	P
Iceland	B5	Y	FD	Y
Indonesia	99	X	99	X
Ireland	B5	Y	FD	Y
Israel	99	X	99/B5/FD(?)	X
Italy	B5	Y	FD	Y
Japan	00	X	00	X
Korea	99	X	B5	X
Liechtenstein	B5	Y	FD	Y
Luxembourg	B5	Y	FD	Y
Malaysia	6C	X	--	X
Mexico	B5	X	B5	X
Netherlands	B5	Y	FD	Y
New Zealand	03	X	7E	X
Norway	B5	Y	FD	Y
Philippines	99	X	B5	X
Poland	99	P	99/8A/FD(?)	P
Portugal	B5	Y	FD	Y
Russia	--	X	99/B5/FD(?)	X
Singapore	--	X	9C/99/B5/FD(?)	X
Slovak Republic	--	X	FD	X
Slovenia	--	P	B5/FD(?)	P
South Africa	--	X	B5/FD(?)	X
Spain	B5	Y	FD	Y
Sweden	B5	Y	FD	Y
Switzerland	B5	Y	FD	Y
Taiwan	02	X	FE	X
Turkey	B5	X	B5/FD(?)	X
United Kingdom	B5	Y	FD	Y
United States	B5	Y	B5	Y

Y = Full approval.
P = Full approval when country joins EU (expected 2004).
X = Not approved

Note: To comply with local regulations when connecting to the PSTN use the specified code for the country of installation. In the US, in the rare cases where the modem refuses to dial or answer try the more generic country code 99.

Appendix D

Approvals

European Union (EU) Statement

This is to certify that the ModemBuffer complies with the EU Directive 89/336/EEC and the amending directive 93/68/EEC, relating to Electromagnetic Compatibility, by application of CISPR 22/European Standard EN 55022 (Class B) requirements for Information Technology Equipment and EN55024 and Council Directive 1999/5/EC on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

European CTR21 Notice

The equipment has been approved in accordance with Council Decision 98/482/EC for pan-European single terminal connection to the public switched telephone network (PSTN). However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point.

EMC/Safety Requirement

EN60950

EN55022	Class B
EN55024	Class B
AS/NZS 3548	Class B
UL/CUL	UL60950/CSA C22.2 No.60950
FCC Part 15	Class B

Network Compatibility Declaration

This equipment is designed to work satisfactorily on all European Union PSTN networks.

USA

FCC Registration Information

The ModemBuffer uses an internal Multi-Tech Modem (MT3400SMI/MT5600SMI) that has been registered with the Federal Communications Commission (FCC). It meets FCC requirements and may be connected directly to your telephone line. On the bottom of this equipment is a label that contains, among other information, the FCC registration number and Ringer Equivalence Number (REN) for this equipment. If requested, this information must be provided to the telephone company. Use the REN to help determine the maximum number of devices you can connect to your telephone without eliminating their ability to ring when your number is called. In many areas, the sum of the RENs of all devices connected to one line should not exceed 5.0. To determine how many devices you can connect to your line, contact your local telephone company to find out the maximum REN for your area.

The ModemBuffer may not be connected to a party line or coin line telephone network. If the ModemBuffer does not function properly, disconnect the unit. If the ModemBuffer causes harm to the network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice is not practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary. The telephone company may make changes in the telephone network. Should these changes affect the ModemBuffer, the telephone company must notify you, in writing, to enable you to maintain uninterrupted service.

An FCC-compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 Compliant. This equipment uses the following USOC jacks:RJ-11C. The telco needs to be connected with a minimum 26AWG telephone cable.

Repair Information

According to the FCC, only Multi-Tech (or an authorised repair Facility) is allowed to service the modem. Repairs require the removal of the modem and return to Multi-Tech. Please contact your supplier or Scannex for details of how to have repairs made.

FCC Rules Part 15 - Computing Devices

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected..

- Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the ModemBuffer.

Industry Canada Information

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunication network protective, operation and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Notice: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination of an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all devices does not exceed 5.

Industry Canada Regulatory Compliance Information for Class B Equipment

This Class B digital apparatus complies with Canadian ICES-003.

AVIS: Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par l'Industrie Canada.

L'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme aux normes de protection, d'exploitation et de sécurité des réseaux de télécommunications, comme le prescrivent les documents concernant les exigences techniques relatives au matériel terminal. Le Ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur. Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêche pas la dégradation du service dans certaines situations. Les réparations de matériel homologué doivent être coordonnées par un représentant désigné par le fournisseur. L'entreprise de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.