



BREW[®] Application Manager and MobileShop[®] 2.1 Guide

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1 Introducing the BREW Application Manager and MobileShop Guide

The *BREW[®] Application Manager and MobileShop[®] Guide* describes the BREW[®] Application Manager (Application Manager) and MobileShop[®]. MobileShop is an application that is a component of Application Manager. Application Manager and MobileShop are delivered to device manufacturers as source code.

This guide presents the design specifications for the reference version of Application Manager. The design specification for the final version is defined through the customization process described in [BREW Application Manager Customization Process](#) on page 11. You need to implement the information provided in all sections of this document to support BREW.

For more information

Online information and support is available for BREW OEMs. Visit the BREW OEM extranet (<https://brewx.qualcomm.com/oem>) for details.

2 BREW Application Manager Overview

The Application Manager is a BREW application that enables device users to start and manage BREW applications and provides file system support for greater than 4GB capacity if the appropriate PK patch has been installed. The Application Manager also includes a software tool called MobileShop that allows device users to browse, purchase, and download BREW applications from the BREW Application Download Server (ADS). Every BREW device must implement a version of the Application Manager.

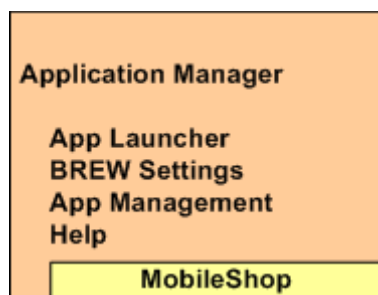


Figure 1. Application Manager

Application Manager is delivered to device manufacturers as a reference application, and it is intended to be customized based primarily on the carrier specific design and branding requirements. Device manufacturers may also modify the design for a particular handset. Customizing the Application Manager involves the carrier, device manufacturers, and Qualcomm, as depicted in Figure 2.

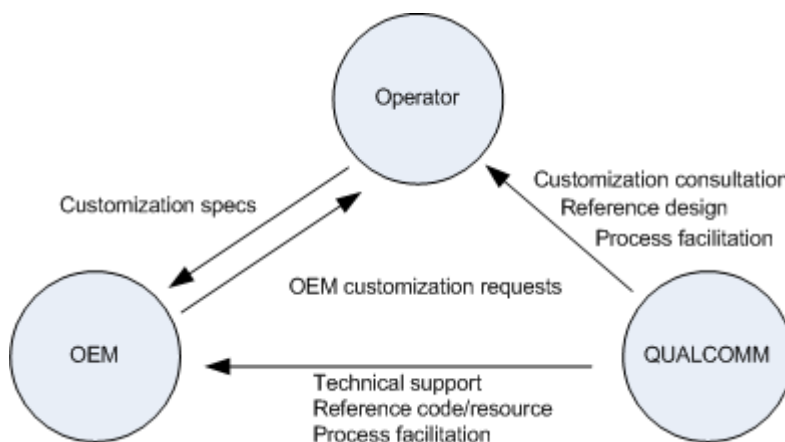


Figure 2. BREW Application Manager customization process

Because the process involves the carrier, device manufacturer, and Qualcomm at different levels, Qualcomm will facilitate the process for efficiency. See [BREW Application Manager Customization Process](#) on page 11.

To support the device users when using and managing BREW applications, a set of features have been identified that must be supported by the final customized version of the Application Manager. For information on the required features, see [BREW Application Manager Required Features](#) on page 13.

Although the Application Manager is a reference application, the carrier often does not have to make significant modifications. For information on design specifications, see [Reference UI Specifications](#) on page 26.

Application Manager package for device manufacturers

The Application Manager package consists of the following items.

- Application Manager source files
- Graphics source files
- Documents:
 - *BREW® Application Manager and MobileShop® Guide*
 - *BREW® Application Manager and MobileShop® Integration Guide*
- English resource files
- Language neutral resource file

Resource files for the following languages are available through the BREW OEM Extranet:

- Chinese (simplified)
- French (Canadian)
- Japanese
- Korean
- Portuguese (Brazilian)
- Spanish (Latin American)

3 BREW Application Manager Customization Process

This section describes a process for supporting a carrier's effort to customize the Application Manager. The Application Manager is provided as source code to the OEMs. Carriers and OEMs can modify the Application Manager to meet their own needs. Customizations often include localization and cosmetics, but other features can be added or modified as long as the application supports the required features described in [BREW Application Manager Required Features](#) on page 13.

Following are the main reasons for using the customizing process:

- Help carriers understand the role and benefit of the Application Manager
- Help carriers identify their customization needs
- Facilitate the communications between carriers, OEMs, and Qualcomm
- Verify that all the required features are implemented

Customization process

The following is a process that is used to facilitate the communications between an operator, a device manufacturer, and Qualcomm.

1. Qualcomm presents the Application Manager to the carrier. The information provided at this time includes:
 - Introduction to the Application Manager
 - Feature requirements
 - Reference Design
2. The carrier checks whether its devices are compatible with the hardware features—for example, support for touch screen that are assumed by the reference design. If there are any devices that are not compatible, the carrier and Qualcomm discuss and determine how to handle each case.
3. Qualcomm and the carrier generate a document that describes how the Application Manager must be customized. This customization document describes only specifications that are different from or added to the specifications described in this document. See [Reference UI Specifications](#) on page 26.
4. Qualcomm reviews the customization document and verifies that all the features are supported.
5. If the customization document is approved, it is presented to the device manufacturers and possibly third party developers. The carrier may allow each device manufacturer to negotiate

- additional customizations. Qualcomm and the carrier will take one of the following two actions if at least one device manufacturer is interested in making additional customizations:
- Generate an additional customization document per OEM that intends to make additional customizations.
 - Or modify the original customization document based on the requests given by device manufacturers.
6. If any revisions are made by device manufacturers, Qualcomm reviews each revised customization document, and verifies that all the features are supported. Otherwise, go to the next step.
 7. Each OEM or possibly third party developers implements the final and customized version of the Application Manager.
 8. The carrier will verify that all features presented in the core document and in the customization document are implemented.

NOTE: Qualcomm will facilitate the process.

4 BREW Application Manager Required Features

This section presents information on the Application Manager's required features. All BREW devices must support all the features that are described in this section. Exceptions are made for those features that are explicitly indicated as options.

Most of the required features listed here are already implemented in the reference application. Those features that must be implemented by the device manufacturers are indicated explicitly.

Starting the Application Manager

- Device users must be able to start the Application Manager using no more than three button presses from the native idle screen. Also, device users must be able to see the Application Manager's icon after pressing no more than one button from the idle screen.

NOTE: This feature must be implemented by the device manufacturer.

Quitting the Application Manager

The Application Manager must quit when one of the following conditions exists:

- If the device user presses the clear key while in the root level UI of the application launcher, MobileShop, the Settings menu, and the Help menu
- If the device user, when in any screen, presses the end key

No other conditions allow the Application Manager to quit.

Touch screen support

Touch screen support allows touch interaction throughout Application Manager. General touch interactions and screen layout modifications required to support touch interaction are described in [Touchscreen specifications](#) on page 27.

Shortcut support

- Shortcut support allows setting of shortcuts for dynamic preloaded and downloaded applications, and enables OEMs to implement a shortcut manager and shortcuts within their applications, including the following:
 - Allows the OEM shortcut application to send a notification to Application Manager for new shortcut settings
 - Enables an OEM shortcut application to retrieve a list of installed applications

OEMs can implement a shortcut manager and shortcuts within their applications. See the *BREW® Application Manager and MobileShop® 2.1 Guide* for more information.

Application information display support

- Application information display support allows custom display of the application information directly on the pricing screen.

Dynamic switching support

- Dynamic switching support allows dynamic switching between all displays (i.e., touchscreen to touchscreen, non-touchscreen to non-touchscreen, or touchscreen to non-touchscreen).

Slider and flip support

Slide and flip support allows Application Manager the ability to respond to slider and flip events using customization settings when the flip or slider is closed.

- Cancels a non-download operation or finishes downloading a new application, and closes Application Manager
- Finishes downloading a new application and transfers the operation of Application Manager to the secondary display

See the *BREW® Application Manager and MobileShop® 2.1 Guide* for more information.

Secondary display support

Secondary display is supported for full Application Manager interaction and supports touch and non-touch secondary displays for QCIF+ or larger with a minimum of 4 external keys on the secondary display as follows:

- Uses one screen at a time and does not use a second display for supplemental information or status
- Supports switching between primary and secondary device displays while maintaining the application state

- Supports touch-enabled primary and secondary displays and adapts the UI as follows:
 - If the secondary display is touch-enabled, touchscreen interaction is supported (see [Touchscreen specifications](#) on page 27).
 - If the secondary display is not touch-enabled, the interaction is supported through key mapping of pre-determined keys for the secondary display. Application Manager requires up, down, select, or clear to operate on a display.

Application tracking

Application Manager tracks the most-used application and the last-used application as follows:

- Tracks the number of times an application is launched by the user
- Tracks the last date and time that each application is launched by the user
- Shows the number of launches and the last date and time launched in the application list that is made available to the OEM shortcut application

Linger timer

The linger timer setting supports a 0-second linger timer. The linger time is reset if another application opens a network connection during the linger period. Linger starts again after the last socket is closed on the device.

File system

Application Manager supports file systems greater than 4GB capacity.

Application Manager icons and names

Qualcomm provides icons for Application Manager and MobileShop. However, the operator determines the final application names and icons to be used for these two applications.

For the use of Qualcomm's trademarks, including the BREW logo, contact Qualcomm.

NOTE: This feature must be implemented by the device manufacturer or the operator.

Application launcher

The Application Manager implements an application launcher tool that allows device users to start applications.

Starting BREW applications

The application launcher allows device users to start all BREW applications, static and dynamic. BREW applications can be started automatically. See [Starting applications automatically](#) on page 23.

Display of application names and icons

The application launcher displays both application icons and their names in the UI. The application icons and the names are retrieved from the Module Information Files (MIF).

Application status indication

Each BREW application has one of the following application statuses. The current status of each application must be visually indicated in the application launcher.

- Disabled applications
- Expired applications
- Demo applications
- Expired demo applications
- Normal applications

Predefined application launcher categories

The Application Manager provides device users with multiple predefined categories. From the device user's point of view, each category is like a folder where BREW applications can be browsed and started. At least one launcher category must be provided by default. Categories cannot be nested and renamed.

The Application Manager must provide tools that allow device users to perform the following tasks in the settings tool:

- Assign launcher categories to BREW applications.
- Change the order of BREW applications listed in each launcher category.

See [Settings](#) on page 20.

Handling disabled applications

If the device user tries to launch a disabled application, the application launcher provides the user with an option to restore the application from the ADS.

Handling expired applications

If the device user tries to launch an expired application, the application launcher provides the user with an option to repurchase the application from the ADS.

Handling demos

If the device user tries to start a demo, the application launcher asks if the user is interested in purchasing the application and provides the following options:

- Purchase the application (default).
- Run the demo.

Handling expired demos

If the device user tries to start an expired demo, the application launcher provides the user with an option to purchase the application from the ADS.

Handling applications RAM fragmentation

If the device user tries to run an application and the device does not have enough RAM due to heap fragmentation, the launcher informs the user that there is not enough RAM to run the application on the device. The launcher suggests to the device user to power cycle the device.

Handling unverified applications

If the user tries to launch an application that has not been verified (i.e., download acknowledgment has not been received by the ADS), the application launcher provides the user with an option to verify the application with the ADS. If the application cannot be verified after the third attempt (i.e., the download acknowledgement fails), the Application Manager removes the application from memory.

MobileShop

The Application Manager implements MobileShop, which is a software tool that allows a device user to browse, purchase, and download BREW applications from the ADS.

MobileShop is presented as an option on the topmost menu in the Application Manager. This is to encourage the device user to use it often for downloading.

Catalog browser

MobileShop is an interactive tool that allows device users to browse the application catalog downloaded from the ADS.

MobileShop and the ADS support several levels of hierarchically organized information. The following sections detail these levels. Following is a short summary:

- Category level as defined through the carrier's catalog Extranet: This level lists the categories of BREW applications, such as games and entertainment. Categories can be nested within other categories, such as action games in the games and entertainment section.
- Application title level, one level down from the category level: The application title level displays the name for each application held within the parent category.

- Application download options level: After an application title is selected, the device user is shown a further level of menu choices that includes the download purchase options and preview information about the application.

MobileShop linger timer

When the device user selects the catalog option from the top level of the MobileShop UI, a connection is made to the ADS. The ADS contains the catalog of BREW applications available for downloading.

If this connection is successfully made, airtime usage occurs. From this point on, a linger timer-part of the BREW platform (but not specific to MobileShop) is applied to control the traffic channel usage and data caching of received information within the MobileShop application. This application catalog information caching occurs for each catalog browsing session, and the cached information is cleared and reset only when the MobileShop application is exited and restarted again.

The airtime linger timer maintains the connection to the ADS and is set to count down by the second. While MobileShop is running, the value of the linger timer is set to the default value of 30 seconds. If additional connection attempts to the server are made by way of a device user's action to request more data, the timer is reset. If the device user provides input to navigate the already downloaded catalog information items for the current MobileShop usage session, the download timer is not reset. The linger time that has not expired is terminated when the device user exits MobileShop.

In an attempt to reduce airtime charges, MobileShop adjusts the linger timer to 1 second when exiting. Adjusting the linger timer to 1 causes BREW to evaluate the network connection needs of all applications running, including background and BREW DNS services, and determine the greatest common denominator to use. In the event that MobileShop is the only application currently using a network connection, the network connection is terminated shortly after the device user exits MobileShop.

Application preview text

When MobileShop retrieves the download/purchase options of an application from the ADS, a brief description about the application may be available from the server. If the preview text is available, MobileShop provides device users with a UI to read the application's description.

Application size preview

When MobileShop retrieves the download or purchase options of an application from the ADS, the size of the application is available and displayed.

Downloading options

After device users find an application they may want to purchase in the catalog browser, MobileShop provides a UI that lists possible download options. The application developers determine which set of download options are available for each BREW application. The following are the possible download options:

- View information about the application.
- Purchase the application—for example, by time, number of uses, subscriptions, and so forth.
- Download a free demo version of the application.
- Upgrade the application (if the older version is already installed).

Restoring a disabled application

A disabled application is an application that the device user has downloaded but has been disabled. A disabled application can be restored by trying to launch the application from the Application Manager. See [Handling disabled applications](#) on page 16.

Searching for applications and categories

MobileShop supports a UI for searching applications and application categories in the catalog by using keywords.

NOTE: This feature requires that you have BDS 1.1 or higher.

Automatically selecting an application to disable

When MobileShop discovers that there is not enough storage space for downloading a new application, MobileShop automatically displays a list of infrequently used and unlocked applications that can be disabled to make space for the download. (See [Lock or unlock](#) on page 23.)

Upgrade options

For applications that have already been downloaded, the device user may have the option to download a reduced price or free upgrade. If an upgrade is available, it is shown in the download options menu. If the device user purchases additional uses or time for an application that can be upgraded, the application is automatically upgraded.

Reinstalling an active application

A device user can use MobileShop to browse the application catalog and purchase additional uses or extend usage of an existing application provided that the same price basis is chosen.

If the device user chooses to redownload an application that does not have any upgrades (binary updates), only the usage information is upgraded and the application binary is actually not redownloaded.

If the device user chooses to download an application that exists at a different price basis (that is, the old price is no longer available), the old price basis is overwritten. Unless the application has any upgrades (binary updates), the application binary is not redownloaded, and only the new usage information is downloaded and stored.

Starting MobileShop from other applications (optional)

MobileShop is started from other applications using cmshop commands..

Price basis change warning

If a device user tries to redownload an existing application using a different price basis, MobileShop warns the user that the new price basis is used instead of the old price basis.

Purchase confirmation

Immediately after a purchase option is selected from the download options menu, MobileShop must ask the device user to confirm the price and the application name.

In addition, if the device user selects a subscription option, MobileShop notifies the device user that he or she is billed for the application periodically—for example, monthly—until the subscription is canceled by the device user.

EULA prompt

After the purchase confirmation dialog, MobileShop may display a EULA dialog for each application if it is provided by the ADS. MobileShop must implement a UI that allows the device user to agree or disagree. MobileShop completes the downloading process only if the device user agrees with the EULA.

Insufficient funds notification (prepay service only)

The insufficient funds notification is for carriers that offer prepay services. When a device user requests an application download from MobileShop, and if the ADS finds that the user does not have enough money to purchase the application in the prepaid account, the user is not allowed to download the application. A message string returned from the ADS appears to the device user.

Credit back capability

The credit back feature is a short-term enhancement to provide a partial solution for an application transfer feature. Credit back is activated when a device user swaps his or her BREW-enable device with another one. The device user is credited for the remaining amount of uses that his or her application had on the old device on the carrier's invoice. To start the credit back process, a special code is entered on the original device. The device user may redownload the application on the new device, but it is considered a separate transaction.

Settings

Application Manager implements an area of the UI that lists a set of BREW specific settings (see the *BREW® Application Manager and MobileShop® 2.1 Guide* for more information).

Application Manager must include the following capabilities:

- Assign launcher categories (folders) to BREW applications
- Edit the order of applications within a launcher category (folder)
- Organize and remove BREW applications; see [Management tool](#) on page 21
- View the log that documents the date of the following activities:
 - Disabling applications
 - Downloading/installing applications
 - Failed downloading attempt
 - Removing applications
 - Restoring application
- Select the current screen saver or turn the screen saver off
- Change the main menu's display style
- Enable or disable airtime warnings
- Access application information

The following capability is for testing only and can be available by modifying a compile time setting:

- Select and switch ADS used by MobileShop; this item must not be included for commercial service

Management tool

Application Manager must implement a management tool that includes a set of small tools for organizing and removing dynamic BREW applications. The tools also allow the viewing of the application's properties, the setting of folders, the settings of sounds and images, and allowing the locking and unlocking of applications. The management tool must be accessible from the settings tool.

Remove applications

The management tool allows device users to remove applications. If the user attempts to remove an application that has not expired, a message displays that the application has not expired. In addition, if the user attempts to remove an application with a shortcut assigned to it, the message also indicates that a shortcut is assigned to the application.

NOTE: As a special UI requirement for subscribed applications, in the remove/disable menu, the management tool uses the phrase “cancel subscription” instead of “remove” for those applications that are subscription-based. After the cancellation is complete, a message appears to confirm that no more invoices are issued and that the application has been deleted.

Postponed transaction notification for canceled subscriptions

When the device user removes a subscription application, the BREW core applications, subsequently referred to as the core applications, attempt to contact the ADS to cancel the subscription immediately upon the removal of the application, unlike the deletion of a nonsubscription application. If the core applications cannot contact the ADS, they queue the transaction with a timestamp, and the transaction is completed when the core applications successfully access the ADS again. In this case, the core applications notify the device user that the cancellation is completed when the device user accesses the ADS again, and that the charges are not applied after the date of cancellation.

Application properties

For each application, the management tool allows device users to view the following application properties:

- Total application size: the storage space that is freed by removing an application
- Application core size: the storage space that is freed by disabling an application; that is, the MOD, BAR, and SIG files
- Data size: Total application size minus application core size
- License information: expired or not, remaining uses, time, subscription fee, subscribed application's monthly anniversary date
- Copyright information
- Developer name
- Last use: time and day
- Version number
- Demo or not: If it is not a demo, it does not have to be explicitly stated.
- Disabled or not: If it is not disabled, it does not have to be explicitly stated.

System properties

Device users can view the following system properties:

- Total storage size
- Free storage size
- Used storage size
- BREW version
- Application Manager version

Manual upgrade check

The management tool allows device users to find out whether or not upgrade options are available for applications.

NOTE: This feature is turned off if the BDS version is not 1.2 or higher.

Set categories

The management tool allows the device users to assign a category to each application.

Lock or unlock

The management tool allows the device users to lock or unlock each application. A locked application cannot be considered a candidate for automatic disable in MobileShop. See [Automatically selecting an application to disable](#) on page 19.

Airtime charge warning

Application Manager may notify the device user that airtime charges apply for network connection time when the device user attempts to do the following:

- Make the connection to the ADS—one warning per MobileShop catalog access.
- Use the search tool in MobileShop.
- Check upgrade availabilities manually.
- Restore an application in the Application launcher (for disabled applications).
- Purchase demo applications or expired applications from the application launcher.
- Cancel a subscription application (management tool).

The user is given a choice to turn off each airtime charge warning. The user can also turn off all the airtime warnings using the settings tool. See [Settings](#) on page 50.

As part of the factory settings, the airtime charge warning can be turned on or off.

In addition, Application Manager's help must contain the detailed information regarding exactly when airtime charges apply.

Starting applications automatically

An application can start automatically during the following circumstances:

- When the device is turned on
- Receipt of SMS notifications
- Receipt of notifications from other external BREW applications/classes, that is, non-core BREW extensions
- Receipt of notifications from core, system-level BREW classes, for example, TAPI timers

When an application automatically runs, it is in the runtime state and can exit at any time. Applications that were suspended by the application that was launched automatically can resume after the application is exited.

Automatic application recall

The BREW ADS servers can automatically delete an application in two ways:

- Pushed SMS application recall: When sent to a designated device, MobileShop runs, and an application is immediately deleted.
- MobileShop application recall check: When a device user starts a new MobileShop application browse session; that is, connects to the server to download catalog information. MobileShop checks a server-held application recall list. If a server flagged application exists on the device, the application is immediately deleted.

In either of the above cases, the recall event is recorded in the log and the device user is shown a message indicating that the application has been deleted.

Automatic recall notification

If a BREW application is recalled and removed by an SMS message, Application Manager must notify the device user that the application has been recalled and removed and ask the device user to acknowledge it.

If a BREW application is recalled and removed when the device user accesses MobileShop, MobileShop notifies the user that the application has been recalled and removed and asks the user to acknowledge it before it displays the catalog.

Application Manager help

Application Manager includes a help tool that explains basic concepts of BREW as well as how common tasks can be performed.

International language support

Application Manager must support all the languages that are supported by the device. If multiple languages are supported by the device, Application Manager automatically uses the current language on the device if `AEEDeviceInfo::dwLang` is set correctly.

Handling RUIM errors

When the Removable User Identity Module (RUIM) card is used with BREW handsets, application ownership is associated with a unique identifier (International Mobile Subscriber Identifier or IMSI) on the card, which can be plugged into different devices. The card used to download the application is required to perform the following tasks:

- Start an application
- Restore a disabled application
- Upgrade an application
- Extend the license of an application

For more information, see the *BREW[®] OEM Note: RUIM Support* located on the BREW OEM extranet.

5 Reference UI Specifications

This section presents information about the UI specifications of the reference Application Manager. The purpose of this UI specification is to document the interface design of the reference Application Manager so that carriers can clearly specify their customizations. Qualcomm works with each carrier to generate a customization document, as described in [BREW Application Manager Customization Process](#) on page 11.

NOTE: The UI flows that appear in this section are schematic diagrams, which do not necessarily represent the exact appearance on the screen. To make the diagrams easy to read, many of the backflows initiated by pressing the clear key are not included. In general, it is assumed that the clear key brings the device user back to the previous screen. Also, the diagrams do not include all the error message dialog boxes.

Device assumptions

The UI design specifications described in the following sections assume that BREW devices support the following features.

NOTE: Device assumptions may not fully apply to touch screen interfaces. See [Touchscreen device assumptions](#) on page 27.

Keypad

The following hardware keys are supported by the BREW device.

- Four directional keys (up, down, left, right)
- Select key
- Clear (back) key
- Send key
- End key
- Standard 12-key phone keypad (0-9, #, *)

Display

The color depth of the display can be monochrome, grayscale (for example, 4 bit), or color, (for example 8 bit, 16 bit).

Fonts

At least three fonts, normal, bold, and large, are supported.

Touchscreen specifications

This section describes the general touch interactions and screen layout modifications required to support touch interaction throughout Application Manager. The modifications outlined in this section are intended to supplement the non-touch Application Manager screens and flows shown throughout the document, not replace them.

The general Application Manager UI specifications described in this guide serve as the primary screen flows illustrating the Application Manager features, while the touch screen specifications described in this section represent modifications necessary to support touch interaction. The basic touch interactions are described in this section, as well as touch layout considerations for the basic Application Manager screen types typically exposed in the UI.

Touchscreen device assumptions

The following are assumptions with regard to touchscreen devices:

- To render touch screens properly, the device screen size should be at least 176 pixels x 220 pixels (QCIF+)
- Although smaller fonts can be used, it is recommended that fonts no smaller than 11 points are used to ensure the touchable target sizes are rendered large enough for most users to easily acquire and activate Application Manager touch screens.
- A hard or virtual keyboard must be integrated by the OEM for proper operation of Application Manager screens that require text entry (e.g., Search or Credit Back).

NOTE: If no hard keyboard is present, ITextCtl must be integrated with the OEM-drawn virtual keyboard.

Basic touch interactions

The following are the basic touch interactions supported in Application Manager:

- Touch and release list menu items and buttons, and scroll the page up or down
- Scroll by dragging list menu items and text screens
- Highlight and launch with a single click

In general, all touchable targets on touch screens (i.e., list menu items and buttons) provide visual feedback when touched by highlighting and typically activate the corresponding function after releasing the finger. If the finger is dragged off a screen target while touching, the item is no longer highlighted and won't activate or open. This behavior is true for all touchable targets—list items and buttons.

Scrolling is generally performed by touching and dragging list items or text when there is more content than can fit on a single screen (i.e., a scrollbar is present), or using scroll buttons.

Haptic feedback can respond to all touchable UI widgets (e.g., buttons, list items, and text). The feedback profile is configurable. See the *BREW® Application Manager and MobileShop® Integration Guide* for details.

List menu item touch selections

Figure 3 shows a touch selection example for a list menu screen. Touching the list item highlights it, and releasing the finger opens or activates the selected item.

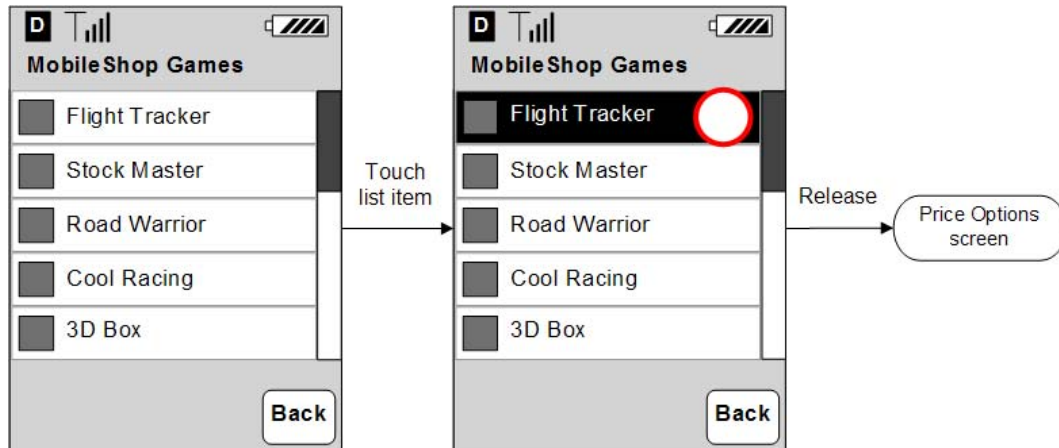


Figure 3. List menu item touch selection

Button touch selections

Button presses are a common touch selection. For all buttons, touching the button highlights it as shown in the example in Figure 4. Releasing it activates the corresponding function.

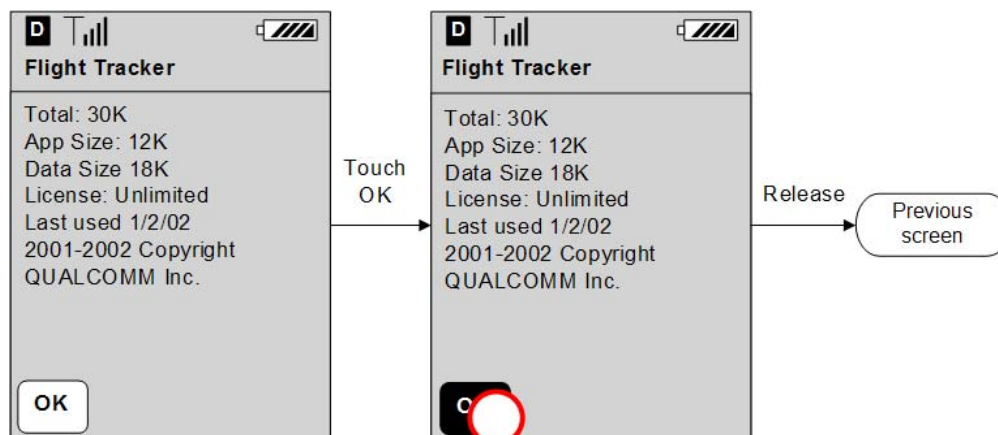


Figure 4. Button touch selection

Scrolling list menus

Figure 5 shows an example of scrolling list menu items in a MobileShop screen.

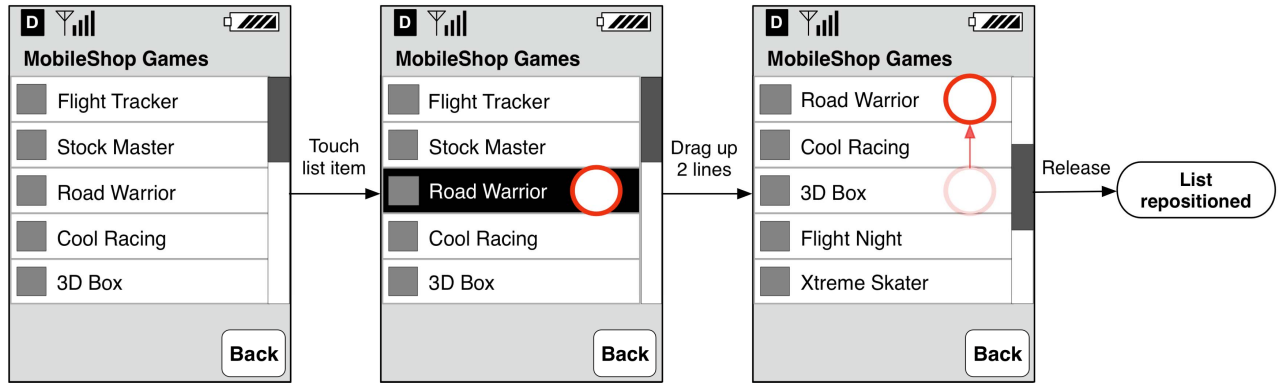


Figure 5. List menu scrolling

When scrolling list menus, the initial touch highlights the item. When dragging the finger up or down, the selected item is no longer highlighted and the screen scrolls one list item at a time. Dragging the finger up the screen displays more items at the bottom of the list, while dragging the finger down displays more items at the top of the list. Scrollbars move in the opposite direction when dragging list items.

Scrolling by dragging list menu items does not function when the scrollbar is not present. Dragging the finger while touching a list item when the scrollbar is not present results in the item no longer being highlighted and no further action occurring.

Scrolling text

Text scrolling is accomplished by touching anywhere in a text field and dragging up to expose more text below the visible portion of the screen (as shown in the example in Figure 6). Dragging down exposes more text above.

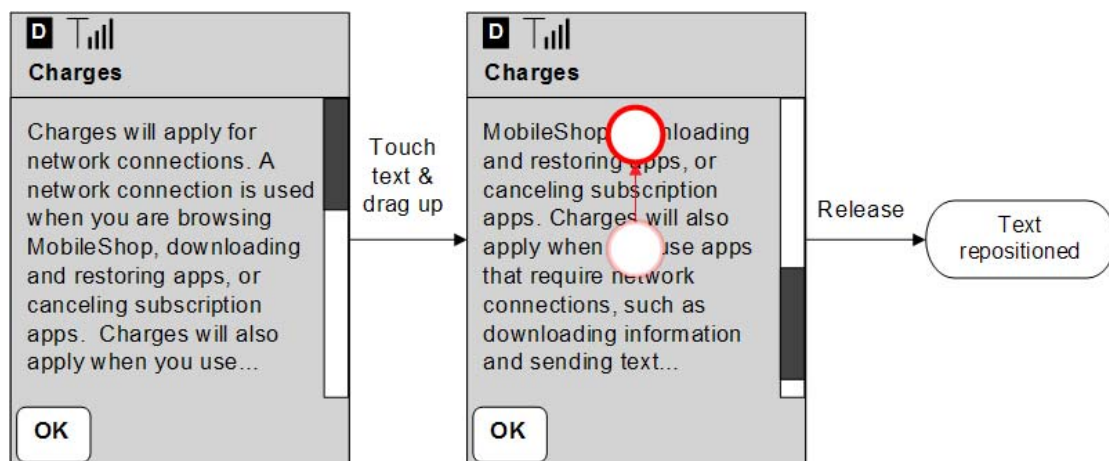


Figure 6. Text scrolling

Text does not highlight when touched or dragged. If all the text fits on a single screen, a scrollbar is not displayed and scrolling is not possible. Touching text without a scrollbar present has no effect.

Button placement principles

Button placement should be consistent across screens. All buttons are located on the bottom row of the screen. The Back and Cancel buttons (used to go back to the previous screen and dismiss screens without completing the action or sequence) should always be placed to the far right on the screen. The OK or Done buttons (used to confirm screens or complete actions or sequences) should always be placed to the far left on the screen.

General screen types requiring modification for touch interaction

This section describes all necessary screen modifications to support touch interaction in Application Manager for the following basic screen types typically exposed in the Verizon UI:

- List menu screens
- Log screen
- Radio button screen
- Text screens
- Question dialogs
- Popup progress dialogs

List menu screens

Many of the screens in Application Manager are list menu screens, as shown in the example in [Figure 7](#).

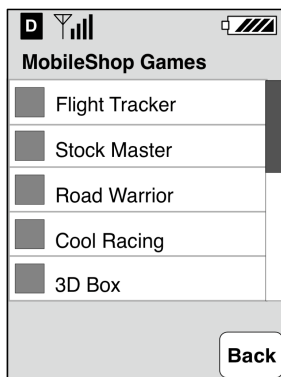


Figure 7. List menu screen

With touch interaction, all list items are touchable targets. List items highlight when touched and activate (or open) when released. The Back button displays the previous screen.

Log screens

Log screens are similar to list menus in appearance, but have slightly different behavior, as shown in the example in [Figure 8](#).

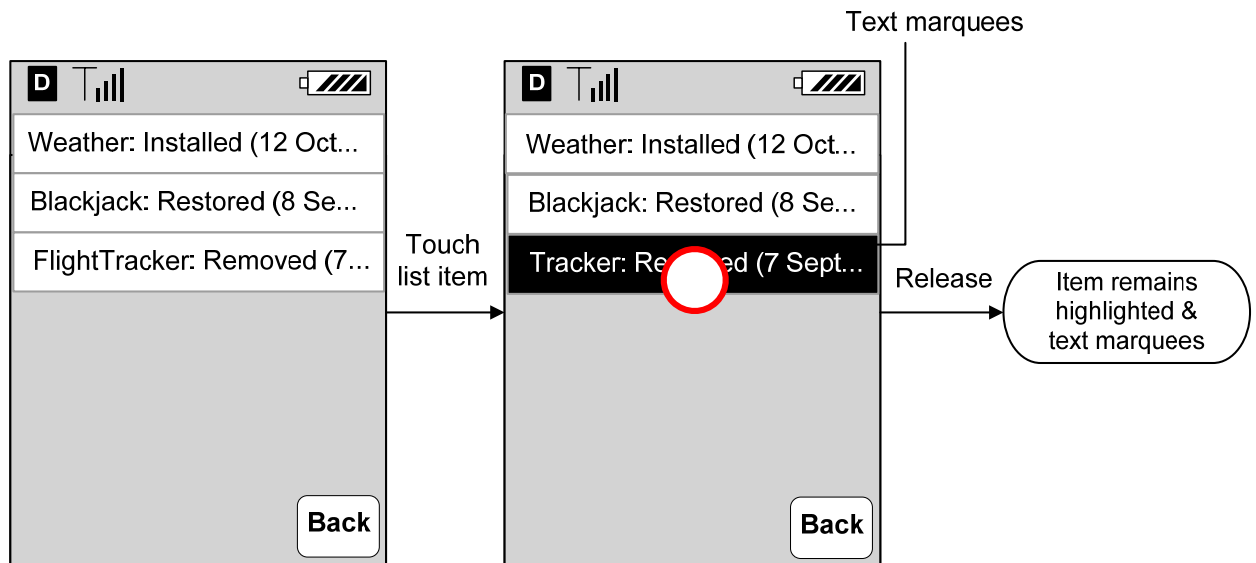


Figure 8. Log screen

Similar to other list menu screens, no list item is highlighted when the log screen initially displays. When list items are touched (highlighted) and released, the list item remains highlighted and the text marquees. Pressing the OK button exits the log screen and returns to the previous screen.

Radio button list screens

Radio button list screens include radio button options in the list. As shown in [Figure 9](#), when any radio button option is touched, the radio button option highlights.

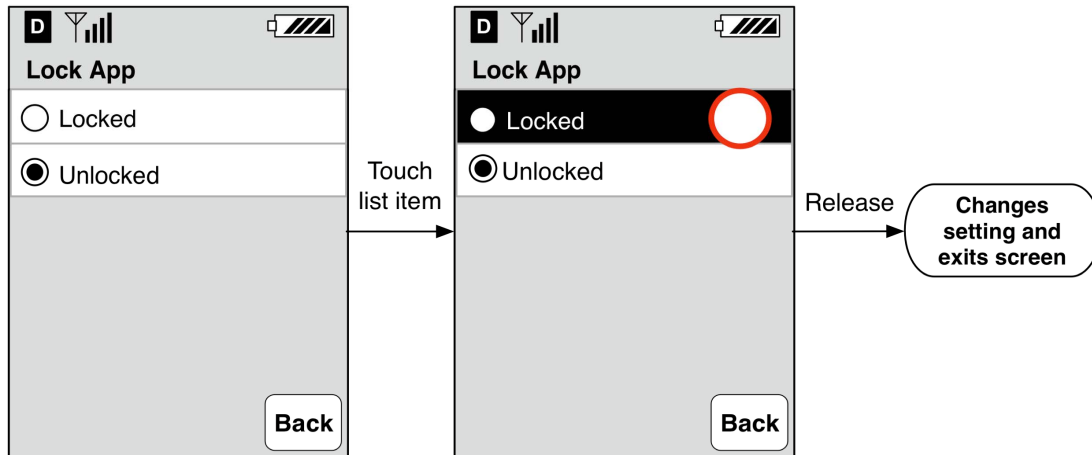


Figure 9. Radio button list screen

When the option is released, the new radio button option fills in and the screen closes. After closing, the new radio button option will be enabled. The Back button returns to the previous screen.

Text or OK dialog screens

Text screens or OK dialogs occur throughout Application Manager. The OK button returns the user to the previous screen. [Figure 10](#) shows an example of the text dialog screen.

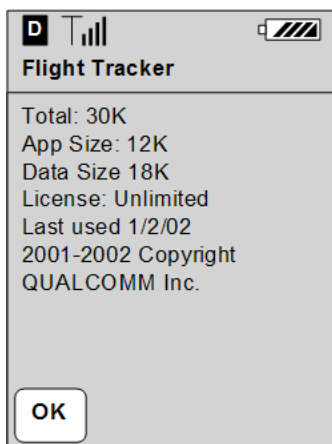


Figure 10. Text screen

Question dialog screens

Question dialog screens typically present a question with two or more possible options in the list, as shown in the example in [Figure 11](#). Touching any of the options highlights the item and releasing activates the touched item.

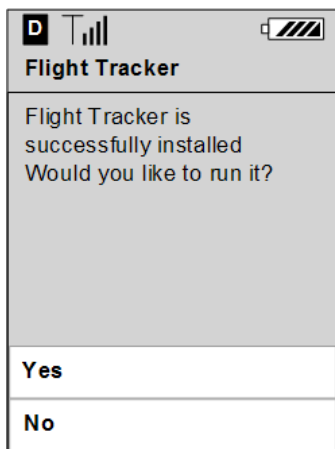


Figure 11. Question dialog

Popup progress screens

Popup progress dialogs show an animated progress bar in a popup window over an existing screen. A Cancel button displays in the lower right portion of the screen. Selecting the Cancel button cancels the operation and returns to the previous screen.

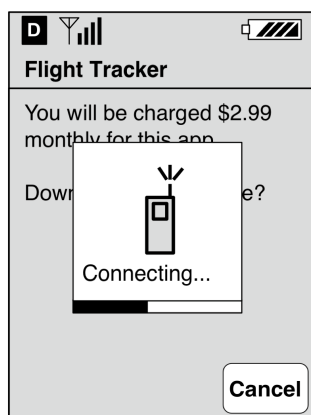


Figure 12. Popup progress screen

Unique screen modifications for touch interaction

The touch screen UI specifications described above are general screen modifications that apply to more than one screen in Application Manager. For example, the [List menu item touch selections](#) specifications described on page 28 apply to all list menu screens throughout Application Manager.

There are, however, several screens within Application Manager that require unique modification to function properly in touch screen devices. These unique modifications are detailed in the corresponding sections below:

- Demo alert (see [Handling demo applications](#) on page 39)
- Memory Full screen (see [Download options](#) on page 44)

Application Manager main menu

The following subsections describe the different layouts for Application Manager's main menu. Three types of menus are available. These views can be turned off as part of factory settings. See [Factory settings](#) on page 64.

Application Manager allows the device user to switch the main menu's view using a settings tool. See [Main menu style display setting](#) on page 53.

The main menu includes MobileShop, Settings, Help, and three application folders (categories). It also includes downloaded BREW applications. The device user may move applications from the main menu to application folders by using the settings tool. [Figure 13](#) shows a small icon view of the Application Manager main menu (the default).

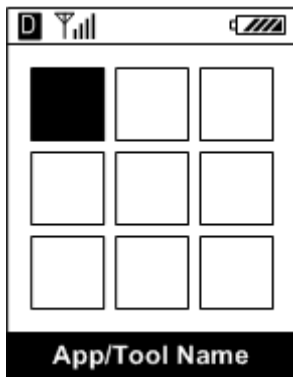


Figure 13. Small icon view (default)

Figure 14 shows a large icon view of the Application Manager main menu.

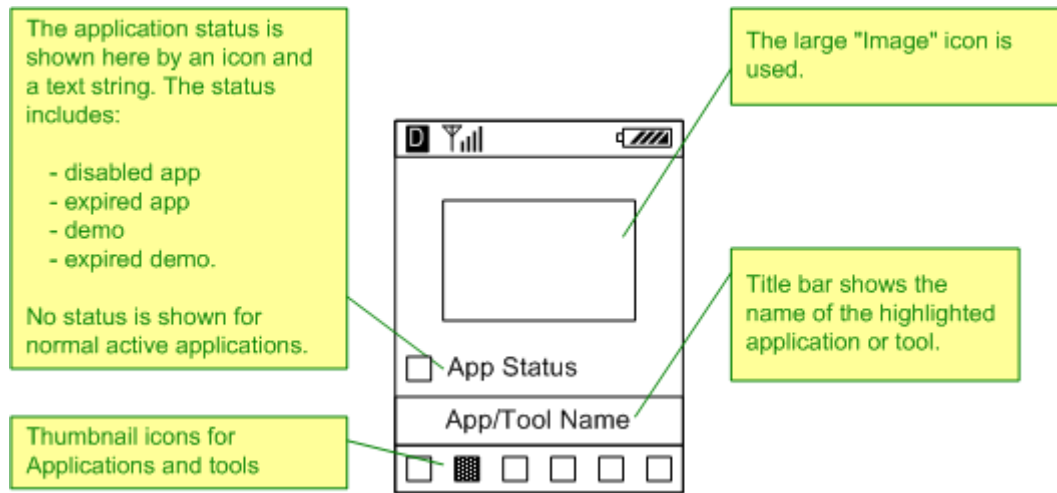


Figure 14. Large icon view

Figure 15 shows a list view of the Application Manager main menu.

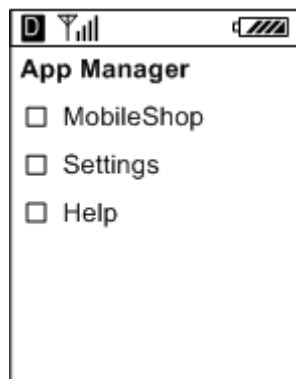


Figure 15. List view

Top-level UI flows

The following describes the top-level UI flow on device displays.

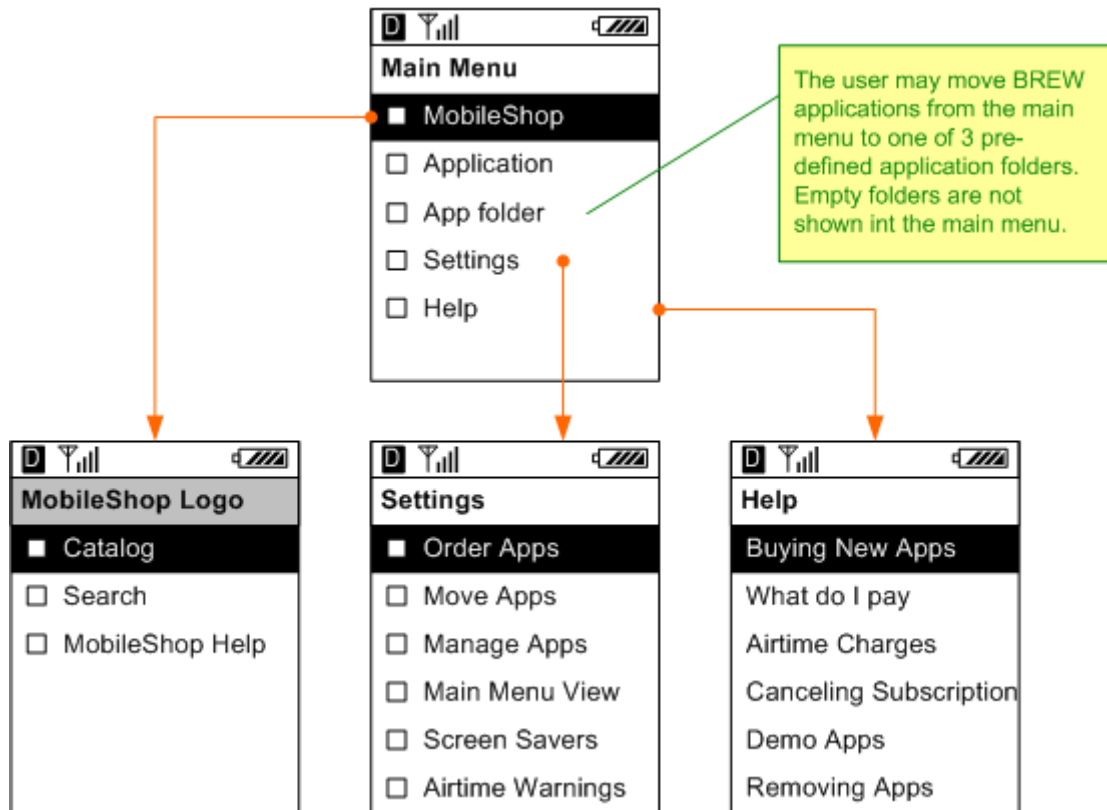


Figure 16. Main menu flow

Application launcher

The main menu of Application Manager functions as launcher, where the user can start BREW applications. See [Touchscreen specifications](#) on page 27.

By selecting a BREW application from the main menu or from one of the category menus starts the application. However, there are certain cases where the application launcher handles it differently. The following subsections describe those cases.

Handling disabled applications

If the device user tries to launch a disabled application, the application launcher helps the device user to restore the application. Figure 17 shows the interaction sequence for restoring disabled applications.

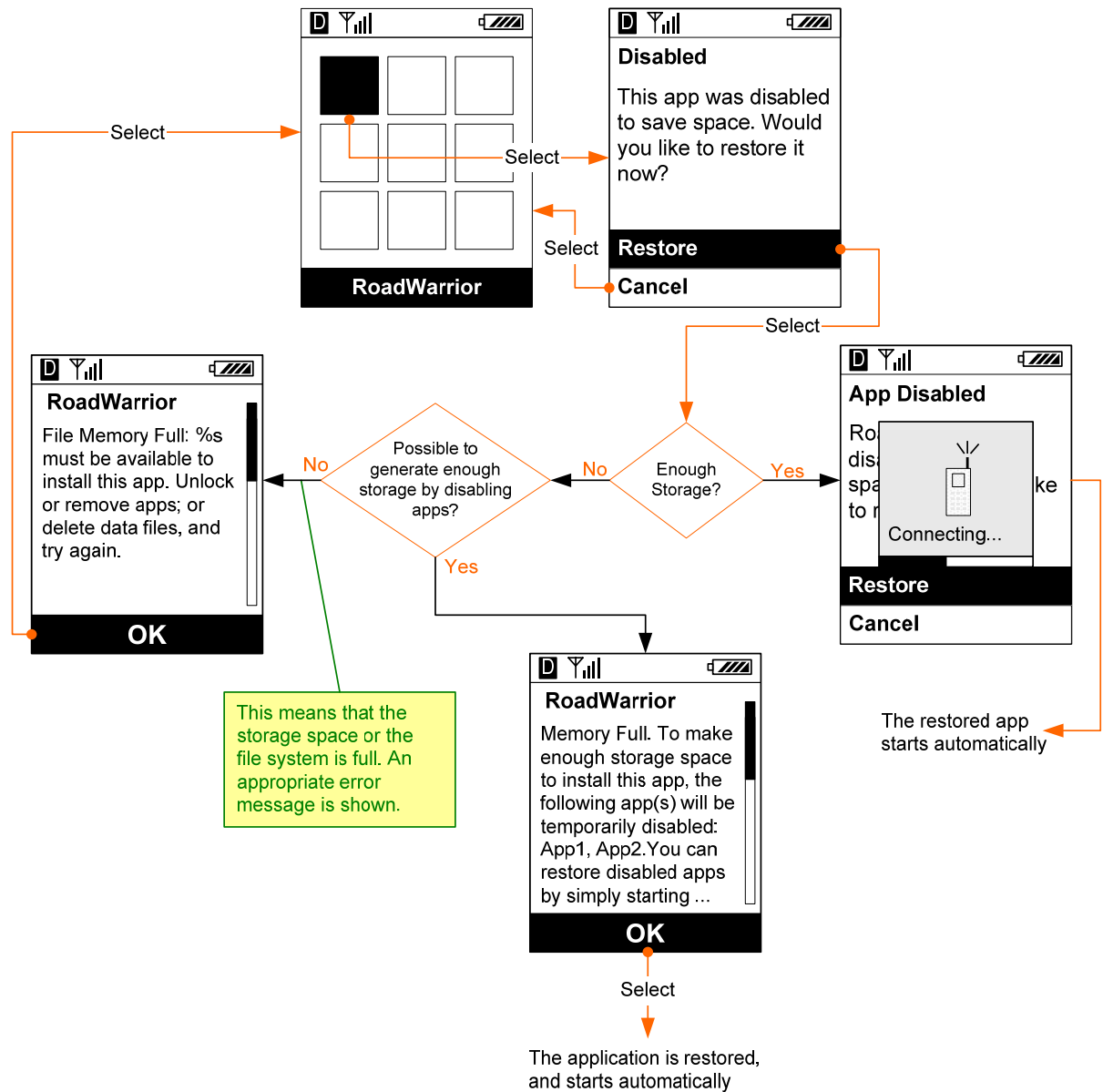


Figure 17. Restoring a disabled application

Handling expired applications

If the device user tries to launch an expired application, the application launcher provides the device user with the following options:

- Purchase more uses.
- Do nothing for now (Cancel).

Figure 18 shows the interface flows for handling an expired application.

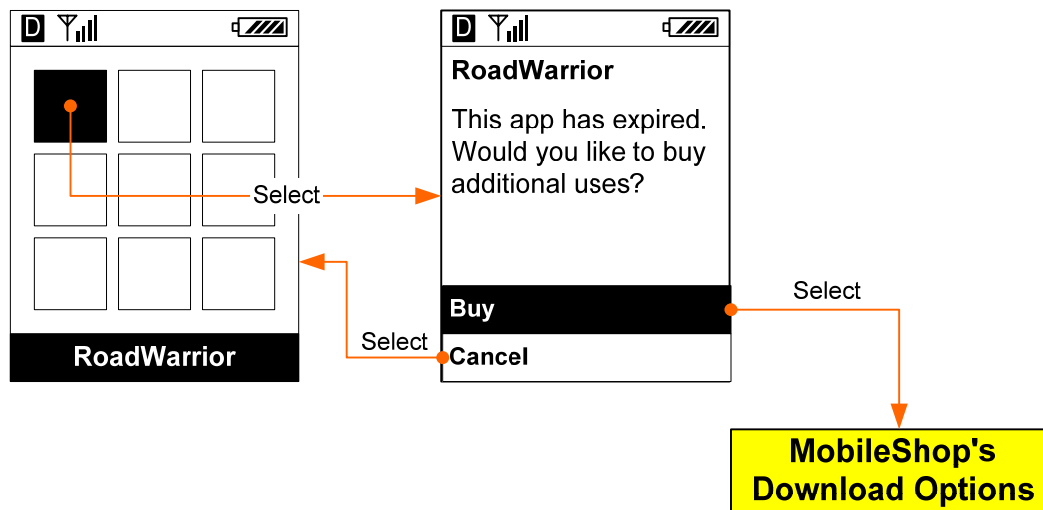


Figure 18. Rebuying an expired application

Handling expired demos

If the device user tries to launch an expired demo, the application launcher provides the device user with the following options:

- Purchase more uses
- Do nothing for now (Cancel)

Figure 19 shows the interface flows for handling an expired demo.

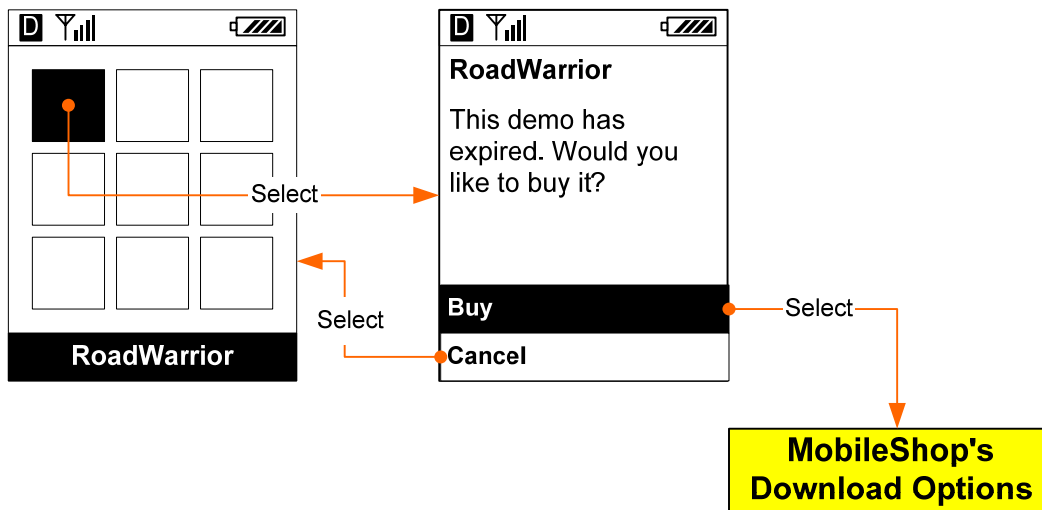


Figure 19. Option to purchase expired demos

Handling demo applications

If the device user tries to launch a demo version that has not expired, the application launcher always provides an option to purchase the application, as shown in Figure 20.

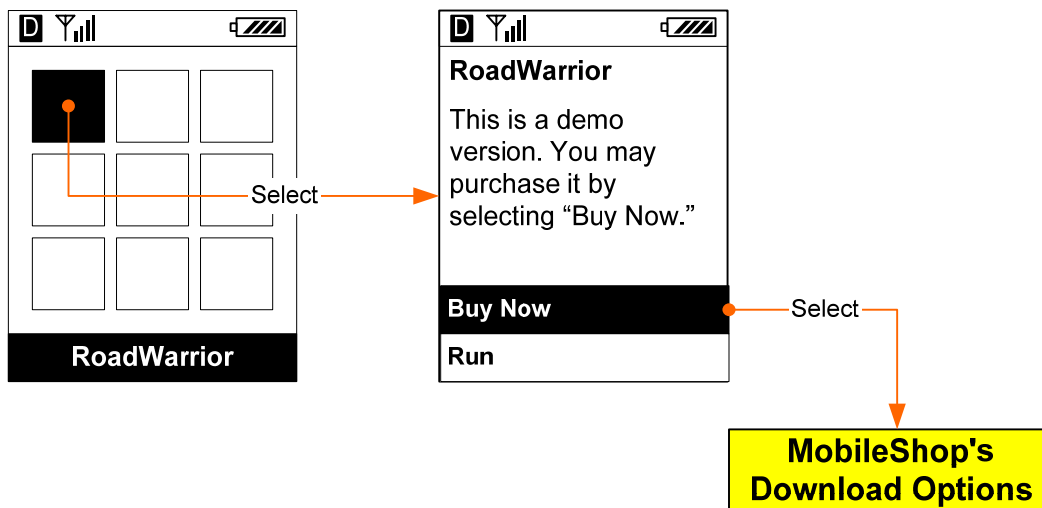


Figure 20. Option to purchase a demo application

Touch screen modifications

A touch-enabled cancel option is required for the Road Warrior screen in Figure 19 to function properly in a touch screen device. As shown in the example in Figure 21, the Buy Now option allows the demo to be purchased, the Run option launches the demo application, and the Cancel

option stops launching the demo application and returns to the previous screen. All three selections are highlighted when touched and activated when released.

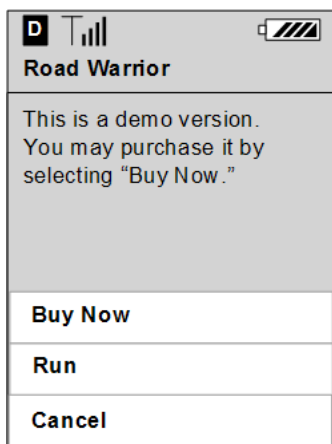


Figure 21. Touch screen modifications

Handling RAM limitation

If the device user tries to start an application, but there is not enough RAM to run the application, a warning dialog appears, as shown in Figure 22.

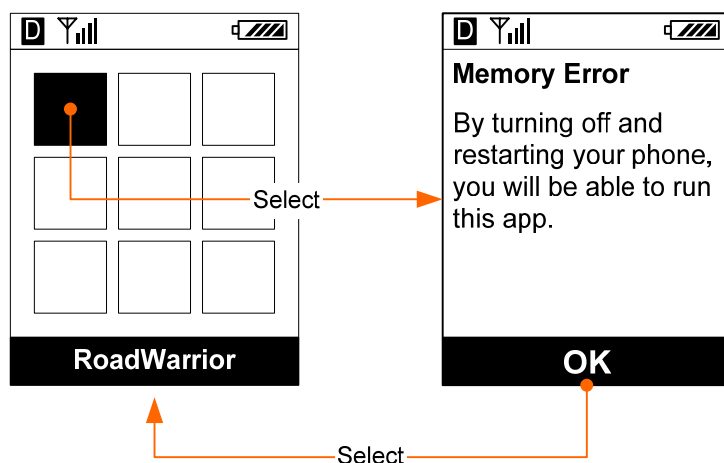


Figure 22. RAM limitation

Handling unverified applications

If the user tries to launch an application that has not been verified (i.e., download acknowledgment has not been received by the ADS), the application launcher provides the user with an option to verify the application with the ADS. If the application cannot be verified after the third attempt (i.e., the download acknowledgment fails), Application Manager removes the application from memory as shown in Figure 23.

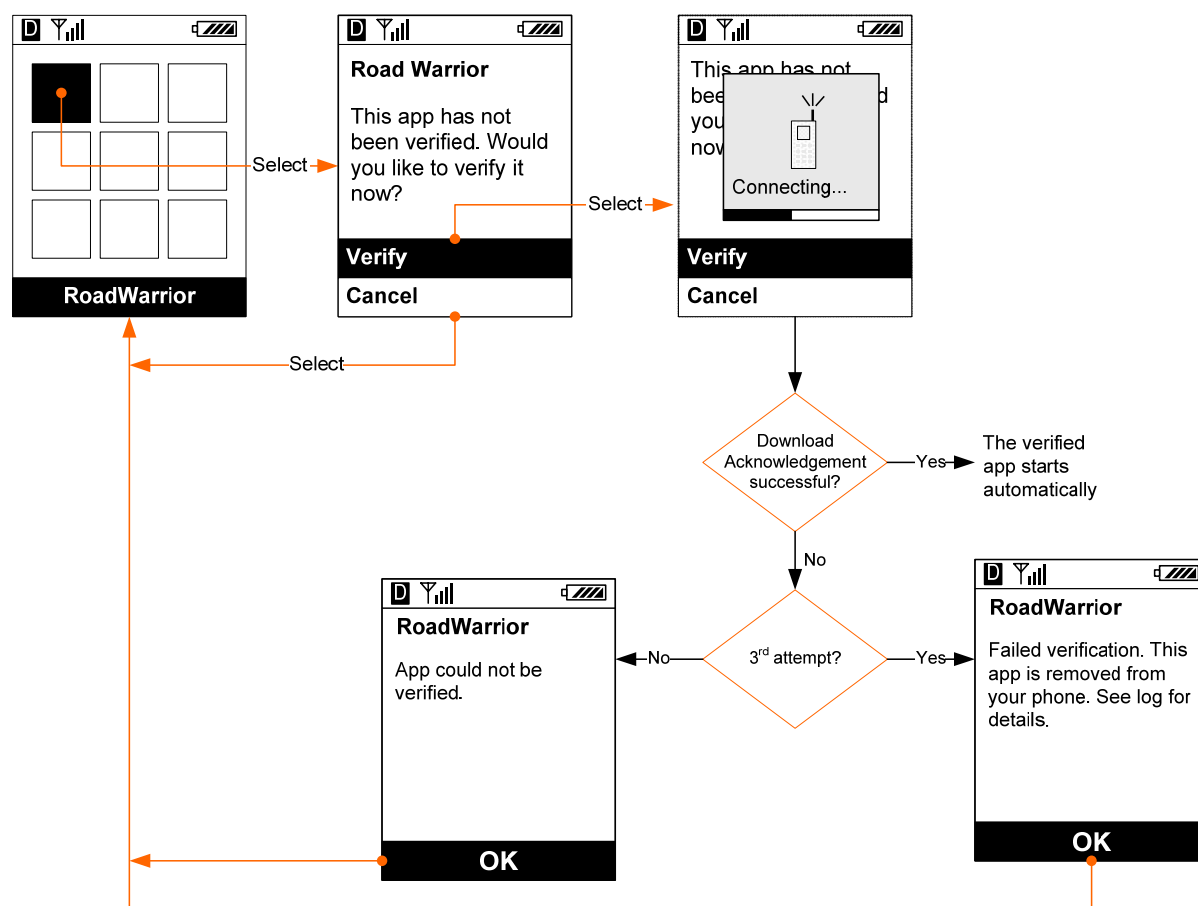


Figure 23. Handling unverified applications

MobileShop

The following subsections provide information about MobileShop, its functionality, and displays.

MobileShop menu option

Figure 24 shows the UI flow after the MobileShop menu item in the Application Manager main menu is selected. The top-level categories in the catalog are downloaded and displayed in a menu.

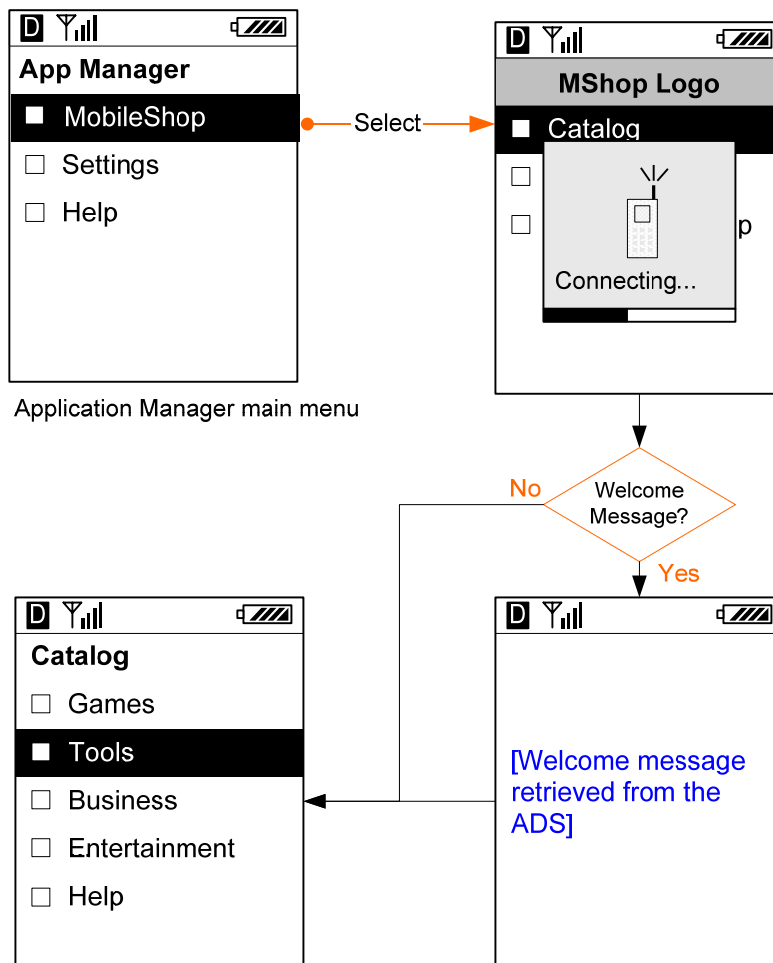


Figure 24. Browsing the catalog

After downloading the top-level categories, the device user can browse the catalog using the UI flow shown in [Figure 25](#).

NOTE: The automatic upgrade features are turned off if the BREW Distribution System's (BDS) version is not 1.2 or higher.

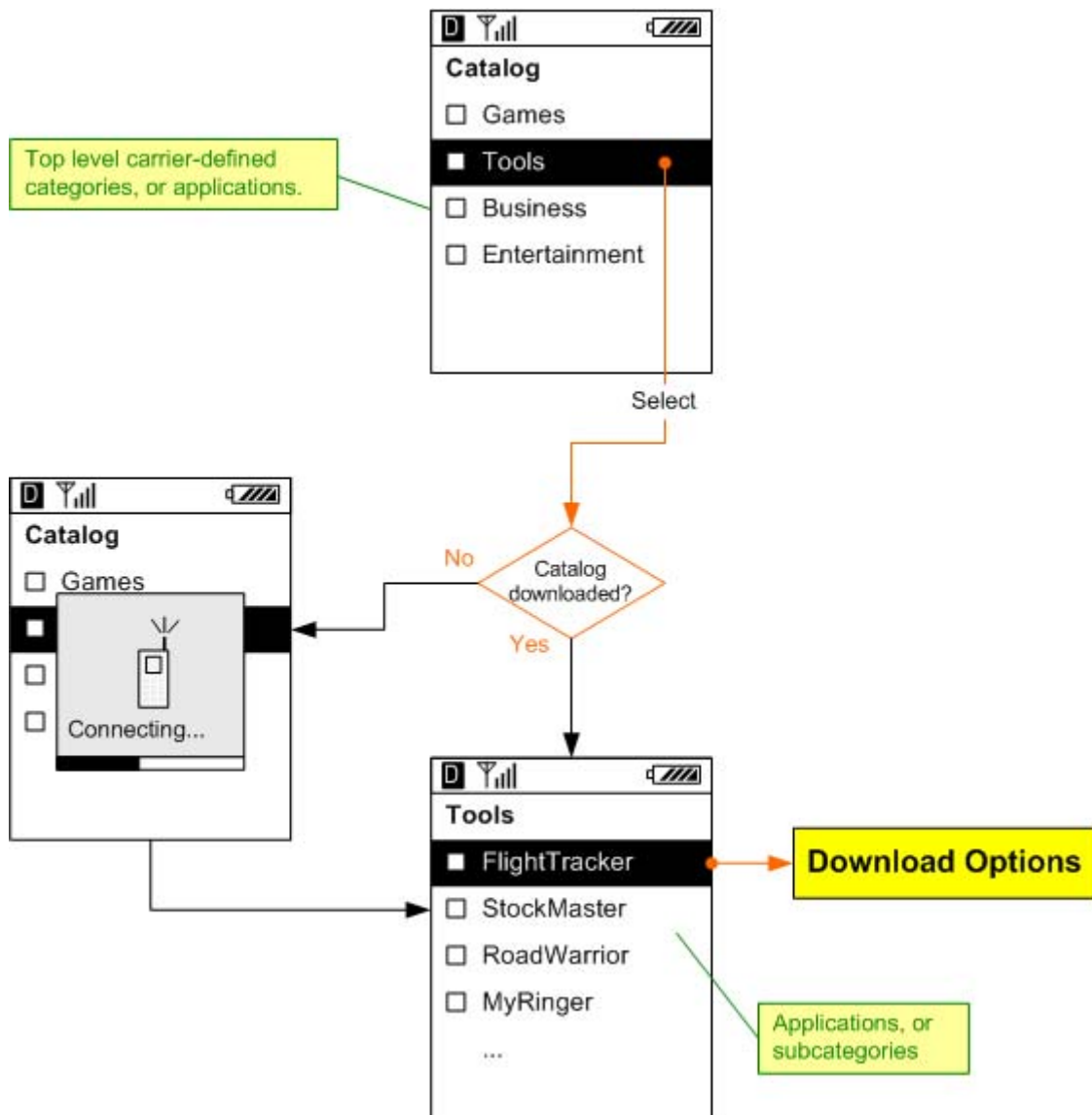


Figure 25. Browsing the catalog (continued)

Download options

If the device user selects an application in the catalog, MobileShop displays a set of download options. Figure 26 shows the UI flow after the download options menu is shown.

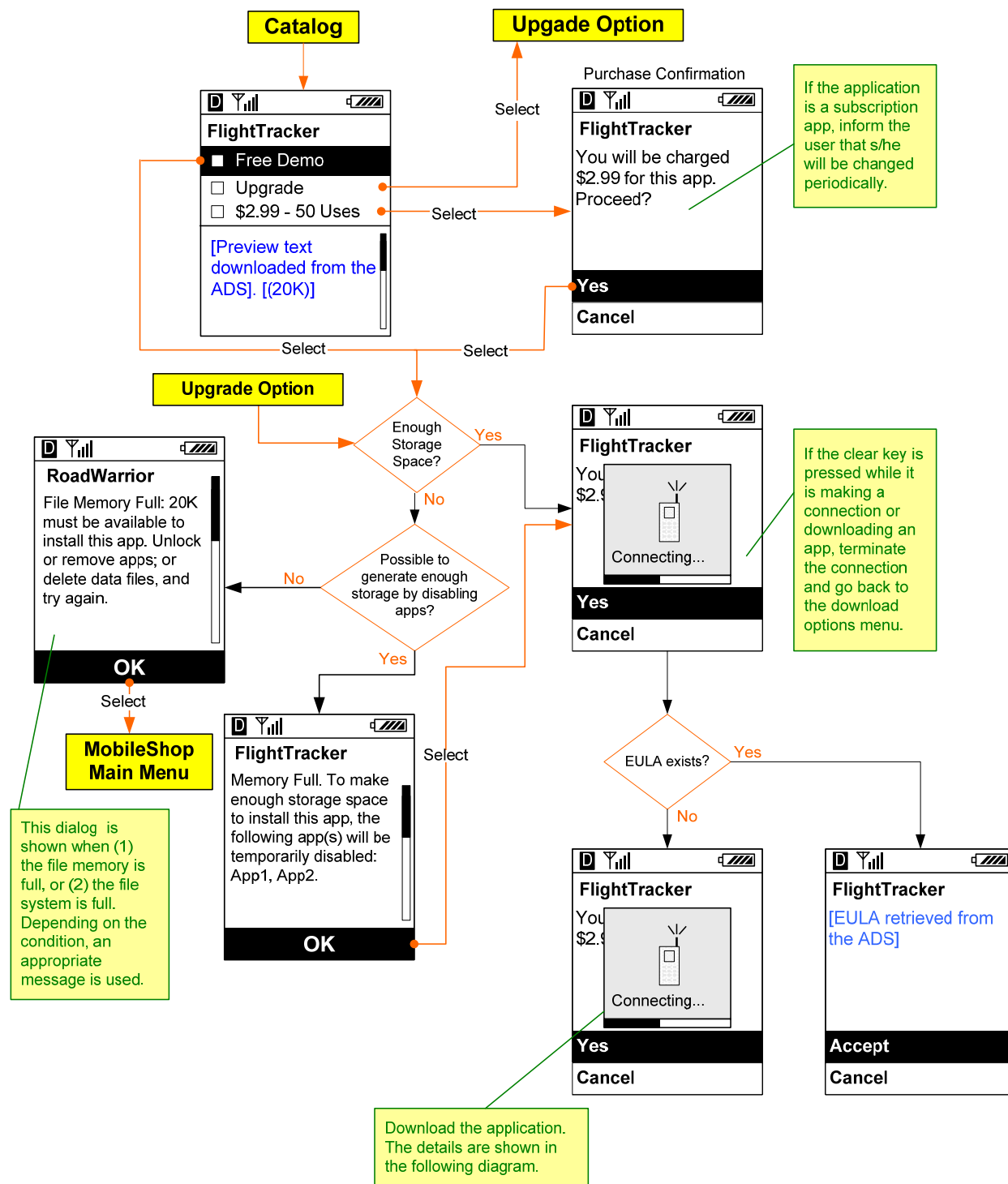


Figure 26. Download options

Touch screen modifications for Memory Full screen

A touch-enabled cancel option is required for the Memory Full screen shown in [Figure 26](#) to function properly in a touch screen device. As [Figure 27](#) shows, the OK option disables the listed applications and proceeds with the download sequence; the Cancel option cancels the operation and returns to the previous screen. Both the OK and Cancel buttons highlight when touched and activate when released.

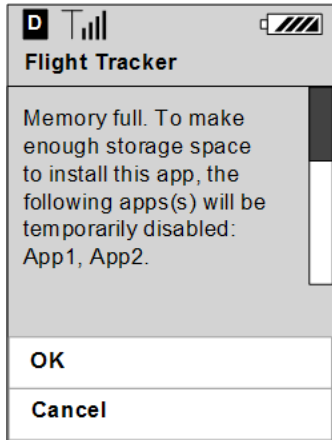


Figure 27. Touch screen modifications for Memory Full screen

Figure 28 shows the UI flow after the downloading process starts.

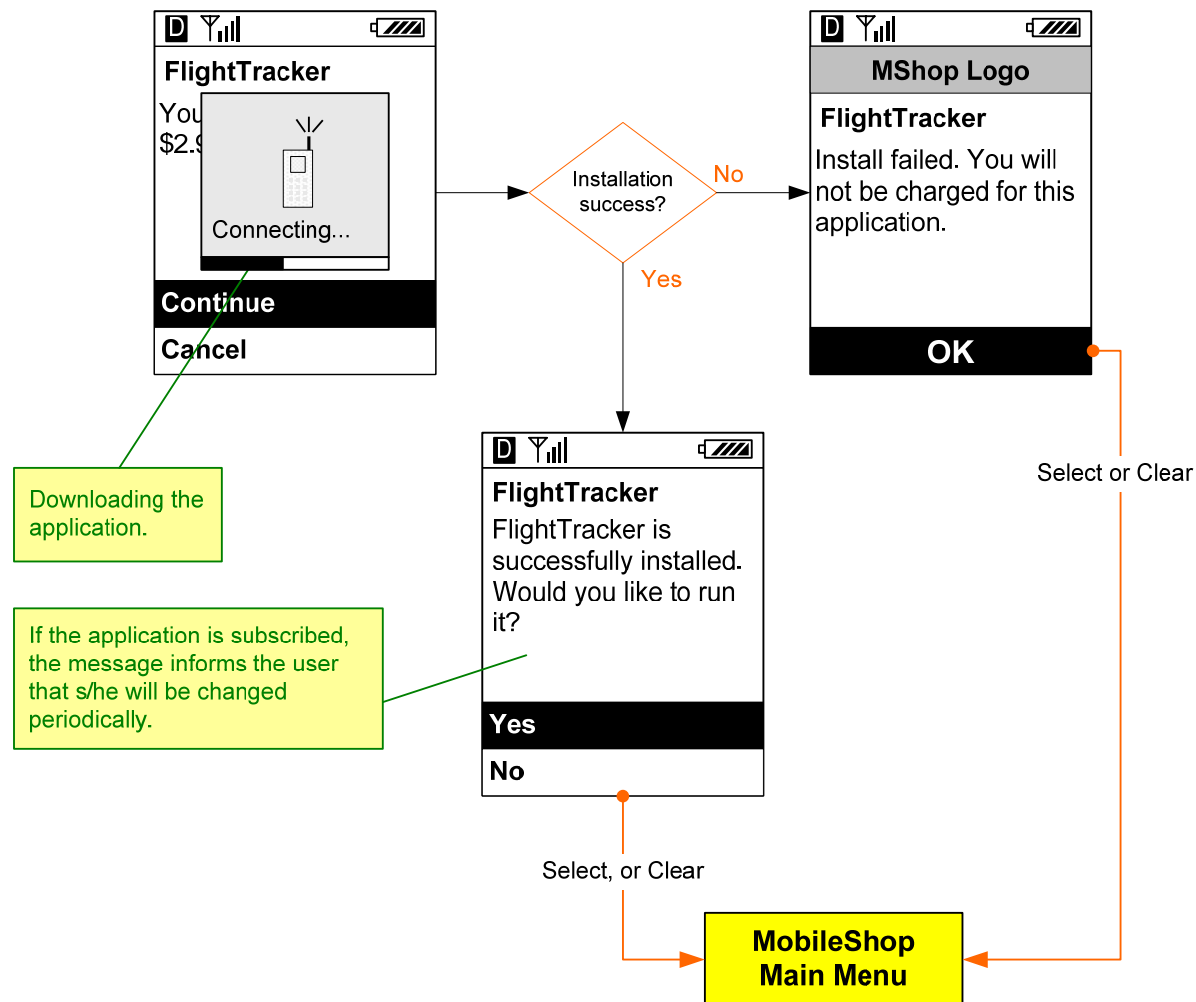


Figure 28. Downloading

Upgrade option

Figure 29 shows the UI flow after the device user selects the upgrade option in the download options menu.

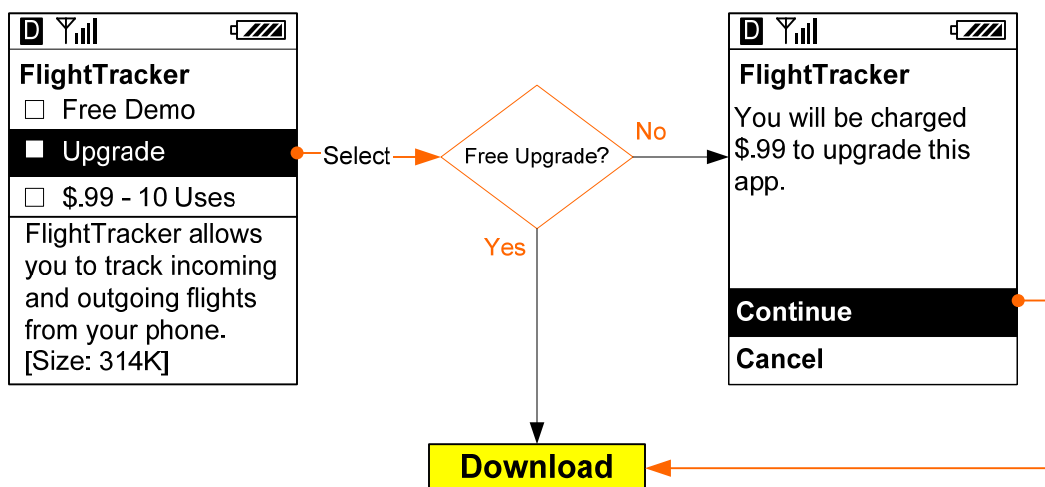


Figure 29. Manual upgrade option

Insufficient funds notification

If the device user has a prepaid service, and his or her account does not have enough funds to purchase the application, the following message is shown. Then, the device user is returned to the download options menu.

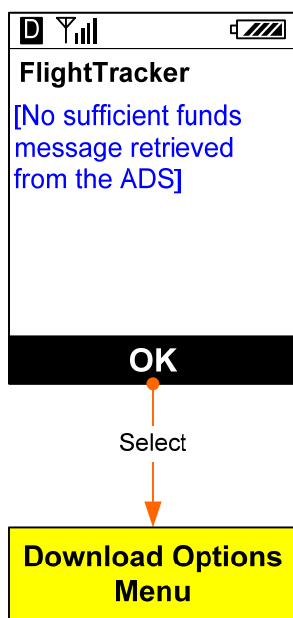


Figure 30. Insufficient funds warning

Search option

If the device user selects the Search option in MobileShop's main menu, MobileShop provides the device user with the following interface to enter keywords and search for desired applications.

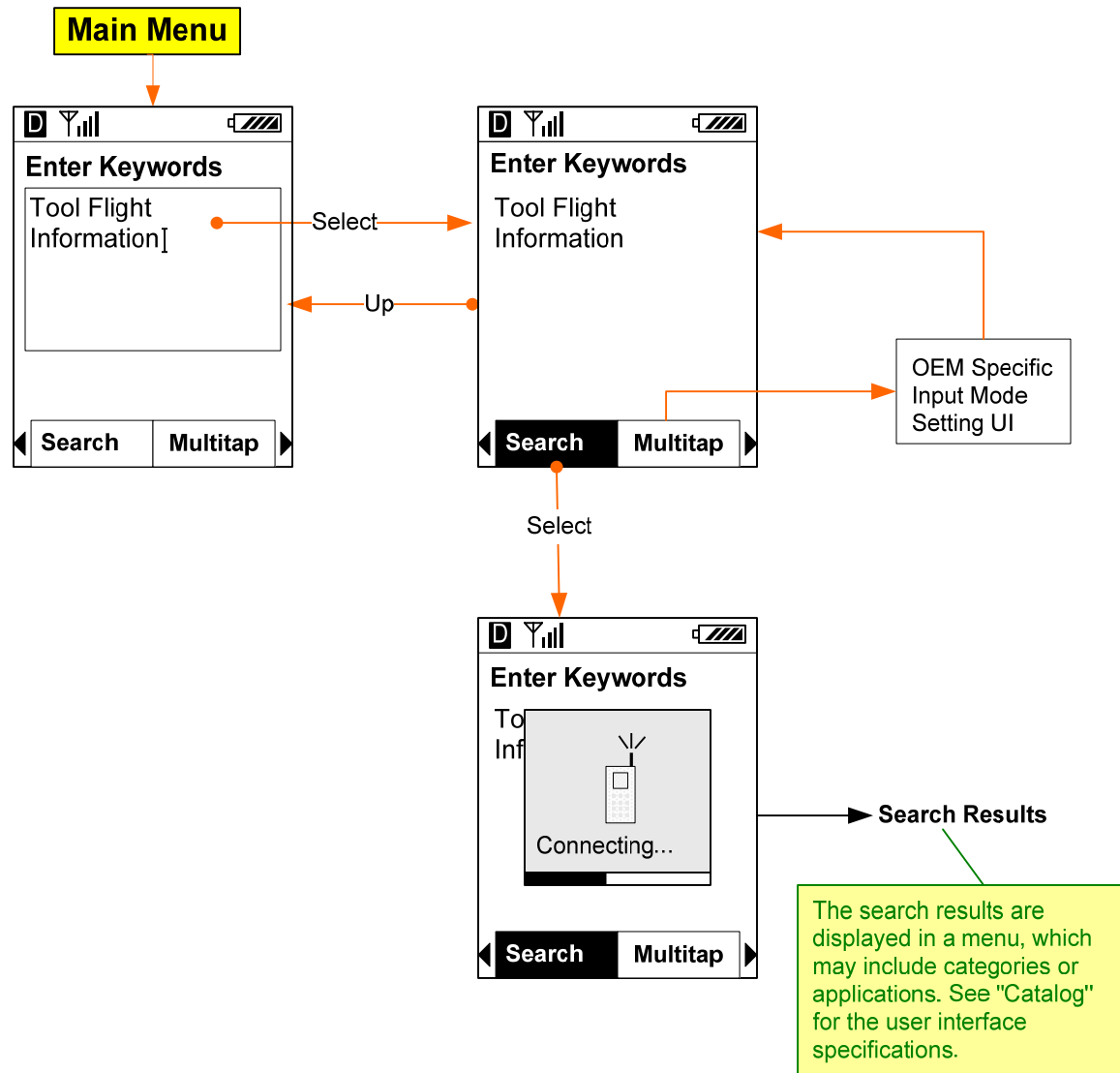


Figure 31. Search tool

Credit back UI

The credit back interface is used by one of the following types of device users:

- A device user who is guided by the carrier's customer support personnel over the phone; that is, the device user is canceling the service over the phone.
- An employee of the store where the device user is returning the BREW device; that is, the device user is either replacing the device or canceling the service at the store.

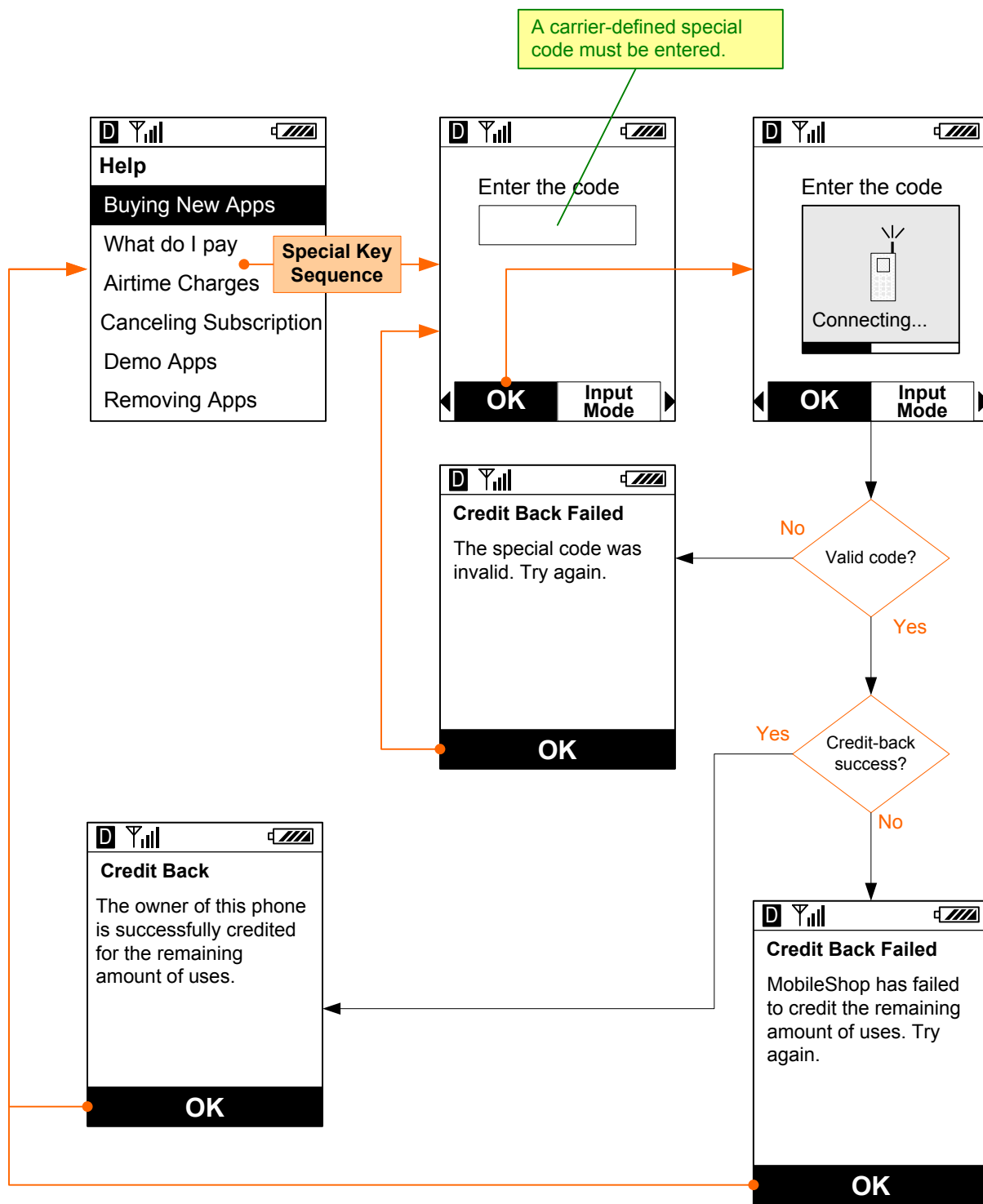


Figure 32. Credit back process

NOTE: When the MobileShop server setting is changed, the management log is erased.

UI text retrieved from the ADS

Table 1 lists the UI text messages that are retrieved from the ADS and displayed in MobileShop.

Table 1. Messages retrieved from the ADS

Text	Source
Catalog's welcome message	Carrier Extranet
Preview text for each application	Developer Extranet
"No sufficient funds" error message for prepaid users	Can be modified in Carrier extranet
End Device User License Agreement (EULA)	Carrier's system that checks the user's account
Category names shown in the MobileShop catalog	Developer Extranet
Application names shown in the MobileShop catalog	Carrier Extranet
DAP, Price plans, and Price points	Developer Extranet
Consumer list price	Can be modified in Carrier Extranet
	Developer Extranet
	Carrier Extranet

Settings

This subsection describes the Application Manager settings.

Settings main menu

Figure 33 shows the main menu of the settings tool.

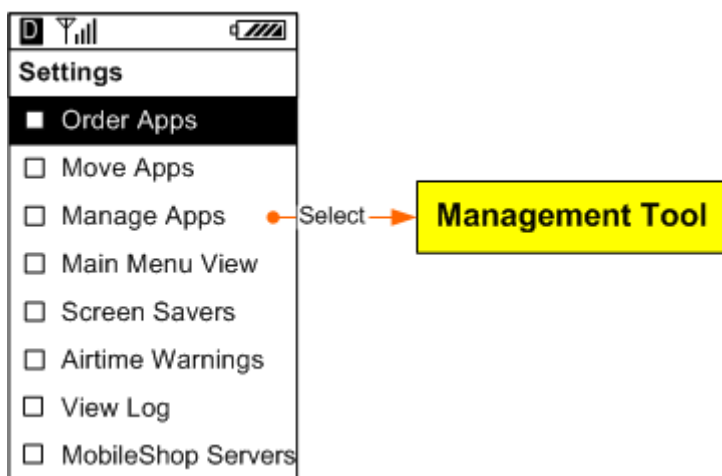


Figure 33. Settings tool main menu

The UI flows for the management tool are shown in [Management tool](#) on page 21.

Order applications within a category

Figure 34 shows the tool that allows device users to change the order of applications in a category menu and the main menu.

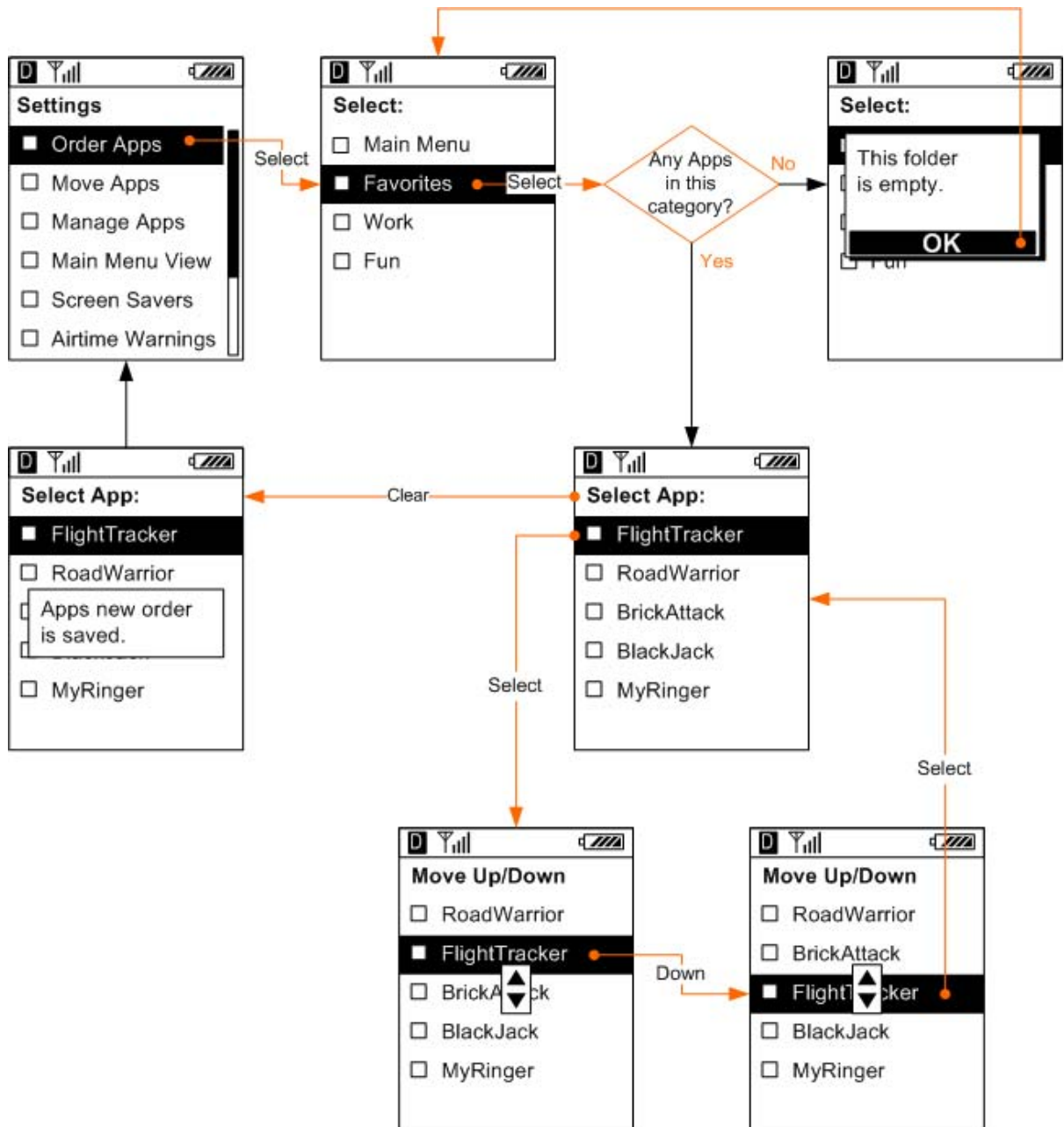


Figure 34. Order applications tool

Move applications across categories

Figure 35 shows the tool that allows device users to move applications from one category to another (including the main menu).

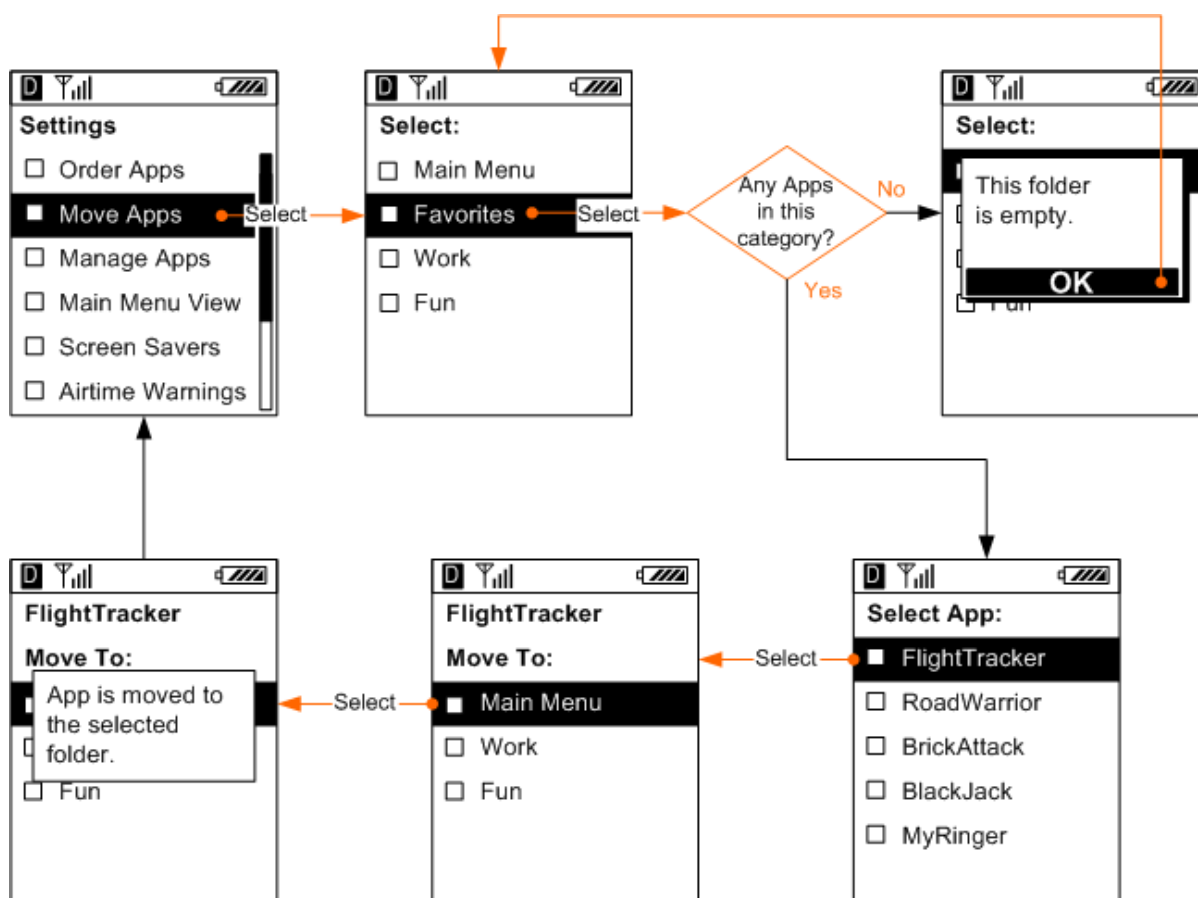


Figure 35. Move application tool

Main menu style display setting

If the simple menu is used, a main menu style setting is provided. [Figure 36](#) shows the UI for setting the style of the main menu.

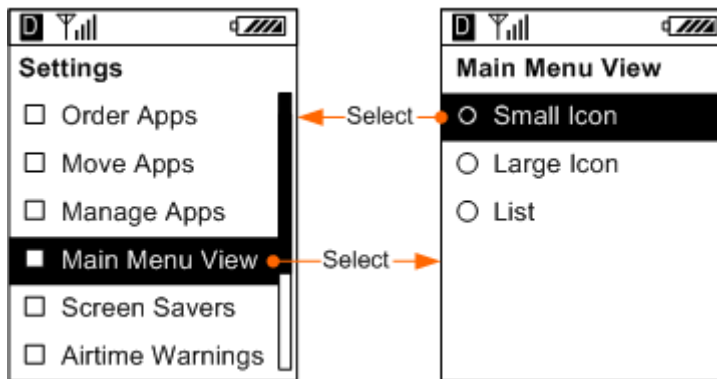


Figure 36. Main menu settings tool

See [Touchscreen specifications](#) on page 27 for the details on the menu styles.

Screen saver setting

Figure 37 shows the UI for selecting or turning off the current screen saver.

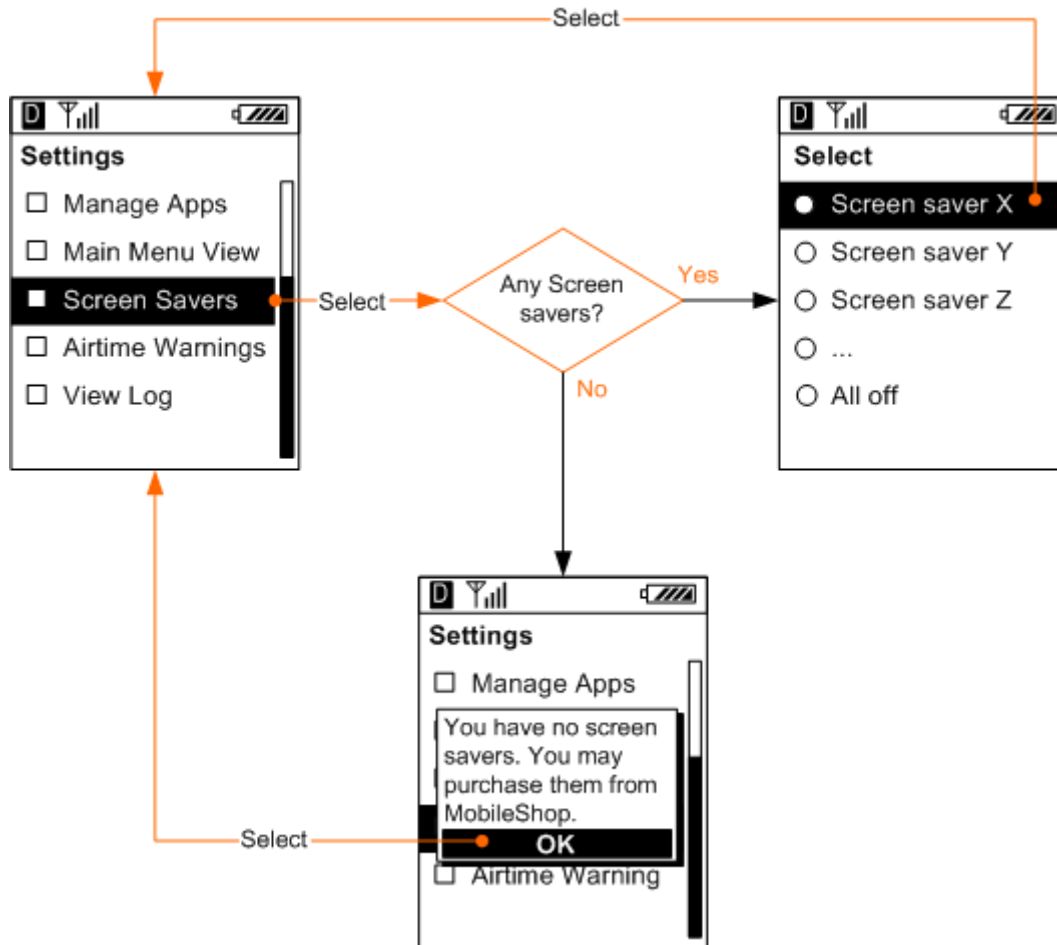


Figure 37. Screen saver setting tool

Airtime warning setting

Figure 38 shows the UI flow for enabling and disabling airtime warnings.

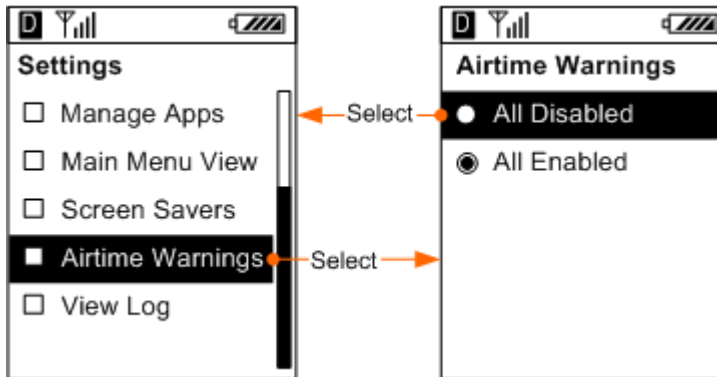


Figure 38. Airtime warning setting

NOTE: Use the configuration setting is both device-dependent and carrier-dependent. Contact Qualcomm to determine if the Configure menu item needs to be used for the device.

Management log tool

Figure 39 shows the tool that displays the Management log tool process.

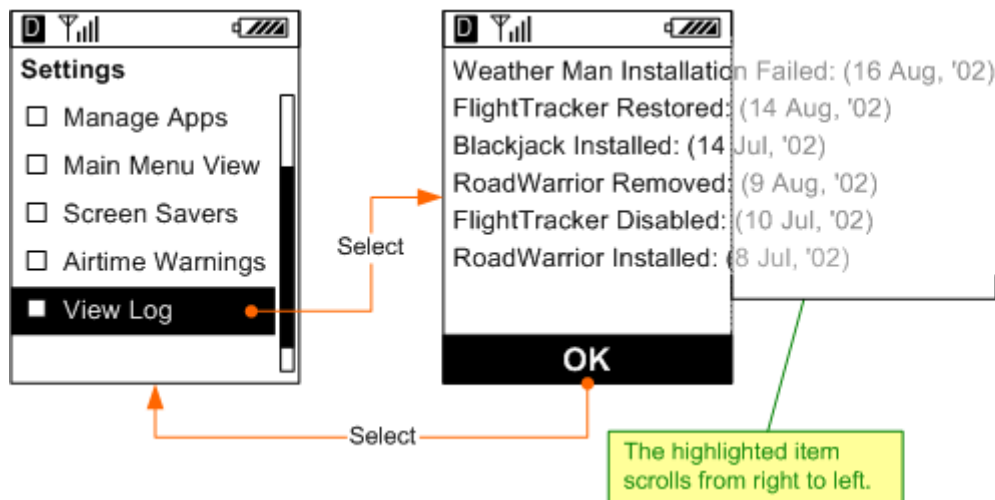


Figure 39. Management log tool

MobileShop server setting

Figure 40 shows the UI for setting the current MobileShop server.

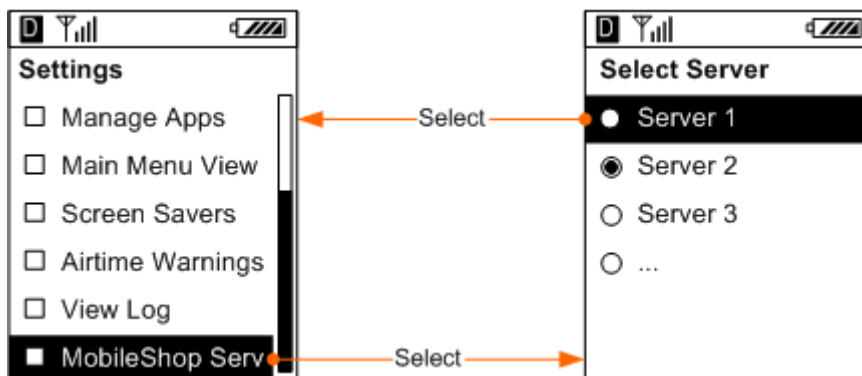


Figure 40. MobileShop server selection tool

Management tool

The management tool is included in the Settings menu. See [Settings](#) on page 50. It includes various utilities that help device users manage BREW applications. The following subsections describe the UI specifications.

System information

Figure 41 shows the main UI screen with System Info selected.

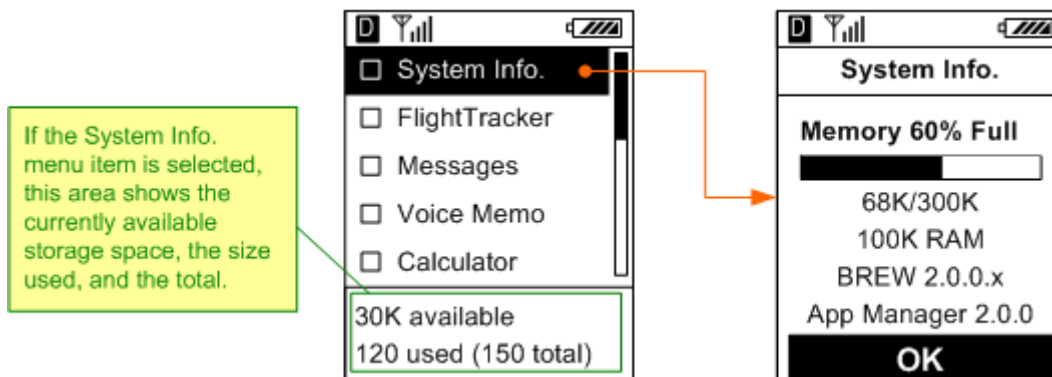


Figure 41. Application management main menu

Application management

The remaining option on the menu includes all downloaded BREW applications installed on the device.

NOTE: The upgrade check feature is removed from the menu if the BDS version is not 1.2 or higher.

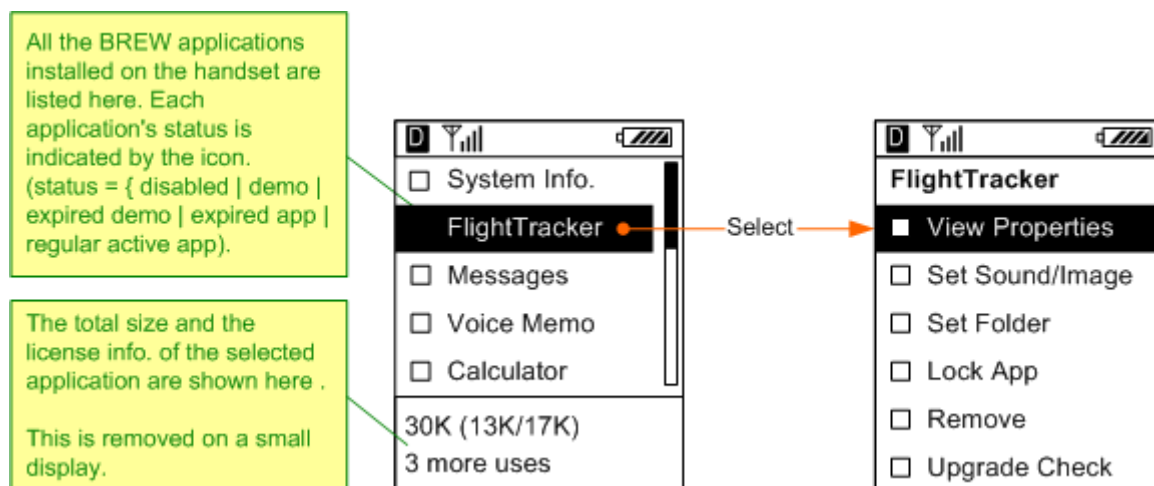


Figure 42. Application management process

View properties option

Figure 43 shows how the application properties are displayed.

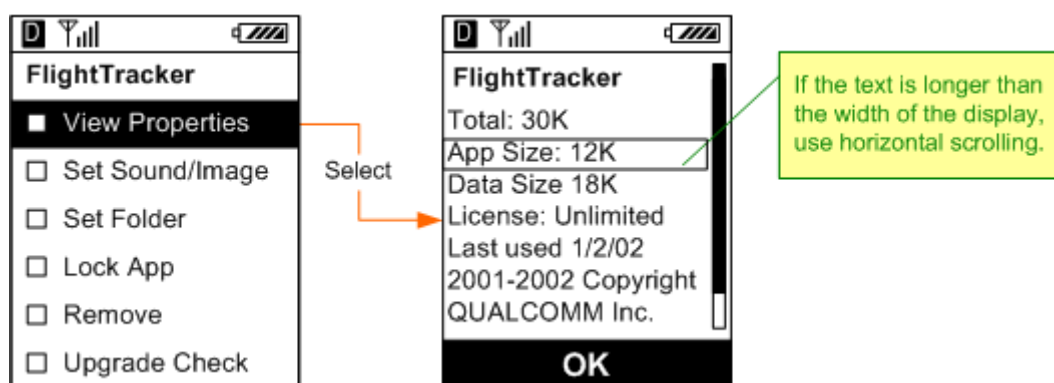


Figure 43. View application properties

The application properties are displayed in the following order:

- Total application size
- App size
- Data size

- License information
- Date of last use
- Copyright
- Developer name
- Version number
- Application status

If the application is a disabled app, a demo app, expired demo app, or expired app, show the status. If the application is a normal active app, show nothing here.

Set Folder option

Figure 44 shows the UI that allows the device users to assign a folder to an application.

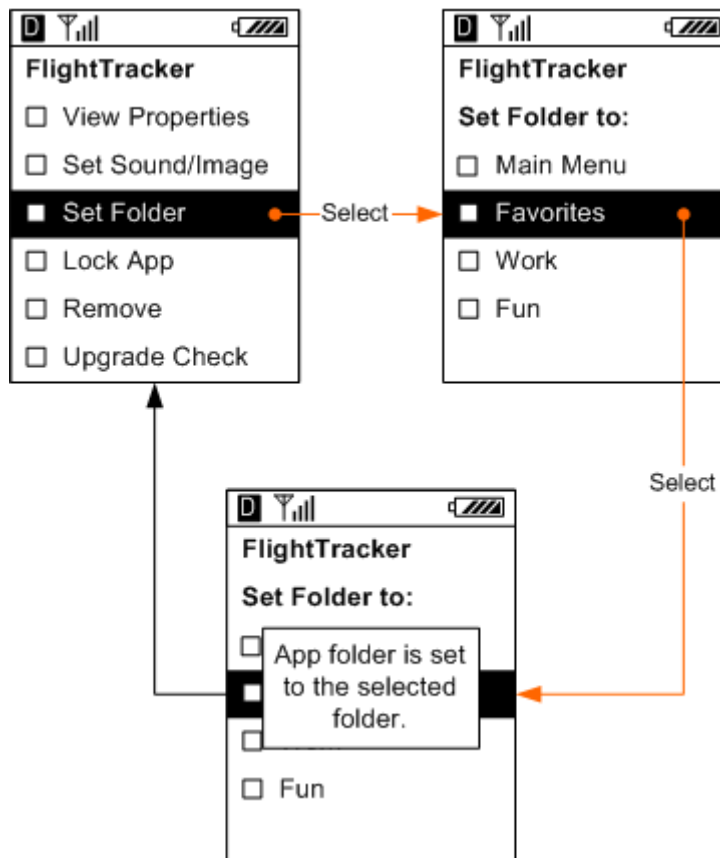


Figure 44. Folder setting tool

Lock/Unlock option

Figure 45 shows the UI flows for locking and unlocking an application.

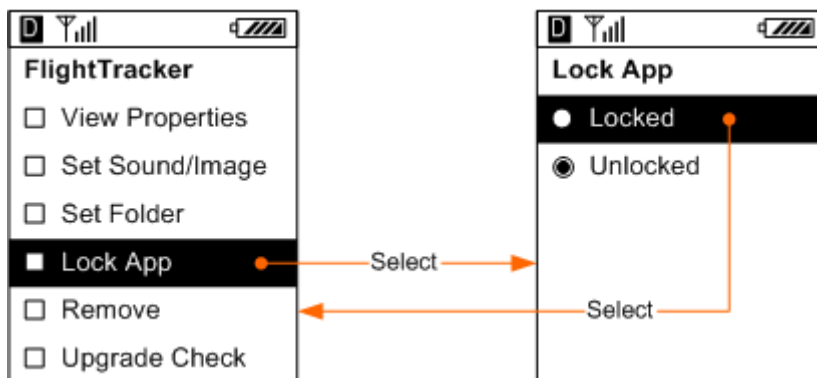


Figure 45. Lock/Unlock option

Remove applications and cancel subscription options

Figure 46 shows the UI flow for removing applications that are not subscribed to.

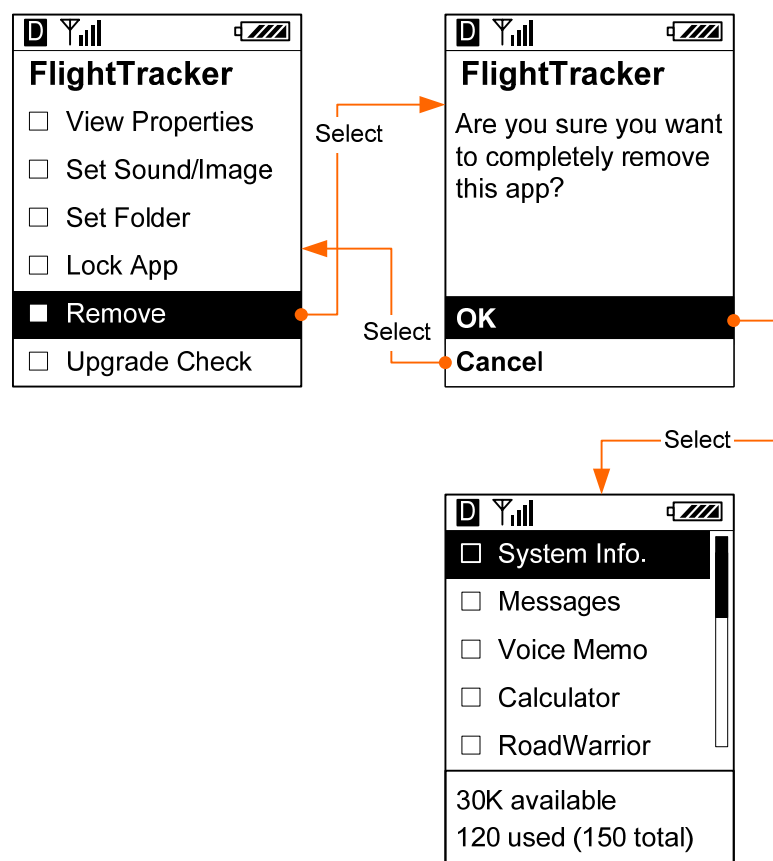


Figure 46. Remove an application

Figure 47 shows the UI flow for canceling applications that are subscribed.

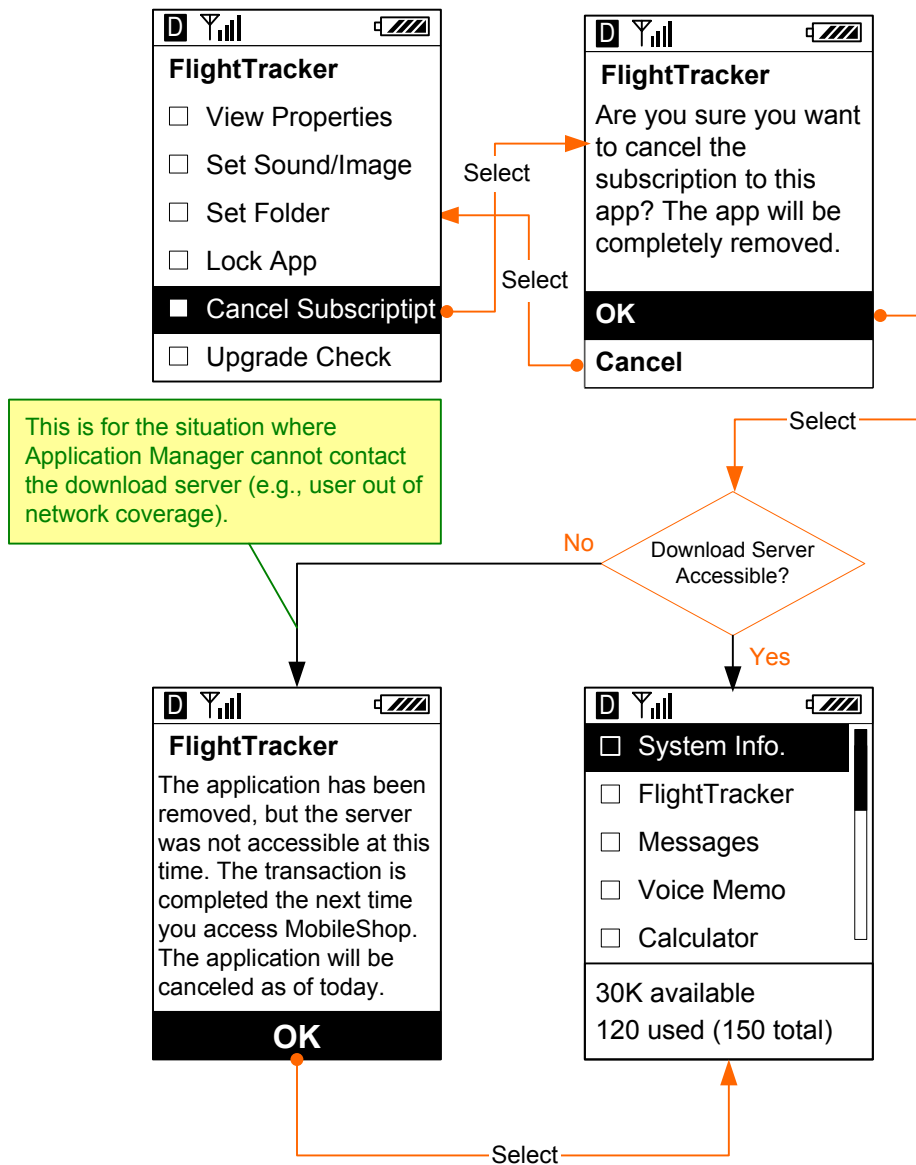


Figure 47. Cancel a subscription application

Manual upgrade check

Figure 48 shows the device user interaction flows for upgrade checking.

NOTE: This feature is removed from the menu if the BDS version is not 1.2 or higher.

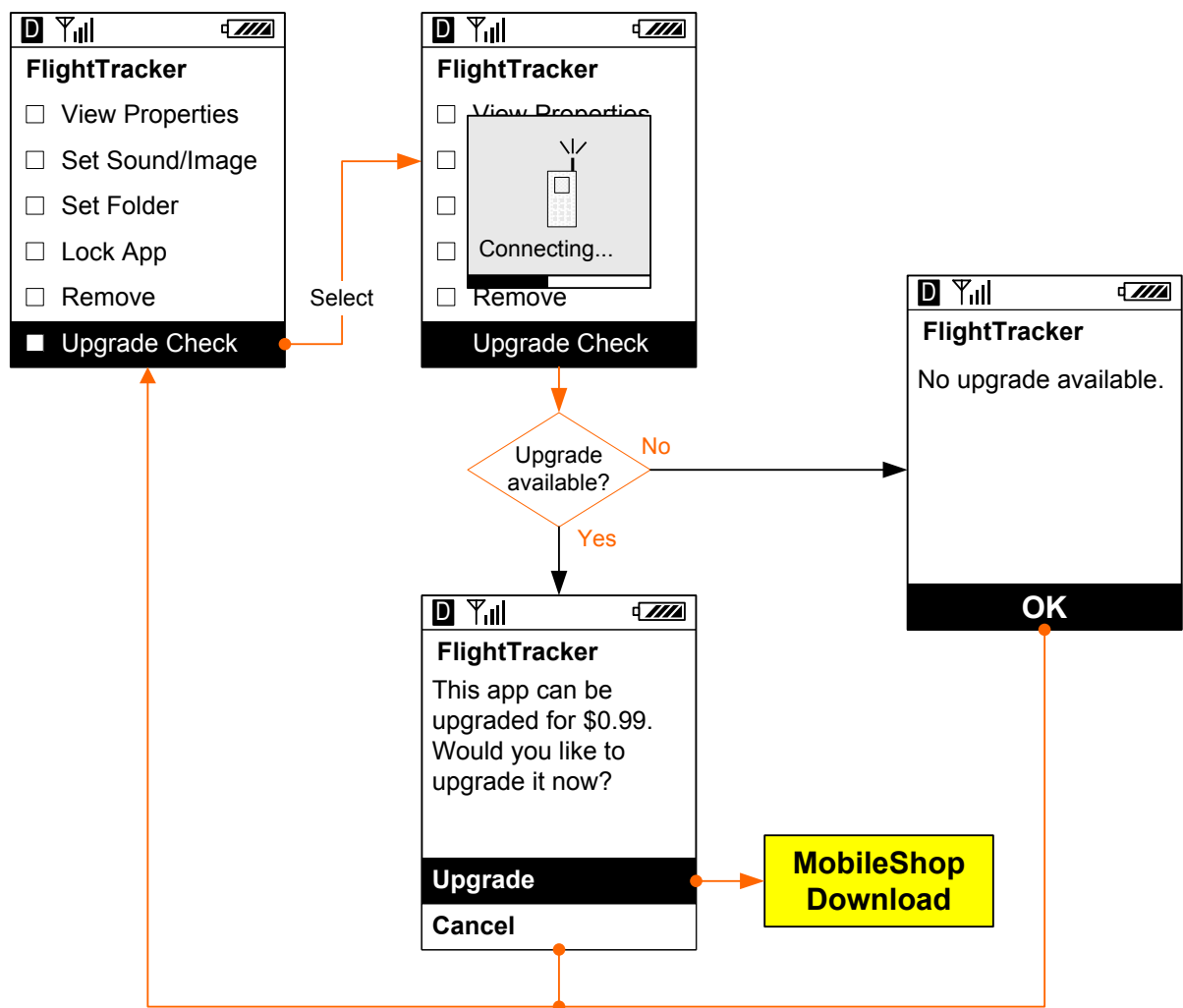


Figure 48. Upgrade check tool

Airtime charge warning

The carrier may choose to display a warning dialog for airtime usage when the device user does the following:

- Attempts to make the connection to the download server (one warning per MobileShop use)
- Checks upgrade availabilities manually

- Launches Application Manager
- Launches a network application

Figure 49 shows the generic airtime warning used in the conditions listed above. As part of the factory settings, the airtime charge warning can be turned on or off.

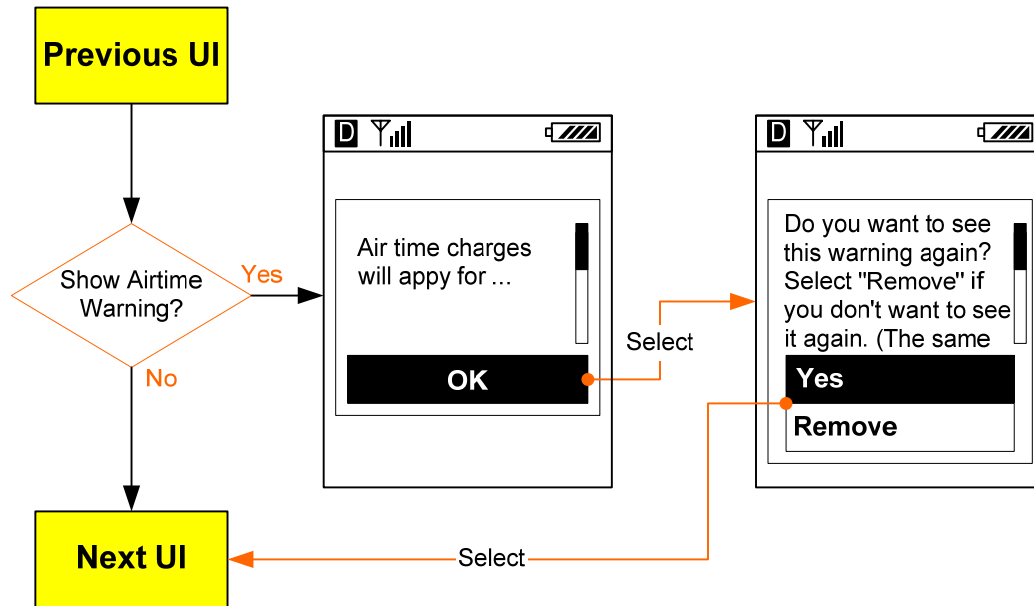


Figure 49. Airtime charge warning

Generic error and warning prompt

In general, error and warning messages appear in the dialog box shown in Figure 50.



Figure 50. Generic error message

Error messages overlap with margins outside each edge of the screen. The size of the error dialog box is specified proportional to the device screen size as part of factory settings. The default is 75 percent.

If the screen size is too small to use margins, the following full screen dialog boxes may be used by setting the dialog size to be 100 percent of the device display size.

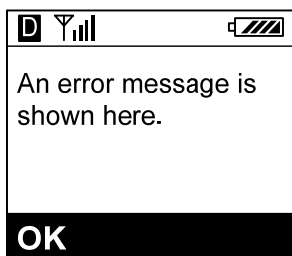


Figure 51. Full screen message for small displays

Generic progress display

Figure 52 shows the schematic design of the progress display used in this document. The animation used in the progress display can be customized.

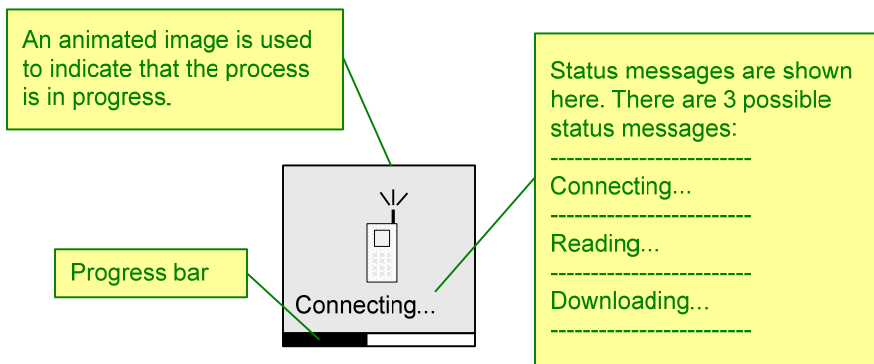


Figure 52. Download progress display

Application Manager help tool

The help tool has two layers. The first level is the main menu that shows the help topics. The second level shows the help content for the chosen topic.

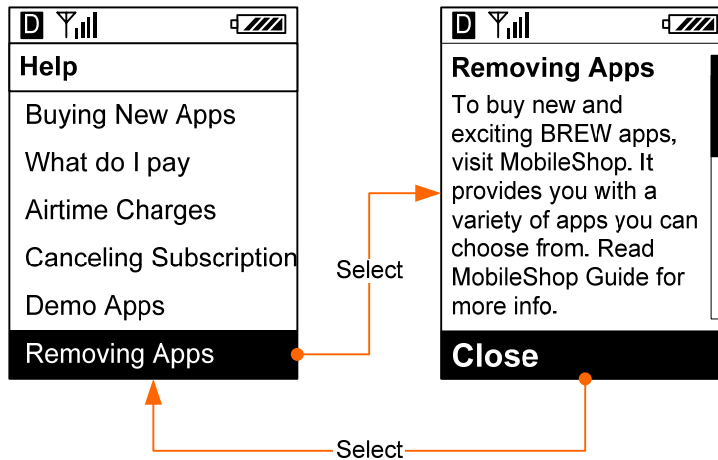


Figure 53. Help topic and content

Factory settings

The following is a list of features that can be turned on/off without modifying the logic in the source code:

- Airtime warning can be turned on or off (per airtime warning)
- Size of the area to use for an error or warning dialog box
- Keypress sequence to start the credit back user interface is 43848669
- Default main menu style (Small icon view, Large icon view, or List view)
- Testing mode (MobileShop Server settings—on or off)
- Screen saver support (on or off)
- Default settings for BDS dependent features. These settings are used only before MobileShop makes the initial connection to the download server.
 - MobileShop's search feature (on or off)
 - Upgrade checking feature (on or off)
- Small screen support (on or off). If a device is designated as small screen device, the large icon view uses icons (26x26) instead of an image and application size. Preview found in Settings → Manage apps will not display.

Appendix A Reference

BREW OEM documentation set

The BREW OEM documentation set includes the following documents:

<i>BREW[®] Porting Guide for MSM[™] Platforms</i>	Describes required interfaces from the OEM that allow BREW to provide various applications services
<i>BREW[®] OEM API Reference</i>	Describes details of the OEM layer APIs
<i>BREW[®] Porting Evaluation Kit User Guide</i>	Describes the Operational Acceptance Test (OAT), PEK Studio, and BREWStone [®] , as well as how to interpret test results
<i>BREW[®] Application Manager and MobileShop[®] Guide</i>	Provides application requirements for Application Manager and MobileShop, as well as reference UI specifications for OEMs developing devices for an operator
<i>BREW[®] Application Manager and MobileShop[®] Integration Guide</i>	Provides information on the installation, integration, and customization of Application Manager and MobileShop on a BREW-enabled device

BREW carrier documentation set

The BREW carrier documentation set includes the following documents:

<i>Operator's Guide to BREW[®] Application Distribution</i>	Explains the BREW distribution process from an operator's point of view, including populating the Carrier Parts List, creating and managing application catalogs, and distributing BREW applications to device users
<i>BREW[®] Porting Evaluation Kit User Guide</i>	Describes BREW Operational Acceptance Test (OAT), PEK Studio, and BREWStone [®] , including how to interpret test results
<i>Transaction Manager Specification</i>	Explains how the Transaction Manager integrates with the billing system
<i>BREW[®] Device Behavior</i>	Identifies the behavior of BREW-enabled devices as it relates to the BREW transaction management and billing processes

Acronyms and terms

The following acronyms and terms are used throughout this document.

ADS	Application Download Server
BDS	BREW Distribution System
DAP	Developer Application Price
Disable	Partially remove a BREW application from the device without requiring the user to pay an additional purchase cost to restore it; frees storage space so the user can download more applications despite the storage limitation of the device
Download options	The options in MobileShop for downloading BREW applications. They include the following: <ul style="list-style-type: none"> ■ Free demo download ■ Purchase an application (see Price basis) ■ Upgrade (free or fee)
Dynamic BREW application	Application generated independently of the BREW core; most dynamic BREW applications are downloaded using MobileShop, but they can also be preloaded on the device
EULA	End User License Agreement
Lock	Prevents the user from removing an application, which locks the application on the file system
MIF	Module Information File
PEK	Porting Evaluation Kit
PK	Porting Kit
Postpay	Pay after downloading through typical carrier billing
Prepay	Pay X number of dollars in advance and download until the prepay account is emptied
Preview text	Description associated with either a category or a BREW application retrieved from the download server and displayed in MobileShop
Price basis	Method of pricing a BREW application
Remove	Delete a BREW application from the device; device users must pay an additional purchase cost to redownload it
Restore	Redownload a disabled BREW application with no additional purchase cost

Static BREW application	Application built with the BREW core; it cannot be disabled or removed
Unlock	Allows the user to remove the lock on the application so they can delete it

NOTE: For OEMs, see the introductory section to the *BREW[®] Porting Guide for MSM[™] Platforms* for more definitions of acronyms and terms used in the BREW OEM document set. For carriers, see the *BREW SDK[®] User Docs* help included with the BREW SDK[®].

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