



Dante

Connection Protocol

The Connection protocol is used to communicate between the desktop and Newton.

This document should be read in conjunction with DockProtocol.h which defines the constants and structures referenced here.

NOTE This protocol supersedes the 1.0 Newton ROM protocol: refer to the Newton 1.0 Connection Protocol document.

Protocol Overview

Newton communicates with the desktop by exchanging Newton event commands. The general command structure looks like this:

```
ULong    'newt'    // event header
ULong    'dock'    // event header
ULong    'aaaa'    // specific command
ULong    length    // the length in bytes of the following data
UChar    data[]    // data, if any
```

Note

- The length associated with each command is the actual length in bytes of the data following the length field.
- Data is padded with nulls to a 4 byte boundary.
- Multi-byte values are in big-endian order.
- Strings are null-terminated 2-byte UniChar strings unless otherwise specified.
- NewtonScript objects are sent in Newton Streamed Object Format (NSOF) (see the [Newton Formats](#) document, chapter 4).

Desktop Applications

Several desktop applications that provide connection services to Newton are available, some of them in [Apple's archive](#). They all implement the protocol defined in this document.

Newton Connection Kit (NCK)	1.0
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Protocol: 1

Functions: backup, restore, install

Newton Connection Kit (NCK)	2.0
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Protocol: 2

Functions: backup, restore, install

Newton Package Installer (NPI)	1.1	released June 20, 1994
Protocol: 1		
Functions: install package only		
Newton Backup Utility (NBU)	1.0	released January 25, 1996
Protocol: 2		
Functions: backup, restore, install		
Newton Connection Utilities (NCU)	1.0	released May 13, 1997
Protocol: 2		
Functions: backup, restore, synchronize, install, import, export, keyboard passthrough		
Ruby Desktop Connection Library (RDCL)	0.2	
Protocol: 2		link
Functions: command line utility		
Newton Connection for Mac OS X (NCX)	2.0.1	released July 19, 2013
Protocol: 1 & 2		link
Functions: backup, restore, install, import, export, keyboard passthrough, screenshot		

Newton 2.0 Dante Protocol

The protocol described here is a superset of the 1.0 protocol. Most commands from the 1.0 protocol are still valid, but some have been superseded.

In this protocol, once a session has been established the connection remains open and commands may be issued by either Newton or desktop. This is a departure from the 1.0 Newton protocol in which each session accomplished one function then disconnected.

Command Summary

The following is a summary of the commands that have been added to the 1.0 protocol, and their four-letter definitions:

kDDefaultStore	'dfst'
kDAppNames	'appn'
kDImportParameterSlipResult	'islr'
kDPackageInfo	'pinf'
kDSetBaseID	'base'
kDBackupIDs	'bids'
kDBackupSoupDone	'bsdn'
kDSoupNotDirty	'ndir'
kDSynchronize	'sync'
kDCallResult	'cres'
kDRemovePackage	'rmvp'
kDResultString	'ress'
kDSourceVersion	'sver'
kDAddEntryWithUniqueID	'auni'
kDGetPackageInfo	'gpin'
kDGetDefaultStore	'gdfs'
kDCreateDefaultSoup	'cdsp'

kDGetAppNames	'gapp'
kDRegProtocolExtension	'pext'
kDRemoveProtocolExtension	'rpex'
kDSetStoreSignature	'ssig'
kDSetSoupSignature	'ssos'
kDImportParametersSlip	'islp'
kDGetPassword	'gpwd'
kDSendSoup	'snds'
kDBackupSoup	'bksp'
kDSetStoreName	'ssna'
kDCallGlobalFunction	'cgfn'
kDCallRootMethod	'crmf'
kDSetVBOCompression	'cvbo'
kDRestorePatch	'rpat'
kDOperationDone	'opdn'
kDOperationCanceled	'opca'
kDOPCanceledAck	'ocaa'
kDRefTest	'rtst'
kDUnknownCommand	'unkn'

Refer to the Newton 1.0 Connection Protocol document for a list of commands used by the original protocol, and to DockProtocol.h for a full list of dock commands.

Session Initiation

Every session starts like this:

Desktop	Newton	
	< kDRequestToDock	
kDInitiateDocking	>	
	< kDNewtonName	
kDDesktopInfo	>	
	< kDNewtonInfo	
kDWhichIcons	>	optional
	< kDResult	
kDSetTimeout	>	optional
	< kDPassword	

If the password sent from the Newton is wrong, the desktop responds with `kDPWWrong`.

kDPWWrong	>
	< kDPassword

The password exchange can occur up to 3 times before the desktop gives up.

kDPWWrong	>
	< kDPassword

If the desktop decides that the Newton has had enough guesses, a `kDResult` indicating `kDBadPassword` error can be sent instead of a `kDPWWrong`.

kDPassword	>
	< kDResult

If the password sent from the desktop is wrong, the Newton signals a `kDResult` indicating `kDBadPassword` error immediately.

If no password has been specified, the key is returned unencrypted, but the password exchange always takes place.

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDRequestToDock

Desktop	<	Newton
		ULong 'rtdk'
		ULong length = 4
		ULong protocol version

The Newton initiates a session by sending this command to the desktop, which is listening on the network, serial, etc. The protocol version is the version of the messaging protocol that's being used by the Newton ROM. The desktop sends a `kDInitiateDocking` command in response.

kDInitiateDocking

Desktop	>	Newton
ULong	'dock'	
ULong	length = 4	
ULong	session type	

The session type can be one of {none, settingUp, synchronize, restore, loadPackage, testComm, loadPatch, updatingStores}; see the Session type enum in `DockProtocol.h`. The Newton responds with information about itself.

kDNewtonName

Desktop	<	Newton
		ULong 'name'
		ULong length
		struct NewtonInfo
		UniChar name[]

The Newton's name can be used to locate the proper synchronize file. The version info includes things like machine type (e.g. J1), ROM version, etc; see the `NewtonInfo` struct declaration in `DockProtocol.h`

kDDesktopInfo

Desktop	>	Newton
ULong	'dinf'	
ULong	length	
ULong	protocol version	
ULong	desktop type	
ULong	encrypted key 1	
ULong	encrypted key 2	
ULong	session type	
ULong	allow selective sync	
NSOF	desktop apps	

This command is used to negotiate the real protocol version. The protocol version sent with the `kDRequestToDock` command is now fixed at version 9 (the version used by the 1.0 ROMs) so we can support package loading with NPI 1.0, Connection 2.0 and NTK 1.0. Connection 3.0 will send this command with the real protocol version it wants to use to talk to the Newton. The Newton will respond with a number equal to or lower than the number sent to it by the desktop. The desktop can then decide whether it can talk the specified protocol or not.

The desktop type identifies the sender – 0 for Macintosh and 1 for Windows.

The password key is used as part of password verification.

Session type will be the real session type and should override what was sent in `kDInitiateDocking`. In fact, it will either be the same as was sent in `kDInitiateDocking` or `kSettingUpSession` to indicate that although the desktop has accepted a connection, the user has not yet specified an operation.

`AllowSelectiveSync` is a boolean. The desktop should say no when the user hasn't yet done a full sync and, therefore, can't do a selective sync.

`DesktopApps` is an array of frames that describes who the Newton is talking with. Each frame in the array looks like this:

```
{ name: "Newton Backup Utility", id: 1, version: 1 }
```

There might be more than one item in the array if the Newton is connecting with a DIL app. The built-in Connection app expects 1 item in the array that has id:

- 1: NBU
- 2: NCU

It won't allow connection with any other id.

kDNewtonInfo

Desktop	<	Newton
		ULong 'ninf'
		ULong length = 12
		ULong protocol version
		ULong encrypted key 1
		ULong encrypted key 2

This command is used to negotiate the real protocol version. See `kDDesktopInfo` above for more info. The password key is used as part of password verification.

kDWhichIcons

Desktop	>	Newton
ULong	'wicon'	
ULong	length = 4	
ULong	icon mask	

This command is used to customize the set of icons shown on the Newton. The `icon mask` indicates which icons should be shown; see the Icon mask enum in `DockProtocol.h`. For example, to show all icons you would use this:

```
kBackupIcon + kSyncIcon + kInstallIcon + kRestoreIcon + kImportIcon +  
kKeyboardIcon
```

kDSetTimeout

Desktop	>	Newton
ULong	'stim'	
ULong	length = 4	
ULong	timeout in seconds	

This command sets the timeout for the connection (the time the Newton will wait to receive data before it disconnects). This time is typically set to 30 seconds.

kDResult

Desktop	< >	Newton
ULong		'dres'
ULong		length = 4
SLong		error code

This command is sent by either Newton or PC in response to any of the commands that don't request data. It lets the requester know that things are still proceeding OK.

kDPassword

Desktop	< >	Newton
ULong		'pass'
ULong		length = 8
ULong		encrypted key 1
ULong		encrypted key 2

When sent by the Newton, this command returns the key received in the `kDDesktopInfo` message encrypted using the password.

When sent by the desktop, this command returns the key received in the `kDNewtonInfo` message encrypted using the password.

kDPWWrong

Desktop	>	Newton
ULong		'pwbd'
ULong		length = 0

If the password sent from the Newton is wrong, the desktop indicates this with a `kDPWWrong` response. If too many attempts at entering a password have been made, the desktop can instead respond with a `kDResult` command indicating a `kDBadPassword` error.

Sync and Selective Sync (Backup)

After the session is started (see above) these commands would be sent:

Desktop	Newton
	< kDRequestToSync
kDGetSyncOptions	>
	< kDSyncOptions
kDLastSyncTime	> this one's fake (0) just to get the newton time
	< kDCurrentTime
kDSetCurrentStore	>
	< kDResult
kDLastSyncTime	>
	< kDCurrentTime

The following would appear only if syncing system info:

kDGetPatches	>
	< kDPatches

The following would appear only if syncing i.x style packages on locked i.x cards:

kDGetPackageIDs	>
	< kDPackageIDList
kDBackupPackages	>
	< kDPackage
kDBackupPackages	>

```

kDBackupPackages      < kDPackage
                      >
                      < kDResult

```

Note that the above only syncs i.x style packages on locked i.x cards. To complete the package sync the packages soup should also be synced.

The sync would continue like this:

```

kDSetSoupGetInfo      >
                      < kDSoupInfo
kDLastSyncTime        >
                      < kDCurrentTime
kDGetSoupIDs          >
                      < kDSoupIDs
kdGetChangedIDs       >
                      < kDChangedIDs
kDDeleteEntries       >
                      < kDResult
kDAddEntry            >
                      < kDAddedID
kDReturnEntry         >
                      < kDEntry

```

Repeat the above for each store and soup followed by:

```

kDOperationComplete   >

```

Optionally the desktop could send this instead of the operation complete:

```

kDSyncResults         >

```

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDSynchronize

Desktop	<	Newton
		ULong 'sync'
		ULong length = 0

This command is sent to the desktop when the user taps the Synchronize button on the Newton. The user wishes to synchronize Newton data with desktop applications.

kDGetSyncOptions

Desktop	>	Newton
ULong 'gsyn'		
ULong length = 0		

This command is sent when the desktop wants to get the selective sync or selective restore info from the Newton.

kDSyncOptions

Desktop	<	Newton
		ULong 'sopt'
		ULong length

NSOF info frame

This command is sent whenever the user on the Newton has selected selective sync. The frame sent completely specifies which information is to be synchronized.

```
{ packages: TRUEREF,
  syncAll: TRUEREF,
  stores: [{store-info}, {store-info}] }
```

Each store frame in the stores array contains the same information returned by the `kDStoreNames` command with the addition of soup information. It looks like this:

```
{ name: "Treasure Island",
  signature: 159604293,
  totalsize: 15982592,
  usedsize: 3346692,
  kind: "Flash storage card",
  soups: ["Names", "Notes", ...],
  signatures: [411528, 843359, ...],
  info: {store-info-frame}
}
```

If the user has specified to sync all information the frame will look the same except there won't be a soups slot--all soups are assumed.

Note that the user can specify which stores to sync while specifying that all soups should be synced.

If the user specifies that packages should be synced the packages flag will be true and the packages soup will be specified in the store frame(s).

kDSyncResults

Desktop	>	Newton
ULong	'sres'	
ULong	length	
NSOF	sync results	

This command can optionally be sent at the end of synchronization. If it is sent, the results are displayed on the Newton. The array looks like this:

```
[["store name", restored, "soup name", count, "soup name" count],
 ["store name", restored, ...]]
```

`restored` is true if the desktop detected that the Newton had been restore to since the last sync.

`count` is the number of conflicting entries that were found for each soup. Soups are only in the list if they had a conflict. When a conflict is detected, the Newton version is saved and the desktop version is moved to the archive file.

File Browsing

File browsing is used by the Newton to select a file to import, a package to load, or a backup to restore. (For synchronize, the process is completely driven from the desktop side.)

After the session has started (see above) these commands would be sent:

Desktop	Newton
	< kDRequestToBrowse


```

kDGetInternalStore    >                                optional
                    < kDInternalStore
kDResult              >
                    < kDGetDevices    Windows only
kDDevices             >                                Windows only
                    < kDGetFilters    Windows only
kDFilters             >                                Windows only
                    < kDGetDefaultPath
kDPath               >
                    < kDGetFilesAndFolders
kDFilesAndFolders->

```

Note that we must start the transaction with a `kDRequestToDock` to force 1.0 and 2.0 versions of Connection to display the correct message.

When the user changes the path by tapping on a folder, picking a new level from the path popup, or picking a new drive on the drive popup in the Dock browser slip:

```

                    < kDSetPath
kDFilesAndFolders   >

```

On Windows only, when the user changes the drive by picking a drive on the drive popup, the desktop will change the drive and set the directory to the current directory for that drive, and return the new path to the newton:

```

                    < kDSetDrive
kDPath              >
                    < kDGetFilesAndFolders
kDFilesAndFolders   >

```

On Macintosh only, if the folder is an alias, it's like this:

```

                    < kDSetPath
kDPath              >
                    < kDGetFilesAndFolders
kDFilesAndFolders   >

```

When the user taps on the File Info button:

```

                    < kDGetFileInfo
kDFileInfo          >

```

On Macintosh only, if the selected item is an alias, before doing import, getfileinfo, or setpath:

```

                    < kDResolveAlias    name of alias
kDAliasResolved     >                                0 or 1, 0 => can't resolve

```

On Windows only, if the user picks a new filter from the list:

```

                    < kDSetFilter
kDFilesAndFolders   >

```

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDRequestToBrowse

Desktop	<	Newton
----------------	-------------	---------------

ULong	'rtbr'
ULong	length
NSOF	file type

This command is sent to a desktop that the Newton wishes to browse files on. File type can be 'import, 'packages, 'syncFiles or an array of strings to use for filtering.

SIMON'S NOTE I have never encountered the array of strings.

kDGetDevices		Windows Only
Desktop	<	Newton
		ULong 'gdev'
		ULong length = 0

This command asks the Windows desktop system to return an array of device names.

kDDevices		Windows Only
Desktop	>	Newton
ULong 'devs'		
ULong length		
NSOF array of device frames		

This command returns an array of frames describing devices. These are the devices which will appear in the devices popup in the Windows file browsing dialog. Each frame in the array should look like:

```
{ name: "c:mydisk",
  disktype: 1 }
```

where `disktype` is one of (floppy = 0, hardDrive = 1, cdRom = 2, netDrive = 3): see the Desktop disk drive types enum in DockProtocol.h.

A corresponding icon is displayed in the popup. This may not be possible in which case this slot will be optional.

kDGetFilters		Windows Only
Desktop	<	Newton
		ULong 'gflt'
		ULong length = 0

This command asks the Windows desktop to send a list of filters to display in the file browser. A `kDFilters` command is expected in response.

kDFilters		Windows Only
Desktop	>	Newton
ULong 'filt'		
ULong length		
NSOF array of strings		

This command returns an array of filters to the Newton. It's sent in response to a `kDGetFilters` command. The filter should be an array of strings which are displayed in the filter popup. If the filter array is `NILREF` no popup is displayed.

kDSetFilter		Windows Only
Desktop	<	Newton

ULong	'sflt'
ULong	length = 4
ULong	index

This command changes the current filter being used. A `kDFilesAndFolders` command is expected in return. `index` is a 0 based long indicating which item in the filters array sent from the desktop should be used as the current filter..

kDSetDrive

Windows Only

Desktop	<	Newton
		ULong 'sdrv'
		ULong length
		NSOF drive string

This command asks the desktop to change the drive on the desktop and set the directory to the current directory for that drive. The string contains the drive letter followed by a colon e.g. "C:".

kDGetDefaultPath

Desktop	<	Newton
		ULong 'dpth'
		ULong length = 0

This commands requests the desktop system to return the default path. This is the list that goes in the folder popup for the Mac and in the directories list for Windows.

kDSetPath

Desktop	<	Newton
		ULong 'spth'
		ULong length
		NSOF array of strings

This command tells the desktop that the user has changed the path. The desktop responds with a new list of files and folders. The path is sent as an array of strings rather than an array of frames as all of the other commands are for performance reasons. For the Mac, the array would be something like:

```
[ "Desktop", {name:"My hard disk", whichVol:0}, "Business" ]
```

to set the path to "My hard disk:business:". "Desktop" will always be at the start of the list, since that's the way Standard File works. So if the user wanted to set the path to somewhere in the Desktop Folder he would send something like

```
[ "Desktop", {name:"Business", whichVol:-1} ]
```

to set the path to "My hard disk:Desktop Folder:business:"

The second item in the array, will always be a frame instead of a string and will contain an additional slot `whichVol` to indicate to the desktop whether that item is a name of a volume or a folder in the Desktop Folder and if so its `volRefNum`.

For Windows the array would be something like:

```
[ "c:\", "business" ]
```

to set the path to "c:\business."

kDPath

Desktop	>	Newton
ULong	'path'	
ULong	length	
NSOF	array of folder frames	

This command returns the initial strings for the folder popup in the Mac version of the window and for the directories list in the Windows version. It is also returned after the user taps on a folder alias. In this case the path must be changed to reflect the new location. Each element of the array is a frame that takes the form:

```
{ name: "MacintoshHD",
  type: kDesktopDisk,
  diskType: kHardDrive,
  whichVol: 0 } // optional - see below
```

where type is one of (desktop = 0, file = 1, folder = 2, disk = 3): see the Desktop file types enum in DockProtocol.h. If the type is kDesktopDisk, there is an additional slot diskType with the values (floppy = 0, hardDrive = 1, cdRom = 2, netDrive = 3): see the Desktop disk drive types enum in DockProtocol.h. Finally, for the second frame in the array i.e. the one after Desktop, there will be an additional slot whichVol, which will be a 0 if the item is disk or a volRefNum if the item is a folder on the desktop.

For example, the Mac might send:

```
[ {name: "Desktop", type: kDesktop},
  {name: "My HD", type: kDesktopDisk, diskType: kHardDrive, whichvol: 0},
  {name: "Business", type: folder} ]
```

or for some folder on the desktop it might send:

```
[ {name: "Desktop", type: kDesktop},
  {name: "Business", type: kDesktopFolder, whichvol: -1},
  {name: "My Folder", type: kDesktopFolder} ]
```

for Windows it might be:

```
[ {name: "c:\", type: kDesktopFolder},
  {name: "Business", type: kDesktopFolder} ]
```

kDGetFilesAndFolders

Desktop	<	Newton
		ULong 'gfil'
		ULong length= 0

This command requests that the desktop system return the files and folders necessary to open a standard file like dialog.

kDFilesAndFolders

Desktop	>	Newton
ULong	'file'	
ULong	length	
NSOF	array of file/folder frames	

This command returns an array of information that's used to display a standard file like dialog box on the Newton. Each element of the array is a frame describing one file, folder or device. An individual frame would look like:

```
{ name: "Whatever",
  type: kDesktopFolder,
  disktype: 0,           // optional if type = disk
  whichVol: 0,           // optional if name is on the desktop
  alias: nil }           // optional if it's an alias
```

The frames should be in the order in the array that they are to be displayed in on the Newton. For example, the array might look like this:

```
[ {name: "Applications", type: kDesktopFolder},
  {name: "important info", type: kDesktopFile},
  {name: "System", type: kDesktopFolder}]
```

If the type is a disk, then the frame will have an additional slot `disktype` with the values (floppy = 0, hardDrive = 1, cdRom = 2, netDrive = 3): see the Desktop disk drive types enum in `DockProtocol.h`. Also, if the current location is the desktop, there is an additional slot `whichVol` to indicate the location of the individual files, folders and disks with the values 0 for disks and a negative number for the `volRefNum` for files and folders on the desktop.

If the item is an alias there is an `alias` slot. The existence of this slot indicates that the item is an alias.

kDGetFileInfo

Desktop	<	Newton
		ULong 'gfin'
		ULong length
		NSOF filename

This command asks the desktop to return info about the specified file. See `kDFileInfo` for info about what's returned.

The `filename` is normally a string, but if the selected item is at the Desktop level, a frame

```
{ name:"Business", whichVol:-1 }
```

will be sent instead, to indicate the `volRefNum` for the file.

kDFileInfo

Desktop	>	Newton
ULong	'finf'	
ULong	length	
NSOF	info frame	

This command is sent in response to a `kDGetFileInfo` command. It returns a frame that looks like this:

```
{ kind: "Microsoft Word document", size: 20480,
  created: 3921837, modified: 3434923,
  icon: <binary object of icon>,
  path: "hd:files:another folder:" }
```

`kind` is a description of the file.
`size` is the number of bytes (actual, not the amount used on the disk).
`created` is the creation date in Newton date format.
`modified` is the modification date of the file.
`icon` is an icon to display. This is optional.
`path` is the "user understandable" path description

kDGetInternalStore

Desktop		Newton
	<	
		ULong 'gist'
		ULong length = 0

This command requests the Newton to return info about the internal store. The result is described with the `kDInternalStore` command.

kDInternalStore

Desktop		Newton
	>	
ULong	'isto'	
ULong	length	
NSOF	store frame	

This command returns information about the internal store. The info is in the form of a frame that looks like this:

```
{ name: "Internal",
  signature: 27675205,
  totalSize: 3608096,
  usedSize: 535972,
  kind: "Internal"
}
```

This is the same frame returned by `kDStoreNames` except that the store info isn't returned.

kDResolveAlias

Desktop		Newton
	<	
		ULong 'rali'
		ULong length = 0

kDAliasResolved

Desktop		Newton
	>	
ULong	'alir'	
ULong	length = 4	
ULong	result: 0 or 1	

This command is sent by the desktop in response to the `kDResolveAlias` command. If the value is 0, the alias can't be resolved. If the data is 1 (or non-zero) the alias can be resolved.

Restore Originated on Newton

Restore uses the file browsing interface described above. After the user taps the Restore button on the Newton Dock slip, the following commands are used:

Desktop	Newton
	< kDRestoreFile
kDResult	>
	< kDGetRestoreOptions
kDRestoreOptions	>
	< kDRestoreOptions
kDSourceVersion	>

Selective restore proceeds as a normal restore would except when it wants to restore a package. In this case it does this:

```
kDRestorePackage      >
                      < kDResult
```

If the user picks a full restore it proceeds like this:

```
                      < kDRestoreFile
kDResult              >
                      < kDRestoreAll
kDSourceVersion       >
```

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDRestoreFile

Desktop	<	Newton
		ULong 'rsfl'
		ULong length
		NSOF filename string

This command asks the desktop to restore the file specified by the last path command and the filename. If the selected item is at the Desktop level, a frame

```
{ name:"Business", whichVol:-1 }
```

is sent. Otherwise, a string is sent.

kDGetRestoreOptions

Desktop	<	Newton
		ULong 'grop'
		ULong length = 0

This command is sent to the desktop if the user wants to do a selective restore. The desktop should return a kDRestoreOptions command.

kDRestoreOptions

Desktop	>	Newton
ULong	'ropt'	
ULong	length	
NSOF	restore info frame	

This command is sent to the newton to specify which applications and packages can be restored. It is sent in response to a kDRestoreFile command from the Newton. If the user elects to do a selective restore the Newton returns a similar command to the desktop indicating what should be restored.

The info frame specifies which applications and packages should be restored:

```
{ storeType: kRestoreToNewton,
  packages: ["pkg1",...],
  applications: ["appl",...] }
```

`storeType` indicates whether the data will be restored to a card or internally to the Newton: see the Backup file origin enum in DockProtocol.h.

kDRestoreAll

Desktop	<	Newton
		ULong 'rall'
		ULong length = 4
		ULong merge

This command is sent to the desktop if the user elects to restore all information. `merge` is 0 to not merge, 1 to merge.

kDRestorePackage

Desktop	>	Newton
ULong 'rpkg'		
ULong length		
NSOF array of packages		

This command sends all the entries associated with a package to the newton in a single array. Packages are made up of at least 2 entries: one for the package info and one for each part in the package. All of these entries must be restored at the same time to restore a working package. A `kDResult` is returned after the package has been successfully restored.

File Importing

File importing uses the file browsing interface described above. After the user taps the Import button on the Newton Dock slip, the following commands are used:

Desktop	Newton
	< kDImportFile
kDTranslatorList	> when there's more than one
	< kDSetTranslator translator available
kDImporting	>
	< kDResult

When the data is ready to be sent to the Newton:

kDSetStoreToDefault	>
	< kDResult
kDSetCurrentSoup	>
	< kDResult
kDAddEntry	>
	< kDAddedID
kDAddEntry	>
	< kDAddedID
kDSoupsChanged	>

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDImportFile

Desktop	<	Newton
---------	---	--------

ULong	'impt'
ULong	length
NSOF	filename string

This command asks the desktop to import the file specified by the last path command and the filename string. The response to this can be either a list of translators (if there is more than one applicable translator) or an indication that importing is in progress. If the selected item is at the Desktop level, a frame

```
{ name:"Business", whichVol:-1 }
```

is sent. Otherwise, a string is sent.

kDTranslatorList

Desktop	>	Newton
ULong		'trnl'
ULong		length
NSOF		array of strings

This command returns an array of translators that can be used with the specified file. The list can include DataViz translators and tab templates. The array should be in the order that the translators should be displayed in the list.

kDSetTranslator

Desktop	<	Newton
		ULong 'tran'
		ULong length = 4
		ULong index

This command specifies which translator the desktop should use to import the file. The translator index is the index into the translator list sent by the desktop in the kDTranslatorList command. The desktop should acknowledge this command with an indication that the import is proceeding.

kDImporting

Desktop	>	Newton
ULong		'dimp'
ULong		length = 0

This command is sent to let the Newton know that an import operation is starting. The Newton will display an appropriate message after it gets this message.

kDSetStoreToDefault

Desktop	>	Newton
ULong		'sdef'
ULong		length = 0

This command can be used instead of kDSetCurrentStore. It sets the current store to the one the user has picked as the default store (internal or card).

kDSoupsChanged

Desktop	>	Newton
ULong		'schg'
ULong		length
NSOF		array of soup change info

This command returns information about what was imported into the Newton. Each array element specifies a soup and how many entries were added to it. There will typically be only one frame in the array. The frame will look like this:

```
[ {soupName: "Notes", count: 7},  
  {soupName: "Names", count: 3} ]
```

SIMON'S NOTE This doesn't appear to be used.

Package Loading

Package loading uses the file browsing interface described above. After the user taps the Load Package button on the Newton Dock slip, the following commands are used:

Desktop		Newton
	<	kDLoadPackageFile
kDLoadPackage	>	
	<	kDResult

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDLoadPackageFile

Desktop	<	Newton
		ULong 'lpfl'
		ULong length
		NSOF filename

This command asks the desktop to load the package specified by the last path command and the filename string. If the selected item is at the Desktop level, a frame

```
{ name:"Business", whichVol:-1 }
```

is sent. Otherwise, a string is sent.

kDLoadPackage

Desktop	>	Newton
ULong	'lpkg'	
ULong	length	
UChar	package data []	

This command will load a package into the Newton's RAM. The package data should be padded to an even multiple of 4 by adding zero bytes to the end of the package data.

kDGetPackageInfo

Desktop	>	Newton
ULong	'gpin'	
ULong	length	
NSOF	package name	

The package info for the specified package is returned. See the `kDPackageInfo` command described below. Note that multiple packages could be returned because there may be multiple packages with the same title but different package ids. Note that this finds packages only in the current store.

kDPackageInfo

Desktop	<	Newton
		ULong 'pinf'
		ULong length
		NSOF array of info frames

This command is sent in response to a `kDGetPackageInfo` command. An array is returned that contains a frame for each package with the specified name (there may be more than one package with the same name but different package id). The returned frame looks like this:

```
{ name:           "package name passed in",
  packageSize:    123,
  packageID:      123,
  packageVersion: 1,
  format:         1,
  deviceKind:     1,
  deviceNumber:   1,
  deviceID:       1,
  modTime:        49228866,
  isCopyProtected: true,
  length:         1723,
  safeToRemove:   true }
```

kDRemovePackage

Desktop	>	Newton
ULong 'rmvp'		
ULong length		
NSOF package name		

This command tells the Newton to delete a package. It can be used during selective restore or any other time.

Functions Initiated by the Desktop While Connected

With the advent of the new protocol, the Newton and the desktop can be connected, but with no command specified. A command can be requested by the user on either the Newton or the Desktop. Commands requested by the Newton user are discussed above. This section describes the commands sent from the Desktop to the Newton in response to a user request on the desktop.

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDDesktopControl

Desktop	>	Newton
ULong 'dsnc'		
ULong length = 0		

To indicate that the desktop is in control, each of the following commands should be preceded by a `kDDesktopControl` command, to which the Newton does not reply. Control is relinquished when the desktop sends a `kDOperationDone` command.

kDRequestToSync

Desktop	>	Newton
ULong		'ssyn'
ULong		length = 0

This command is sent when the desktop wants to start a sync operation, when both the Newton and the desktop were waiting for the user to specify an operation.

kDRequestToRestore

Desktop	>	Newton
ULong		'rrst'
ULong		length = 0

This command is sent when the desktop wants to start a restore operation, when both the Newton and the desktop were waiting for the user to specify an operation.

kDRequestToInstall

Desktop	>	Newton
ULong		'rins'
ULong		length = 0

This command is sent when the desktop wants to start a load package operation, when both the Newton and the desktop were waiting for the user to specify an operation.

During an install session, packages are loaded with the `kDLoadPackage` command, so the command sequence looks like:

Desktop	Newton
kDDesktopControl	>
kDRequestToInstall	>
	< kDResult
kDLoadPackage	>
	< kDResult
kDLoadPackage	>
	< kDResult
kDOperationDone	>

An install session can also be cancelled by either Newton or desktop as usual:

Desktop	Newton
	< kDOperationCanceled
kDOpCanceledAck	>

Remote Query

All of the commands in this section are based on the NewtonScript query functions. Please see the Newton Programmer's Guide for details about the functions performed by the commands. The query command returns an id representing the query's cursor. Each of the other commands take this cursor as a parameter. Entries are returned with the `kDEntry` command.

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDQuery

Desktop	>	Newton
ULong		'qury'
ULong		length
NSOF		parameter frame

The parameter frame must contain a `querySpec` slot and may contain a `soupName` slot.

Performs the specified query on the current store. The query spec is a full query spec including valid test, etc. functions. The soup name is a string that's used to find a soup in the current store to query. If the soup name is an empty string or a `NILREF` the query is done on the current soup. A `kDLongData` is returned with a cursor ID that should be used with the rest of the remote query commands.

kDLongData

Desktop	<	Newton
		ULong
		'ldta'
		ULong
		length = 4
		ULong
		long data

Newton returns a long value. The interpretation of the data depends on the command which prompted the return of the long value.

kDCursorGotoKey

Desktop	>	Newton
ULong		'goto'
ULong		length = 4 + key size
ULong		cursor id
NSOF		key

The entry at the specified key location is returned. `NILREF` is returned if there is no entry with the specified key.

kDEntry

Desktop	<	Newton
		ULong
		'ntry'
		ULong
		length
		NSOF
		soup entry

kDCursorEntry

Desktop	>	Newton
ULong		'crsr'
ULong		length = 4
ULong		cursor id

Requests the entry at the current cursor.

kDCursorMap

Desktop	>	Newton
---------	---	--------

ULong	'cmap'
ULong	length = 4 + function size
ULong	cursor id
NSOF	function

Applies the specified function to each of the cursor's entries in turn and returns an array of the results. A `kDRefResult` is returned. See `MapCursor` in NPG.

kDRefResult

Desktop	<	Newton
		ULong 'ref '
		ULong length
		NSOF result

kDCursorMove

Desktop	>	Newton
ULong	'move'	
ULong	length = 8	
ULong	cursor id	
ULong	count	

Moves the cursor forward `count` entries from its current position and returns that entry. Returns `NILREF` if the cursor is moved past the last entry.

kDCursorNext

Desktop	>	Newton
ULong	'next'	
ULong	length = 4	
ULong	cursor id	

Moves the cursor to the next entry in the set of entries referenced by the cursor and returns the entry. Returns `NILREF` if the cursor is moved past the last entry.

kDCursorPrev

Desktop	>	Newton
ULong	'prev'	
ULong	length = 4	
ULong	cursor id	

Moves the cursor to the previous entry in the set of entries referenced by the cursor and returns the entry. If the cursor is moved before the first entry `NILREF` is returned..

kDCursorReset

Desktop	>	Newton
ULong	'rset'	
ULong	length = 4	
ULong	cursor id	

Resets the cursor to its initial state. A `kDResult` of 0 is returned.

kDCursorResetToEnd

Desktop	>	Newton
ULong	'rend'	
ULong	length = 4	

```

        ULong      cursor id

```

Resets the cursor to the rightmost entry in the valid subset. A `kDResult` of 0 is returned.

kDCursorCountEntries

Desktop	>	Newton
ULong	'cnt '	
ULong	length = 4	
ULong	cursor id	

Returns the count of the entries matching the query specification. A `kDLongData` is returned.

kDCursorWhichEnd

Desktop	>	Newton
ULong	'whch'	
ULong	length = 4	
ULong	cursor id	

Returns `kDLongData` with a 0 for unknown, 1 for start and 2 for end.

kDCursorFree

Desktop	>	Newton
ULong	'cfre'	
ULong	length = 4	
ULong	cursor id	

Disposes the cursor and returns a `kDResult` with a 0 or error code.

Keyboard Passthrough

Keyboard passthrough can be initiated by both desktop:

Desktop	Newton
<code>kDStartKeyboardPassthrough</code>	>
	< <code>kDStartKeyboardPassthrough</code>
<code>kDKeyboardString</code>	>
<code>kDKeyboardString</code>	>

and Newton:

Desktop	Newton
	< <code>kDStartKeyboardPassthrough</code>
<code>kDKeyboardString</code>	>
<code>kDKeyboardString</code>	>

At any time keyboard passthrough can be cancelled by the desktop:

Desktop	Newton
<code>kDOperationCanceled</code>	>
	< <code>kDOpCanceledAck</code>

or by the Newton:

Desktop	Newton
	< <code>kDOperationCanceled</code>

kDOPCanceledAck >

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDStartKeyboardPassthrough

Desktop	<>	Newton
	ULong	'kybd'
	ULong	length = 0

This command is sent to enter keyboard passthrough mode. It can be followed only by kDKeyboardChar, kDKeyboardString, kDHello and kDOperationCanceled commands.

kDKeyboardChar

Desktop	>	Newton
ULong	'kdbc'	
ULong	length = 4	
UniChar	character	
UShort	state	

This command sends *i* unicode character to the Newton for processing.

The keyboard state is defined as follows:

Bit *i* = command key down

SIMON'S NOTE The keyboard state appears to be ignored.

kDKeyboardString

Desktop	>	Newton
ULong	'kbds'	
ULong	length	
UniChar	string[]	

This command sends a string of characters to the Newton for processing. The characters are 2-byte unicode characters in big-endian order and must be null-terminated. If there are an odd number of characters the command should be padded, as usual.

Miscellaneous Additions

Dock Commands

All commands begin with the 'newt', 'dock' event header as shown in the general form. For simplicity, that's not shown in the descriptions that follow.

kDGetAppNames

Desktop	>	Newton
ULong	'gapp'	
ULong	length = 4	

ULong what to return

This command asks the Newton to send information about the applications installed on the Newton. See the `kDAppNames` description below for details of the information returned. The `what to return` parameter determines what information is returned; see the `Info to return with kDAppNames` enum in `DockProtocol.h`.

```
0: return names and soups for all stores
1: return names and soups for current store
2: return just names for all stores
3: return just names for current store
```

kDAppNames

Desktop	<	Newton
ULong		'appn'
ULong		length
NSOF		result frame

This command returns the names of the applications present on the newton. It also, optionally, returns the names of the soups associated with each application. The array looks like this:

```
{[name: "app name", soups: ["soup1", "soup2"]},
 {name: "another app name", ...}, ...]
```

Some built-in names are included. "System information" includes the system and directory soups. If there are packages installed, a "Packages" item is listed. If a card is present and has a backup there will be a "Card backup" item. If there are soups that don't have an associated application (or whose application I can't figure out) there's an "Other information" entry.

The soup names are optionally returned depending on the value received with `kDGetAppNames`.

kDSetVBOCompression

Desktop	>	Newton
ULong		'cvbo'
ULong		length = 4
ULong		what to compress

This command controls which VBOs are sent compressed to the desktop. VBO can always be sent compressed, never compressed or only package VBOs sent compressed; see the VBO compression enum in `DockProtocol.h`.

```
0: don't compress VBOs
1: compress packages only
2: compress VBOs
```

kDRestorePatch

Desktop	>	Newton
ULong		'rpat'
ULong		length
NSOF		patch data

This command is used to restore the patch backed up with `kDGetPatches`. The Newton returns a `kDResult` of 0 (or an error if appropriate) if the patch wasn't installed. If the patch was installed the Newton restarts.

kDSourceVersion

Desktop	>	Newton
ULong	'sver'	
ULong	length = 16	
ULong	version	
ULong	manufacturer	
ULong	machine type	
ULong	patch data	

This command tells the Newton the version that the subsequent data is from; see the Source OS version enum in DockProtocol.h.

```
kOnePointXData = 1
kTwoPointXData = 2
```

For example, if a 1.x data file is being restored the desktop would tell the Newton that version 1 data is coming. Same for importing a 1.x NTF file. Otherwise, it should indicate that 2.x data is coming. When the connection is first started the version defaults to 2.x. This information is necessary for the Newton to know whether or not it should run the conversion scripts. A `kDResult` command with value 0 is sent by the Newton in response to this command. This command affects only data added to the Newton with `kDAddEntry` and `kDAddEntryWithUniqueID` commands. In particular, note that data returned by `kDReturnEntry` isn't converted if it's a different version than was set by this command.

`manufacturer` and `machine type` tell the Newton the type of Newton that's the source of the data being restored. These are sent at the beginning of a connection as part of the `kDNewtonName` command.

kDGetPassword

Desktop	>	Newton
ULong	'gpwd'	
ULong	length	
NSOF	title string	

This command displays the password slip to let the user enter a password. The string is displayed as the title of the slip. A `kDPassword` command is returned.

Protocol Extension Operations

kDRegProtocolExtension

Desktop	>	Newton
ULong	'pext'	
ULong	length	
ULong	command	
NSOF	function	

This command installs a protocol extension into the Newton. The extension lasts for the length of the current connection (in other words, you have to install the extension every time you connect). The function is a NewtonScript closure that would have to be compiled on the desktop. See the Dante Connection (ROM) API IU document for details. A `kDResult` with value 0 (or the error value if an error occurred) is sent to the desktop in response.

kDRemoveProtocolExtension

Desktop	>	Newton
ULong	'prex'	
ULong	length	
ULong	command	

This command removes a previously installed protocol extension.

Import Operations

kDImportParametersSlip

Desktop	>	Newton
ULong	'islp'	
ULong	length	
NSOF	info frame	

The following is a possible example of what would be displayed on the Newton following the kDImportParametersSlip command:

<missing image>

The slip will, at minimum, display 2 text string fields corresponding to the slip title and a filename. Up to 5 additional fields, plus the CloseBox, could be displayed. While the slip is displayed, kDHello commands are sent to the desktop. When the user taps on the "Import" button or the CloseBox, a kDImportParameterSlipResult is sent to the desktop. Each of the other 5 fields is shown if the slot defining it exists in the frame parameter.

The frame contains the following slots used to configure the display of the slip:

```
{
  slipTitle: "PDF Import",           // REQUIRED string for slip title
  fileName: "Results.pdf",          // REQUIRED name of file being imported
  appListInfo: {
    title: "Import into",           // title above textlist
    listItems: ["Notes","Works"],  // name of applications listed in textlist
    selected: [1] },               // array in indexes of items in the
                                   // listitems array to select. e.g. [1,3]
                                   // would select 1st and 3rd items
  conflictsInfo: {
    text: "string",                 // string for labelpicker label
    labelCommands: ["one","two"] }, // array of strings
                                   // corresponding to available choices
                                   // in picker list
  datesInfo: {
    title: "string1",               // title above datedurationtextpicker
    text: "string2",                // datedurationtextpicker label
    startTime: 48828712,             // start time (minutes from 1/1/1904)
    stopTime: 48828927 },           // stop time (minutes from 1/1/1904)
  importInfo: {
    title: "Import" ,               // REQUIRED string for button label
    importParametersDoneScript: func() nil } // function object to call
                                   // after button is tapped
}
```

kDImportParameterSlipResult

Desktop	<	Newton
		ULong 'islr'
		ULong length
		NSOF result frame

This command is sent after the user closes the slip displayed by `kDImportParametersSlip`. The result is a frame containing the following three slots:

```
{
  appList : ["Notes","Works"],      // strings of the items selected
                                      // in the textlist of applications
  conflicts : "string",              // string of labelpicker entry line
  dates : [48828712, 48828927]      // beginning and ending dates
                                      // of the selected interval
                                      // expressed in minutes
}
```

If the user cancels, the result sent is a `NILREF`.

Store Operations

`kDSetStoreName`

Desktop	>	Newton
ULong		'ssna'
ULong		length
NSOF		name string

This command requests that the name of the current store be set to the specified name.

`kDSetStoreSignature`

Desktop	>	Newton
ULong		'ssig'
ULong		length
ULong		signature

This command sets the signature of the current store to the specified value. A `kDResult` with value 0 (or the error value if an error occurred) is sent to the desktop in response.

`kDGetDefaultStore`

Desktop	>	Newton
ULong		'gdfs'
ULong		length = 0

This command returns info about the default store. This info is the same as the info returned by the `kDGetStoreNames` command (see `kDStoreNames` for details). The default store is the one used by `kDLoadPackage`.

`kDDefaultStore`

Desktop	<	Newton
		ULong 'dfst'
		ULong length
		NSOF store frame

This command returns a store info frame describing the default store. This frame contains the same info returned for all stores by the `kDStoreNames` command except that it doesn't include the store info. It contains the name, signature, total size, used size and kind.

`kDCreateDefaultSoup`

Desktop	>	Newton
---------	---	--------

ULong	'cdsp'
ULong	length
UniChar	soup name string

This command creates a soup on the current store. It uses a registered soupdef to create the soup meaning that the indexes, etc. are determined by the ROM. A `kDResult` is returned. If no soupdef exists for the specified soup an error is returned.

kDSetStoreGetNames

Desktop	>	Newton
ULong		'ssgn'
ULong		length
NSOF		store frame

This command is the same as `kDSetCurrentStore` except that it returns the names of the soups on the stores as if you'd send a `kDGetSoupNames` command. It sets the current store on the Newton. A store frame is sent to uniquely identify the store to be set:

```
{ name: "Gilligan's Island",
  kind: "Flash storage card",
  signature: 734830,
  info: {store-info-frame}      // this one is optional
}
```

A `kDSoupNames` is sent by the Newton in response.

Soup Operations

kDSetSoupSignature

Desktop	>	Newton
ULong		'ssos'
ULong		length
ULong		signature

This command sets the signature of the current soup to the specified value. A `kDResult` with value 0 (or the error value if an error occurred) is sent to the desktop in response.

kDSendSoup

Desktop	>	Newton
ULong		'snds'
ULong		length = 0

This command requests that all of the entries in a soup be returned to the desktop. The Newton responds with a series of `kDEntry` commands for all the entries in the current soup followed by a `kDBackupSoupDone` command. All of the entries are sent without any request from the desktop (in other words, a series of commands is sent). The process can be interrupted by the desktop by sending a `kDOperationCanceled` command. The cancel will be detected between entries. The `kDEntry` commands are sent exactly as if they had been requested by a `kDReturnEntry` command (they are long padded).

kDBackupSoup

Desktop	>	Newton
ULong		'bksp'
ULong		length = 4

ULong last known unique id

This command is used to backup a soup. The result is a series of commands that includes all entries changed since the last sync time (set by a previous command), all entries with a unique id greater than the one specified, and the unique ids of all other entries to be used to determine if any entries were deleted. The changed entries are sent with `kDEntry` commands. The unique ids are sent with a `kDBackupIDs` command. A `kDBackupSoupDone` command finishes the sequence. If there are any ids > 0x7FFF there could also be a `kDSetBaseID` command. The changed entries and unique ids are sent in unique id sequence. The Newton checks for `kDOperationCanceled` commands occasionally. If the soup hasn't been changed since the last backup a `kDSoupNotDirty` command is sent instead of the ids. A typical sequence could look like this:

Desktop	Newton
<code>kDBackupSoup</code>	>
	< <code>kDBackupIDs</code>
	< <code>kDEntry</code>
	< <code>kDEntry</code>
	< <code>kDBackupIDs</code>
	< <code>kDEntry</code>
	< <code>kDSetBaseID</code>
	< <code>kDBackupIDs</code>
	< <code>kDBackupSoupDone</code>

See the definition of the other commands for details.

kDSoupNotDirty

Desktop	<	Newton
		ULong 'ndir'
		ULong length = 0

This command is sent in response to a `kDBackupSoup` command if the soup is unchanged from the last backup.

kDBackupIDs

Desktop	<	Newton
		ULong 'bids'
		ULong length = -1
		SShort encoded ids

This command is sent in response to a `kDBackupSoup` command--see that command for command sequence details. The length for this command is always set to -1 indicating that the length is unknown. The ids are specified as a compressed array of 16 bit numbers. Each id should be offset by any value specified by a previous `kDSetBaseID` command (this is how we can specify a 32 bit value in 15 bits). Each id is a number between 0 and 0x7FFF (32767). Negative numbers specify a count of the number of entries above the previous number before the next break (non-contiguous id). The sequence is ended by a 0x8000 word. So, if the Newton contains ids

0, 1, 2, 3, 4, 10, 20, 21, 30, 31, 32

the array would look like this:

0, -4, 10, 20, -1, 30, -2, 0x8000

Thus we send 8 words instead of 11 longs. Is it worth it? If there are a lot of entries it should be.

kDSetBaseID

Desktop	<	Newton
---------	---	--------

ULong	'base'
ULong	length = 4
ULong	new base id

This command sets a new base id for the ids sent with subsequent `kDBackupIDs` commands. The new base is a long which should be added to every id in all `kDBackupIDs` commands until a `kDBackupSoupDone` command is received.

kDBackupSoupDone

Desktop	<	Newton
		ULong 'bsdn'
		ULong length = 0

This command terminates the sequence of commands sent in response to a `kDBackupSoup` command.

Entry Operations

kDAddEntryWithUniqueID

Desktop	>	Newton
ULong	'auni'	
ULong	length	
NSOF	entry frame	

This command is sent when the PC wants to add an entry to the current soup. The entry is added with the id specified in the data frame. If the id already exists an error is returned.

WARNING! This function should only be used during a restore operation. In other situations there's no way of knowing whether the entry's id is unique. If an entry is added with this command and the entry isn't unique an error is returned.

General Operations

kDCallGlobalFunction

Desktop	>	Newton
ULong	'cgfn'	
ULong	length	
NSOF	function name symbol	
NSOF	function args array	

This command asks the Newton to call the specified function and return its result. This function must be a global function. The return value from the function is sent to the desktop with a `kDCallResult` command.

kDCallRootMethod

Desktop	>	Newton
ULong	'crmf'	
ULong	length	
NSOF	method name symbol	
NSOF	method args array	

This command asks the Newton to call the specified root method. The return value from the method is sent to the desktop with a `kDCallResult` command.

kDCallResult

Desktop	<	Newton
		ULong 'cres'
		ULong length
		NSOF result ref

This command is sent in response to a `kDCallGlobalFunction` or `kDCallRootMethod` command. The ref is the return value from the function or method called.

kDResultString

Desktop	>	Newton
ULong	'ress'	
ULong	length	
SLong	error code	
NSOF	error string	

Reports a desktop error to the Newton. The string is included since the Newton doesn't know how to decode all the desktop errors (especially since the Mac and Windows errors are different).

kDOperationDone

Desktop	>	Newton
ULong	'opdn'	
ULong	length = 0	

This command is sent when an operation is completed. It's only sent in situations where there might be some ambiguity. Currently, there are two situations where this is sent. When the desktop finishes a restore it sends this command. When a sync is finished and there are no sync results (conflicts) to send to the Newton the desktop sends this command. Hmm... not quite true.

kDOperationCanceled

Desktop	< >	Newton
	ULong 'opca'	
	ULong length = 0	

This command is sent when the user cancels an operation. The receiver should return to the "ready" state and acknowledge the cancellation with a `kDOpCanceledAck` command..

kDOpCanceledAck

Desktop	< >	Newton
	ULong 'ocaa'	
	ULong length = 0	

This command is sent in response to a `kDOperationCanceled`.

kDHello

Desktop	< >	Newton
	ULong 'helo'	
	ULong length = 0	

This command is sent during long operations to let the Newton or desktop know that the connection hasn't been dropped.

kDRefTest

Desktop	< >	Newton
ULong		'rtst'
ULong		length
NSOF		object

This command is first sent from the desktop to the Newton. The Newton immediately echos the object back to the desktop. The object can be any NewtonScript object (anything that can be sent through object read/write).

This command can also be sent with no ref attached. If the length is 0 the command is echoed back to the desktop with no ref included.

kDUnknownCommand

Desktop	< >	Newton
ULong		'unkn'
ULong		length = 4
ULong		bad command

This command is sent when a message is received that is unknown. When the desktop receives this command it can either install a protocol extension and try again or return an error to the Newton. If the built-in Newton code receives this command it always signals an error. The bad command parameter is the 4 char command that wasn't recognized. The data is not returned.

Session Termination

kDDisconnect

Desktop	< >	Newton
ULong		'disc'
ULong		length = 0

This command is sent by either desktop or Newton when the docking operation is complete.

Compatibility

The protocol version has been incremented so old versions of Newton Connection will no longer work with this version. The reason for this is that although the protocol itself is upwardly compatible, the data structures in other parts of the 2.0 Newton have changed to such a degree that old versions of Newton Connection will no longer work.

However, since it's desirable also to support package downloading from NPI, NCK 1.0 and Connection 2.0 the ROMs will also support the old protocol for downloading packages. To make this work, the 2.0 ROMs will pretend that they are talking the old protocol when they send the `kDRequestToDock` message. If a new connection (or other app) is on the other end the protocol will be negotiated up to the current version. Only package loading is supported with the old protocol.

When a 2.0 ROM Newton is communicating with NPI 1.0, NCK 1.0 or 2.0 Connection the session would look like this:

Desktop	Newton
	< kDRequestToDock

kDInitiateDocking	>	session type MUST be loadPackage
	< kDNewtonName	
kDSetTimeout	>	optional
	< kDResult	
kDLoadPackage	>	
	< kDResult	
kDDisconnect	>	