Hand Held Products

Dolphin™ RF
Getting Started

Release 8/3/98

HAND HELD® PRODUCTS

The latest version of this document can be downloaded from http://www.handheld.com.

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Introduction

Congratulations on the purchase of your new Dolphin Hand Held Computer/Bar Code Scanner.

You have made a wise choice in selecting the Dolphin, a device known world-wide for its ergonomic shape, light weight and single-handed data collection features.

The comfortable patented shape allows true, one-handed operation and fits either hand comfortably. Built to last, the Dolphin's ruggedly built case houses a 386 microprocessor and DOS operating system that is easily programmable with standard programming tools like Microsoft Visual C/C++, Borland C++, or Hand Held's family of Simplicity Software.

Dolphin is one of the most durable devices available, and is designed to withstand repeated five-foot drops onto a concrete floor. It also resists extreme temperatures, humidity levels and dust conditions.

The Dolphin's collection of features includes:

- **Comfortable Patented Shape**
  Allows true, one-handed operation. Fits either hand comfortably.

- **Light Weight and Pocket-Sized**
  Just 12 ounces (340 grams) and ergonomically designed for the user's hand.

- **Easy To Program**
  Program in Microsoft C++, Borland or use the Simplicity ™ family of rapid application development software from Hand Held Products.

- **Proven, Rugged and Reliable**
  The Dolphin's extra thick ABS case can handle repeated 5-foot (1.5m) drops to concrete. Its gasketed seams earned an IP65 (environmentally sealed) rating. Single board construction eliminates weak mechanical connections and epoxy-coated keys prevent keyboard legend wear.

- **Large, Easy-to-Read 8-line x 20-character Backlit Display**
  Can display text or graphics, including foreign character sets. Natural scan and viewing angle.

- **Reliable Optical Communications**
  Dolphin uses reliable infrared optical communications to upload and download data to PC's and printers.

- **Scan or Key-In Data**
  Non-contact laser reads all standard bar code symbologies. Up to 72" (183 cm) with reflective labels.

- **Two Convenient Keyboard Options:**
  36 Key Alpha-Numeric Keypad or 20 Key Numeric-Alpha Keypad

- **Long Battery Life**
  Up to 15,000 scans or 10 hours of operation from a single charge

- **Memory to Spare**
  Expand up to 10MB of memory. (2MB RAM + 8MB Non-volatile FLASH)

- **Available with 5 Different Scanning Options**
  - Dolphin™ (Scans from 2 to 36" or 5.1 to 91.4cm)
  - Dolphin LR (Long Range scanning from 10 to 80" or 25.4 to 203.2cm)
  - Dolphin HD (High Density bar code scanning from 2 to 8.5" or 5 to 21.6cm)
  - Dolphin HV (High Visibility scanning in high ambient light)
  - Dolphin NS (Non-Scanning option for keyboard data-entry only)

At the time of this release, Dolphin RF documentation was not complete.   This 'Getting Started Guide' will help walk you through setting up and configuring your Dolphin RF terminal. The latest version of this document can be downloaded from www.handheld.com The document is in the Technical Support, Dolphin download area at:

http://www.handheld.com/public/service/download/index02.html.

Before You Start

You will need the following hardware and software:

Dolphin RF Terminal and a charged battery pack
The Dolphin Terminal is used to scan bar codes and collect data.
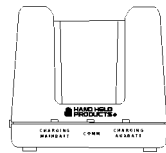
Dolphin HomeBase™

The HomeBase is used to charge batteries and provides a serial communication link between the terminal and your PC.
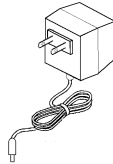
Wall Mount Adapter

The wall mount adapter provides power to the terminal and HomeBase™.
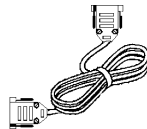
Serial Cable
The serial cable is used to connect the HomeBase™ to your PC.

Terminal and HomeBase™ User Documentation
The documentation that describes how to use the Terminal and HomeBase

Dolphin OS and Development System
Contains Dolphin RF's utilities and Development tools.

Dolphin RF TCP/IP Stack
Dolphin RF's communication drivers. Two options are available TCP/IP kernel only and Full install.

Proxim Access Point, or other WLIF compatible 2.4GHz Spread Spectrum radio if you plan to develop software or run the Dolphin RF Demo.

You also need the following software if you plan to develop applications for the Dolphin RF terminal:

Dolphin RF TCP/IP Software Development Kit for DOS

Microsoft Visual C/C++ (Version 1.52) , Borland C++ (Version 5.X) Compiler or Borland Turbo C (Version 3.0)

Setting up the Dolphin RF Hardware

Refer to the Dolphin™ Terminal and HomeBase™ User's Guides for information on setting up the Dolphin™ terminal and HomeBase™.

Dolphin™ Terminal User's Guide

The Dolphin™ Terminal User's Guide covers the following topics:

• Introduction to the Dolphin Terminal

• Getting Started

• Dolphin Terminal Features

• Dolphin Accessories

• Dolphin Serial Interface

• Dolphin Terminal Specifications

• Troubleshooting

• Contacting Hand Held Products

• Bar Code Symbology Reference

• GS DOS Command Reference

• Sample Bar Codes

Dolphin HomeBase™ User's Guide

The Dolphin HomeBase™ User's Guide covers the following topics:

• Introduction to the Dolphin HomeBase™

- Getting Started

- HomeBase™ Features

- Programming the HomeBase™

- HomeBase™ Serial Interface

- Troubleshooting

The Dolphin™ Terminal and HomeBase™ User's Guides are duplicated in electronic help files included with the Dolphin OS and Development System.   Refer to the Dolphin OS and Development System help file or README.TXT file for a list of documentation available for Dolphin RF.

Setting up the Dolphin RF Software

Dolphin OS and Development System

The Dolphin RF terminal comes with a set of diskettes containing the Dolphin OS and Development System.   The Dolphin OS and Development Systems includes the following:

- Dolphin Development Tools and Libraries (API)

- Sample Programs with source code

- Dolphin Utilities including Communication and Upgrade Wizard

- Electronic Help

- Boot Loader & ROM Image

Installation

The Dolphin OS and Development System installs easily using a standard Windows installation utility. To install:

1. Start up Microsoft Windows and Close/Exit any active Windows Applications.

2. Insert the Dolphin OS and Development System diskette #1 into drive A or drive B.

3. In Windows 3.1, select File|Run from Program Manager, or, from Windows 95, select Start|Run.

4. Type **a:\setup** (or **b:\setup**) and press **ENTER.**

5. Follow the instructions on the screen to complete the installation and setup procedure. The setup program will create the following directories on your system:

Directory	Contents
c:\dolphin\	Default installation directory, containing HHP Help and Read Me First Files.
c:\dolphin\bootldr	Backup of Dolphin Boot Loader(BURN.EXE and BOOTLDR.BIN)
c:\dolphin\devtools	Dolphin Development Libraries, Samples and API Help file.
c:\dolphin\wizzard	Dolphin Upgrade Wizard
c:\dolphin\hhpdemo	HHP Dolphin Batch Demo Program
c:\dolphin\romimage	Backup of Dolphin ROM Image
c:\dolphin\utils	Dolphin Utilities (YX.EXE, DCOMM.EXE, SLEEP.EXE, STATUS.EXE, BMP2LCD.EXE)
c:\dolphin\devtools\samples\rfdemo\server	Host/Server application
c:\dolphin\devtools\samples\rfdemo\client	Client application for Dolphin RF

Getting Additional Help

The Dolphin OS and Development System setup program will setup a Dolphin group or folder and install the following Help and text files.

*   README.TXT - Text file containing important information the developer should be aware of before installing the Dolphin OS and Development System. The setup program installs an icon named 'ReadMe First' in the Dolphin Group or Folder.

*   CONTACT.HLP - Electronic help file with information on contacting Hand Held Products by phone, fax, email, WWW or the BBS. The setup program installs an icon named 'Contacting HHP' in the Dolphin Group or Folder.

- DOLPHOS.HLP - Electronic help file describing the contents of the 'Dolphin OS and Development System'. The setup program installs an icon named 'OS and Development System' in the Dolphin Group or Folder.

- DOLPHIN.HLP - Electronic users guide for the Dolphin HomeBase. The setup program installs an icon named 'Dolphin Help' in the Dolphin Group or Folder.

- HOMEBASE.HLP - Electronic users guide for the Dolphin Terminal. The setup program installs an icon named 'HomeBase Help' in the Dolphin Group or Folder.

- DOLPHAPI.HLP - Electronic help file describing the sample applications and functions contained in the Dolphin API. The setup program installs an icon named 'Dolphin API' in the Dolphin Group or Folder.

Dolphin RF TCP/IP Stack

The Dolphin RF TCP/IP Stack is not included with the Dolphin OS and Development System and must be purchased separately. Two TCP/IP options are available for Dolphin RF:

- **TCP/IP Kernel Only** – FTP Software TCP/IP Kernel, plus PING.EXE, FTP.EXE, INET.EXE and   PCTCPCFG.EXE.

- **TCP/IP Full Stack** – Complete retail PC/TCP Networking Software from FTP Software.

If you are developing software, planning to customize the TCP/IP stack, or need access to advanced features such as DHCP/Bootp and SNMP you should order the full package which includes more detailed documentation and a variety of client utilities.

The TCP/IP stack for Dolphin RF was developed by FTP Software. For more information regarding the TCP/IP stack, you can refer to the following document at FTP Software's web site:

http://www.ftp.com/product/pctcp/pctcp4.html

Note: Only individuals with network experience and familiarity with TCP/IP should attempt to modify Dolphin RF's TCP/IP settings.

Installing the TCP/IP Stack

The Dolphin TCP/IP Stack installs easily using a standard Windows installation utility. To install:

1. Start up Microsoft Windows and Close/Exit any active Windows Applications.

2. Insert the Dolphin TCP/IP Stack diskette #1 into drive A or drive B.

3. In Windows 3.1, select File|Run from Program Manager, or, from Windows 95, select Start|Run.

4. Type **a:\setup** (or **b:\setup**) and press **ENTER.**

Follow the instructions on the screen to complete the installation and setup procedure. The setup program will create the following directories on your system:

Directory	Contents
c:\dolphin\rfstack	Dolphin RF TCP/IP stack

Transferring the TCP/IP Stack to the Terminal

To install the TCP/IP stack on your Dolphin RF terminal, run the Dolphin Upgrade Wizard[1] and follow the instructions provided **OR** transfer STACKINS.EXE from the C:\DOLPHIN\RFSTACK directory to Dolphin RF's C:\ drive and run STACKINS –D[2] to uncompress the files.

Note: [1]To use the Dolphin Upgrade Wizard the TCP/IP stack must be installed in the default Dolphin directory, C:\DOLPHIN\RFSTACK. You can ignore the steps to update the Bootloader, ROM Image and HHP Demo. [2]:You must use the –D option to recreate the directory structure, if you forget, you will need to remove the files and re-install the TCP/IP Stack.

Loading the TCP/IP Drivers

The TCP/IP drivers can either be loaded via the AUTOEXEC.BAT file or a *.BAT. A sample AUTOEXEC.BAT file and L.BAT file have been included with the Dolphin RF TCP/IP stack.

Dolphin RF TCP/IP File Description

The following files are installed as part of the Dolphin RF TCP/IP Kernel.

Root Directory (C:\)

- STACKINS.EXE   Backup of Dolphin RF TCP/IP Stack, Type
                        STACKINS -D to Extract
- AUTOEXEC.BAT Dolphin Autoexec.bat file
- CHKKEY.EXE   Utility to check for keypress during batch file
- README.TXT   Text Information file
- RF <DIR>   Directory containing RF drivers

RF Subdirectory (C:\RF\)

- CHAININT.EXE   HHP Utility to speed up Dolphin RF
- ETHDRV.EXE   TCP/IP Driver
- LSL.COM   ODI driver for the Dolphin Radio
- NET.CFG   Radio configuration file
- ODIPKT.COM   Packet driver
- OEMTSR.COM   HHP driver for the Dolphin Radio
- PCTCP.INI   TCP/IP configuration file
- RL2UISA.COM   Radio driver
- PING.EXE   TCP/IP PING client
- RFSETUP.EXE   HHP RF configuration utility
- P.BAT   Batch file to launch ping

- FTP.EXE   TCP/IP FTP client

- INET.EXE   TCP/IP Diagnostic client

- PCTCPCFG.EXE TCP/IP configuration utility

- ld.bat   Batch file to load RF drivers in debug mode

- l.bat   Batch file to load RF drivers

- subnet.bat   Batch file to get/set domain using PCTCPCFG

- ip.bat   Batch file to get/set IP using PCTCPCFG

- ETC <DIR>   Directory containing additional configuration file

ETC Subdirectory (C:\RF\ETC)

- COMMUNIT.CNFConfigure SNMP communities, hosts and

  permissions.

- CONTEXT.CNF   Context configuration file

- ENTITY.CNF   Entity configuration file

- PROTOCOL   Internet (IP) protocols

- RPC   RPC configuration file

- SERVICES   Services configuration file

- TIMEZONE.INI   Time zone information

- TRAPCOMM.CNF   Configure hosts and SNMP communities for

  SNMP Traps

Sample AUTOEXEC.BAT

The following is a commented sample batch file used to load the TCP/IP drivers:

```
@ECHO OFF
echo load oemtsr
c:\rf\oemtsr.com

rem Load the ODI driver for RangeLan2 (PROXIM FILE)
echo load lsl.com
c:\rf\lsl.com /c=c:\rf\net.cfg

rem Load the Radio driver (PROXIM FILE)
echo load rl2uisa.com
c:\rf\rl2uisa.com

rem Set the environment vars (FTP FILE)
```

```
SET PCTCP=c:\rf\pctcp.ini

rem Load the ODI packet shim
echo load odipkt.com
c:\rf\odipkt.com 0

rem Load the FTP stack
echo load ethdrv.exe
c:\rf\ethdrv

rem Load the HHP speed up program
echo load Chainint.exe
c:\rf\chainint.exe
```

Drivers must be loaded in the order specified in the example listed above.

Sample Debug batch file

For trouble shooting purposes a debug batch file call LD.BAT has been included as well. The debug batch file pipes the driver results to a text file so they can later be examined for troubleshoot driver problems. The debug batch file is shown below:

```
@ECHO OFF
echo load oemtsr
c:\rf\oemtsr.com > rfload.txt

rem Load the ODI driver for RangeLan2 (PROXIM FILE)
echo load lsl.com
c:\rf\lsl.com /c=c:\rf\net.cfg >> rfload.txt

rem Load the Radio driver (PROXIM FILE)
echo load rl2uisa.com
c:\rf\rl2uisa.com >> rfload.txt

rem Set the environment vars (FTP FILE)
SET PCTCP=c:\rf\pctcp.ini

rem Load the packet shim (?)
echo load odipkt.com
c:\rf\odipkt.com 0 >> rfload.txt

rem Load the FTP stack
echo load ethdrv.exe
c:\rf\ethdrv >> rfload.txt

rem Load the speed up pgm
echo load Chainint.exe
c:\rf\chainint.exe >> rfload.txt
```

Configuring the TCP/IP Stack

Note: Only individuals with network experience and familiarity with TCP/IP should attempt to modify Dolphin RF's TCP/IP settings.

Using RFSETUP.EXE

After installing the TCP/IP stack on the Dolphin RF terminal you will need to configure the following TCP/IP settings:

- Security ID

- Domain

- IP Address

- Subnet Mask

These settings can be set using the Dolphin RFSETUP.EXE program. To use the program, run RFSETUP at the Dolphin's DOS prompt. Follow the screen prompts to set the Dolphin RF's IP Address, Domain and Security ID. Dolphin RF must be rebooted for settings to take place.

Note: The Security ID is not set or cleared until the Dolphin RF battery pack is removed and then inserted again.

Manual Setup

Note: Only individuals with network experience and familiarity with TCP/IP should attempt to modify Dolphin RF's TCP/IP settings.

Some less common settings (such as router) may need to be modified for your application. These settings can be modified by editing the NET.CFG and PCTCP.INI files in the Dolphin C:\RF directory. To edit the files, transfer them to a PC, modify them with a text editor, and transfer the modified files back to the Dolphin terminal.

Note: The NET.CFG and PCTCP.INI files must be reside in the Dolphin C:\RF directory.

NET.CFG Settings

The following is a sample NET.CFG file:

```
LINK DRIVER RL2UISA
     INT              3        ; Fixed do not change
     PORT              270     ; Fixed do not change
     STATION_TYPE     0        ; The Dolphin is a "station"
     DOMAIN           0        ; Using Domain 0 by default
     SUBCHANNEL       1        ; Subchannel 1 by default
     CHANNEL          1        ; Channel 1 by default
     MASTER_NAME      HHP_MASTER
INACTIVITY_SEC       5        ; Timeout/Sleep setting (<>0)
     INACTIVITY_MIN   0        ; Timeout/Sleep setting (<>0)
     SNIFF_TIME       0        ; Don't SNIFF
PEER_TO_PEER         N        ; NO peer to peer
     ROAM_CONFIG      1        ; We will let you ROAM
     MAC_OPTIMIZE     0        ; Only valid if MASTER
FRAME ethernet_II             ;The type of frame we are expecting

/*** THIS IS THE END OF THE FILE  NOTE: You must have a blank line
at the end of the file ***/
```

Note: The semi-colons (;) and the descriptions following are for clarification of this explanation and should NOT be included in the NET.CFG file

The NET.CFG setting are described in the following section.

Station Type (Default for Dolphin RF = 0)

Each subnetwork must have one unit, called the Master, to coordinate the hopping sequence. Units classified as Stations synchronize to and follow the Master's hopping sequence.

An acting Master can be configured either as a Master or Alternate Master. Alternate Masters act either as a Master or a Station. If an Alternate Master unit is unable to locate another Master within range, it acts as a Master. If a Master is already present, then the Alternate Master acts as a Station. When there are multiple Alternate Masters, they coordinate among them-selves to determine who will become the Master. There must be at least one station on the network designated as the Master.

The Station_Type settings are as follows:

- Master = 2

- Alternate Master = 1

- Station = 0

Domain (Default for Dolphin RF = 0)

To communicate, all Station_Types require the same Domain number. Radios on different Domains cannot communicate with each other. The Domain is a software filter which does not affect the actual radio frequency or the frequency hop sequence.

You may want to set everyone on your network to the same Domain. For larger wireless networks, use the Domain to establish roaming subnetworks throughout your building. For example, the Engineering Department may use Domain 2 and the Sales Department may use Domain 5. Then engineers can only roam within the geographical area mapped out by Access Points(Aps) with a Domain setting of 2. The Domain is a number between 0 and 15 with 0 being the default setting. Channel default=1

Channel (Does not apply; Default for Dolphin RF = 1)

Each Master can select one of 15 Channels to establish communications with Stations. Each Channel number sets a unique frequency hopping sequence allowing for multiple subnetworks with higher data rate transmission capability in the same air space.

Subchannel   (Does not apply; Default for Dolphin RF = 1)

The Subchannel is a software code that is added to each radio packet. It does not affect the frequency hopping sequence like a Channel does. Use a Subchannel if you need more than 15 Masters in the same area and, therefore, all the Channels are used. For example, you can use Channel 1, Subchannel 1 for Network A and Channel 1, Subchannel 2 for Network B. The two net-works will not communicate with one another. They are, how-ever, still sharing the 1.6 Mbps pipe since they are both using Channel 1. The Subchannels are designated 1 through 15 with 1 being the default setting. You need only set the Subchannel on a Master or Alternate Master. Stations will ignore the parameter if it is set. Master_Name optional This optional parameter of up to 11 characters specifies an alphanumeric name to simplify the identification of each Master in your network. You may not have spaces in the name. You need only set the Master_Name on a Master or Alternate Master. Stations will ignore the parameter if it is set.

Security ID (Default for Dolphin RF = blank)

To enhance the security of a wireless subnetwork, the master and all stations unit must have the same security ID to establish communication. This ID is encrypted and stored in the Dolphin RF radio itself, not in software. It is not accessible but may be changed by using the RFSETUP program. There are 1,048,576 unique choices for the Security ID. If you do change it, however, you will need to change the Security ID on all other radios with which this one communicates.

MAC Optimize (Default for Dolphin RF = O)

This parameter can help improve throughput for small networks. If you have eight (8) or fewer wireless nodes communicating with a Access Point(AP) at the same time, set this parameter to *Light*. (More than eight nodes can be synchronized to an AP, however the *Light* parameter setting is only appropriate for networks consisting of eight or fewer nodes communicating simultaneously.) For networks with more than eight concurrent wireless users, set the parameter to *Normal*. You need only to set the MAC_Optimize parameter on a Master or Alternate Master. Stations will ignore the parameter if it is set. The

MAC_Optimize settings are as follows:

- Light = 0

- Normal = 1

Roam Config (Default for Dolphin RF = 1)

The Roam_Config parameter allows you to determine how quickly Dolphin RF will roam from one AP to another. For areas with many APs providing heavy overlapping coverage, set this parameter to *Fast* to maintain high throughput for each wireless node. In most networks, set the Roam_Config parameter to *Normal*. Wireless node throughput will not change noticeably, and an overabundance of APs is not required.

If the wireless coverage area provided by APs is sparse, set the Roam_Config parameter to *Slow*. Wireless nodes will not roam until they are nearly out of range of the AP. You need only set the Roam_Config parameter on a Station or Alternate Master. Masters will ignore the parameter if it is set.

The Roam_Config settings are as follows:

- Slow = 0

- Normal = 1

- Fast = 2

Peer to Peer

If the Peer_to_Peer parameter is set to *Yes*, wireless clients can communicate with one another. If set to No, the wireless nodes will only communicate with the Master unit. This results in a shorter synchronization time between the wireless clients and the Master unit.

Inactivity Timeout

To conserve battery life, Dolphin RF has an inactivity sleep mode. The sleep mode is automatically engaged when a certain period of time has elapsed since the computer has sent or received data over the network. Once the card is asleep, it can be awoken by a Master station attempting to send data to it. However, if the sleeping machine is acting as the Master station, you will lose all communication on your network. Do not set an inactivity timeout on a Master station. Calculate the time before sleeping by adding the Inactive_Min and Inactive_Sec parameters and rounding the sum to the nearest 5 second interval.

PCTCP.INI Settings

The following is a sample PCTCP.INI file:

```
[pctcp time]
time-zone-subsection = us-est
dst-begins = 95
dst-ends = 306

[pctcp time us-est]
time-zone-name = EST
time-zone-full-name = US/Eastern Standard Time
time-zone-offset = 5:00
dst-rule = US Federal
dst-name = EDT
dst-offset = 4:00
dst-begin-day = M4.1.0
dst-end-day = M10.5.0
dst-begin-time = 2:00
dst-end-time = 2:00

[pctcp ifcust 0]
ip-address = 10.16.1.10
```

```
subnet-mask = 255.255.255.0
interface-type = PKTDRV
frame-type = DIX-Ethernet
asynch-send=yes
odi-pkts=8

[pctcp addresses]
domain-name-server =

[pctcp general]
etc-dir = c:\rf\etc
user =
host-name =
domain =
name-resolution = dns
time-zone-name = EST
time-zone-offset = 300

[pctcp kernel]
serial-number = 4000-0282-9596
authentication-key = 3219-7791-9237
interface = ifcust 0
window = 11680
low-window = 5840
keepalive-timeout = 60000
mtu-discovery = no
slow-link-multiplier = 2
rtt-multiplier = 3
do-slow-start = yes
small-packets = 10
small-packet-size = 160
large-packets = 10
kernel-int=61
```

The most common settings used in the PCTCP.INI file are :

- ip-address

- subnet-mask

- router

Where:

ip-address=ip_address

Specifies the Internet address of this interface. Your IP address must be unique and assigned by your network administrator. *This parameter must be set for programs to work in LAN environments.*

subnet-mask=mask

Specifies how much of the address to reserve for subdividing networks. In the mask, the bit positions in the 32-bit address used for the network and subnet parts are represented with appropriate number of "1", and "0"s for the host part. The mask should contain at least the standard network portion.

router=ip_addresses

Specifies the default IP router addresses (up to a maximum of three). If all your hosts are on a single LAN, you can ignore this parameter. Otherwise, ask your network administrator for the value for this parameter.

Additional Information

For more information regarding the PCTCP.INI settings, you should refer to the following document at FTP Software's web site:

http://www.ftp.com/techsup/quick-help/docs/param.html

This reference contains detailed information about the PCTCP.INI, the configuration file for the Dolphin RF. It lists and describes the configuration file sections and the specific parameters in each section.

Dolphin RF Demonstration Program

The Dolphin RF Demonstration Program is a Client/Server application that can be used to demonstrate Dolphin RF.   The Server portion of the demo (RFSERVER.EXE) was written in VB using Winsocks. The Client portion of the demo (RFCLIENT.EXE) was written C/C++ . C and Visual basic source code is also provided.

Using the Demonstration Program

Network Connection

Make sure your RF connection is setup properly.   This connection can be an Access Point(AP) connected to your network, or an RF adapter install in your Host/Server system.

Host/Server Software

The setup program will create a 'Dolphin RF Demo' icon on the Windows Desktop and in the Dolphin folder. Double click on this icon to launch the Demo Server program. Note the IP address specified applications status line.

Client/Terminal Software

Verify the Dolphin RF TCP/IP stack is installed and configured. The setup program will create a 'server' and 'client' sub-directory in the directory you specify(defaults to C:\DOLPHIN\DEVTOOLS\SAMPLES\RFDEMO). The client software must be transferred to the Dolphin RF terminal before using the demonstration program. Refer to the Dolphin Users Guide or help file for information on transferring files.

To run the client software, type RFCLIENT [IPADDRESS], where IPADDRESS in the IP address specified in the server applications status line.

RF Client Options

The RF Client application accepts the following keyboard input:

F1 - Connect to Server
F2 - Disconnect from Server
A - Drivers Status
B - Get Auto Power Off State
C - Enable Auto Power Off
D - Disable Auto Power Off
E - Is RF power on
F - Set RF Power on
G - Set RF Power off
H - Get Link Status
I - Get Radio Configuration
J - RF_LPSTOP test
M - Put Dolphin In Low Power
N - Put Radio & Dolphin to Sleep
O - Put Dolphin to Sleep, Radio in Suspend

ON/Scan - Transmit data

Developing Applications
for Dolphin RF

You will need the following software if you plan to develop software for the Dolphin RF terminal:

Dolphin OS and Development System
Includes the Microsoft and Borland C/C++ API for Dolphin RF.

Dolphin RF TCP/IP Software Development Kit for DOS
C/C++ API for Accessing the TCP/IP drivers

Microsoft Visual C/C++ (Version 1.52) , Borland C++ (Version 5.X) Compiler or Borland Turbo C (Version 3.0)

Refer to the documentation provided with the Development tools for help in creating application for Dolphin RF.

Note: At the time of this release, the Dolphin RF API was not fully documented. Refer to the Dolphin OS and Development System README.TXT, C:\DOLPHIN\DEVTOOLS\INCLUDE\DOLPHIN.H include file and the C:\DOLPHIN\DEVTOOLS\SAMPLES\RF_LIB_TEST.C sample application for additional help in creating applications for Dolphin RF.

Troubleshooting

The Dolphin RF Terminal was designed to provide years of trouble-free use. In the event that something does go wrong with the Dolphin Terminal, take a look at the list of symptoms and solutions listed below.

1. The Dolphin RF can not communicate via RF to the Host.

- Make sure the Access Point is on.

- Make sure that the host is up and running and can be accessed from another system on the network. Use the PING utility to verify the host is reachable.

- Make sure that the Domain, IP and Subnet are setup correctly on the Dolphin and the Access Point. The Domain, Subnet and Security ID must match on the Dolphin and the Access Point.

- Verify the you have specified an IP for the Client that is on the same network as the Host.

- Did you change the TCP/IP settings? The NET.CFG and PCTCP.INI files must be reside in the Dolphin C:\RF directory. Dolphin RF must be rebooted for settings to take place.

- Make sure all security ID's are set to the same value or cleared. *The Security ID is not set until the Dolphin RF battery pack is removed and then inserted again.*

- Use the PING.EXE utility from the Dolphin terminal to check the Dolphin RF connection. Use the P.BAT to launch PING.EXE, by entering P [Host IP].

- Make sure that the Dolphin RF TCP/IP drivers have been loaded correctly. Use the LD.BAT file to load the drivers and view the RFLOAD.TXT log file.

- If you are using the RF demo make sure you have specified the correct IP address on the RFCLIENT command line. You need to run RFCLIENT [IP] on the terminal.

- You may not be in range of your Access Point. Run PING to determine if you are in range.

2. Why can't I synchronize to the Master?

- You may have a different Domain or Security ID.

3. What happens if I go out of range?

- This is determined by the network and the amount of time you are out of range, but you may be logged off the network. The same thing will happen if you unplug a wired Ethernet cable.

4. How do I know if I'm out of range?

- Use the PING.EXE utility from the Dolphin terminal to check the Dolphin RF connection. Use the P.BAT file, by entering P [IP].

5. What happens when my Dolphin RF goes to sleep?

- The Dolphin RF Radio may also go to sleep. It is unable to send and receive messages to the network until the terminal wakes up. Depending on the network configuration and the amount of time the machine is asleep, you may lose your network connection.

- Several Sleep options are available to the Dolphin RF developer to minimize this issue. Refer to the Dolphin OS and Development System for details.

6. I am able to ping the Host/Server but am not able to ping the Dolphin RF terminal from the Host/Server.

- The Dolphin RF radio does not wake up for broadcast messages.   The Access Point (AP) can be configured to convert broadcast messages in to a unicast message.

7. Why do I get 'Invalid parameter' when using the TCP/IP clients?

- The TCP/IP client requires the parameter to be entered using lower case. Since you can not enter lower case characters from Dolphin's keyboard, create a batch to enter the parameters.   For example, the following batch file can be used to run PING.EXE with the –t option:

  if"%1"="" goto plain

  ping -t %1

  goto end

  :plain

  ping -t 10.16.1.10

:end

8. The display is blank, the Dolphin RF Terminal will not turn on.

- Recharge the battery or replace it with a known good battery. Reset the Dolphin Terminal, refer to Troubleshooting Section in the Dolphin Terminal User's Guide for directions on resetting the terminal.

9. The Dolphin Terminal will not scan a bar code.

- The bar code may be out of spec. Try reading some of the bar code examples in Appendix C, or locate a bar code sample that you know can be read by another Dolphin Terminal. Consult your software developer to ensure the correct bar code symbology is being used.

10. Dolphin's Battery Gas Gauge does not seem accurate

- The gas gauge is only an estimate of the remaining battery life.   The technology used in the high-capacity NiMH batteries makes it impossible to determine the actual battery capacity.

- The gas gauge uses data stored inside the battery pack, so the battery may need to be recalibrated.   Use the *Service Aux. Battery* feature of the HomeBase™ to recalibrate the battery.   See the HomeBase™ manual or electronic help files for additional information.

- Check the image version for the Dolphin Bootloader, OS and ROM. The latest version of the Dolphin OS and Development System can be downloaded from the HHP website 'www.handheld.com'.

11. The battery keeps failing in my Dolphin Terminal.

- Make sure the battery has been fully charged. Batteries should charge for a minimum of 4 hours before use.

- If the battery has been stored for a long period of time, it may take 3 charge/discharge cycles before the battery reaches its full storage capacity. The capacity of NiMH batteries decreases as the number of charge/discharge cycles increases. So, if you are experiencing low run times, a new battery may be required. To increase the run time of the Dolphin Terminal, try to limit the use of the speaker, scan engine and backlight.

12. The Dolphin Terminal is not communicating with my host computer via a serial connection.

- Make sure the HomeBase™ is plugged in.

- Make sure the Dolphin Terminal is inserted properly into the HomeBase™. The CHARGING MAINBATT LED should be solid green. If not, remove the Dolphin Terminal and re-insert it into the HomeBase™.

- Ensure the communications baud rate is set correctly. Set communications for 9600, N, 8, 1.

- Make sure that Configuration Switch 2 on the back of the HomeBase is set to 'Fixed BPS'. Make sure the RS-232 cable is properly attached to the HomeBase and host computer. Also check to ensure that the cable is configured properly.

- Use the HBDIAG.EXE program to configure and test the HomeBase settings.

13. I can not enter an ':' to change to Drive B at the DOS prompt.

- On the alphanumeric Dolphin, the ':' is a special character that can be entered by typing 'SHIFT' 'Z'. On the numeric Dolphin, press the SHIFT key to switch the Dolphin to alpha mode. This is indicated by the <ABC> symbol indicated on the LCD. Then press the <0> key twice. See reference to special characters in Dolphin Terminal Features section for additional information.

TCP/IP Client Function Reference

Ping

Usage:

ping [-options] host

The PING command determines whether a specific IP address is accessible. It works by sending packet to the specified address and waiting for a reply.

Options:

-d [bytes]	dump input packet
-d# [bytes]	dump output packet
-e	cancel extended security
-i hops	IP time to live
-j dest 1...dest n	loose source routing
-k dest 1...dest n	strict source routing
-l length	set length of icmp data
-n times	ping host times number of times
-o	no-op option
-p precedence	set IP precedence
-q	trace route
-Q	trace route without DNS
-r	record route
-s	level [authority]basic security
-t	ping forever
-v type	set type of service
-w seconds	time to wait for answer
-x [{1|3 dest1..destn}]	timestamp option
-z	quiet mode (turn off stats)

Example batch file:

```
if"%1"="" goto plain
ping -t %1
goto end
:plain
ping -t 10.16.1.10
:end
```

Ftp

Usage:

ftp [-d] [-u userid password] [-p port_no.] [host] [command]

The FTP command transfers files between the Dolphin RF computer and remote hosts running an FTP server. This command is the easiest to use for transferring files between hosts.

Command   Specifies an ftp interactive command.

-d   Displays all ftp network commands and responses sent over the ftp control connection. This option displays your password after you enter it.

Host   Specifies the hostname or IP address of the remote host.

-p port no   Specifies a port number on the remote host.

userid password   Logs you in to the remote host using your username and password.

Pctcpcfg

Usage:

pctcpcfg [-k| -K] [-b] [-i FILE] [-p PACKAGE] SECTION [-s SUBSECT] NAME {VALUE}

This program will let you set new values in the INI file or kernel. You can provide more than one VALUE at a time.

-k	sets value in kernel and ini file
-K	sets value in kernel only
-b	don't create a backup file
-i FILE	name of an alternate ini file
-p PACKAGE	name of package (default is PCTCP)
-s SUBSECT	name of subsection
-help	display the list of kernel variables that can be set

If a VALUE is not provided, then the current value(s) for the variable NAME will be shown. If NAME is "", then all variables for SECTION will be shown

Variables that can be set in kernel are:

[pctcp addresses]
      domain-name-server   type: IP address list

[pctcp kernel]
      host-table   type: text
      window   type: number

[pctcp general]
      domain   type: text
      completion-domain   type: text list

[pctcp <interface> <n>]
      subnet-mask   type: IP address
      IP-address   type: IP address
      router   type: IP address list

Example batch file:

```
@ECHO OFF
IF "%1" = "" GOTO GETIP
PCTCPCFG.EXE -I C:\RF\PCTCP.INI IFCUST -S 0 IP-ADDRESS %1
GOTO END
:GETIP
PCTCPCFG.EXE -I C:\RF\PCTCP.INI IFCUST -S 0 IP-ADDRESS
:END
```

Inet

Usage:

int [arp] [debug] [pap] [ppp] [route] [slip] [stats]

The INET command displays network statistics from the kernel, or unloads the kernel from memory. You may supply one of the following arguments:

- Arp - Displays the current contents of the kernel's ARP cache. config [advanced I security]

- debug - Displays information about packet receipt and transmission, interrupts, ARP statistics, etc. The debug argument also displays the physical address of the interface. This argument is useful when troubleshooting network performance, tuning the kernel, and analyzing remote transfers.

- route - Displays the current contents of the kernel's routing cache. The routing cache contains the information learned through ICMP Host Redirect packets. The routing cache holds 16 entries.

- stats - Displays network statistics about the network interface. The statistics include the name of the interface, its network (IP) address, the subnet mask, and the total number of packets sent out and received on this interface. Inet stats also displays a number of TCP, IP, ICMP, and User Datagram Protocol (UDP) counters, including bad incoming packets and messages broken down by type.

- tcp - Displays the contents of the kernel's TCP connections table, a set of statistics for each active connection.

- unload - Unloads the kernel from memory. If you use inet unload, you must use ethdrv to reload the kernel into memory.

- version - Displays the version number of the active kernel, not the version number of the inet command.

- -? - Displays and explains the usage line of this command.

- -version - Displays the version and patch level of this command. Refer to this information if you call Technical Support.

Rfsetup

Usage:

RFSETUP

To use the program, run RFSETUP at Dolphin's DOS prompt. Follow the screen prompts to set Dolphin RF's IP, Domain and Security ID. Dolphin RF must be rebooted for settings to take place.

Note: *The Security ID is not set until the Dolphin RF's battery pack is removed and then inserted again.*

Additional Information

If you plan on developing software for Dolphin RF, plan to customize the TCP/IP stack, or need access to advance features such as DHCP/Bootp and SNMP you should order the full TCP/IP package which includes more complete documentation and a wide variety of client utilities.

The TCP/IP stack for Dolphin RF was developed by FTP Software. For more information regarding the TCP/IP stack, you can refer to the following document at FTP Software's web site:

http://www.ftp.com/product/pctcp/pctcp4.html