ROM Crafter

Users Guide

Version 2.4

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Contact Information

Brayder Technologies Inc. is an innovative software firm, focused on providing top quality software for the Palm Computing platform. We have a great depth of talent in software design and anticipate bringing many exciting products to you in the future.

Brayder now partners with HandEra in the development and marketing for ROM Crafter. All Sales and Marketing and Level 1 and 2 support for ROM Crafter will be provided by HandEra.

If you need to contact us regarding ROM Crafter, please use one of the following:

- www.handera.com for information on ROM Crafter functions and downloadable files
- kit.mcdowall@handera.com or 515-710-8584 for questions or support for ROM Crafter

Conventions

This guide uses the following text formats:

- Command buttons appear in all capitals. For example, tap OK.
- Menu, Dialog, and Pick List names appear capitalized. For example, the Options menu.

- Menu and Pick List items, and System prompts appear in quotations. For example, choose “Preferences” from the Options menu.
- References to other applications and other sections appear in italics. For example, *see on page 5*.
- Notes appear in a smaller font. For example:

Note: *This is an example of a note.*

Table of Contents

Terminology

The memory terminology associated with ROM Crafter can be confusing. The various terms involved are as follows:

- **Flash Memory**. The term “flash” is now used for many industry technologies. For ROM Crafter purposes, “flash” is the hardware chip memory used in many Palm OS devices. Flash memory is non-volatile, meaning it does not lose its contents if power is lost. Power loses can result from the batteries expiring or from a device malfunction (sometimes from being dropped, etc). The Palm OS is housed in non-volatile flash memory, so if the battery power expires, the Palm OS is still available when the battery power is resumed. “Flash memory” and “ROM” are often used interchangeably, which makes discussions even more confusing.

- **ROM**. ROM stands for “Read Only Memory”. Flash memory is not “read only”, but is often referred to as ROM. Palm OS software image files are also called a “ROM” file. Thus, when discussing “ROM”, it is important to come to an agreement on terms.

  Since it is more common today to call the non-volatile hardware memory on Palm OS devices “ROM” than the more technically accurate “Flash”, ROM Crafter uses the terms “System ROM” and “Expansion ROM” to refer to the non-volatile flash hardware memory areas. Again, neither is truly “Read Only”.

  ROM Crafter also uses the term “ROM” to refer to the customized software image file that will be created by ROM Crafter and loaded to Palm OS devices by the ROM Imager component of ROM Crafter.

About ROM Crafter

ROM Crafter by Brayder Technologies provides the ability to customize PalmOS devices to the specific needs of an organization. By creating devices that target exact needs, ROM Crafter brings increased dependability, simplicity and availability to a PalmOS based application deployment.

PalmOS devices can be permanently customized using ROM Crafter by removing unnecessary components from the System ROM, and storing critical applications and databases in the Expansion ROM. Only ROM Crafter provides the power to do this safely and easily.

ROM Crafter provides functions to do the following:

- Add user programs to non-volatile ROM memory
- Delete un-needed Palm provided applications, commonly referred to as PIMs (such as Expense, Datebook, etc)
- Add user programs and databases to RAM memory, back them up to non-volatile ROM memory, and automatically restore them to RAM after a device hard reset
- Backup a device ROM Image to a Windows PC (such as a ROM master image)
- Backup a device ROM to an SD card
- Load ROM images to up to 8 devices concurrently via USB or serial connectivity
- Load a ROM image from an SD card to a device
- Delete un-needed Languages from devices in order to create more user ROM space

ROM Crafter Process Overview

The use of ROM Crafter generally follows this process:

Build Master Device ROM Image

1. With ROM Crafter, build a package to be installed to devices, specifying parameters for:

    - PIMs to delete
    - User Programs to add to Expansion ROM
    - User Programs and databases to add to RAM and backup to Expansion ROM
    - Device makes and models
    - Package installation parameters

2. When the package parameters are entered, save the package parameter file (it is a file in .prc format). Then send the package to a Palm OS device via HotSync or any other means of loading a .prc file on a Palm OS device.

3. Once the package is on the device, it can either be automatically or manually started. When the package is started, the requested device functions are performed.

Backup Master ROM Image To PC

Using the ROM Imager component of ROM Crafter, the master ROM image can be backed up from the master device to a PC ROM file, or to an SD card using the 'ROM Backup.prc' program.

Mass Load Clone Devices With Master ROM Image

Using the ROM Imager component of ROM Crafter, the master ROM image can be mass loaded to up to eight (8) devices at a time. Alternatively, ROM Crafter built custom ROMs can be loaded to devices using an SD card file and the 'ROM Restore.prc' program.

Update Expansion ROM Files On Devices

After a device software image has been customized via ROM Crafter, (either by loading a new master image or by installing a ROM Crafter package), subsequent ROM Crafter packages can be built and deployed to update individual programs or databases. These updates can replace the files already stored in Expansion ROM memory with new updated versions.

PalmOS Memory Architecture

Applications and data can be stored in four distinct areas, on a PalmOS device, each with their own advantages and disadvantages. A PalmOS device has a different design philosophy than a typical computer. This is reflected in how applications and data are stored and accessed.

The primary storage areas are RAM, System ROM and Expansion ROM. Each of these areas can store and allow direct access to applications and data. The fourth storage area is an expansion card. Expansion cards allow applications and data to be stored, but they typically require items to be moved to RAM before they can be directly accessed.

- RAM is where most add-on applications are stored and where all user-generated data is stored. The main feature of RAM is that items are directly modifiable by the PalmOS. The disadvantage of this storage area is that its contents will be lost if a battery failure or a hard reset should occur.

- System ROM is the storage area where the PalmOS itself is stored, along with all of the built-in applications. The main features of the System ROM are that it contains the core operating system and its contents are not lost on a battery failure. The disadvantage of this storage area is that it is not normally modifiable. Items stored in the System ROM are not updateable.

- Expansion ROM is the storage area supported by **ROM Crafter**. It uses the remaining area of the ROM that is not used by the System ROM. On devices that use Flash ROM, it can be used to store applications and databases. The contents of the Expansion ROM will not be lost if a battery failure or hard reset occurs. Files can be moved in and out of the Expansion ROM using the **ROM Crafter** libraries. The only disadvantage of this storage area is that it is not directly modifiable by the PalmOS. Modifiable items must be updated in RAM and then moved to the Expansion ROM.

- Expansion cards are used as a secondary storage area by the PalmOS. Files can be moved between RAM and an expansion card, and PalmOS applications can be modified to use expansion cards for data storage. The PalmOS Launcher provides a way of running applications from an expansion card by transparently copying it into RAM and then running it from there. The main advantage of expansion cards is their storage size; they can significantly add to the storage capabilities of a PalmOS device. The main disadvantage of expansion cards is that they work differently than the other storage areas and cannot be used transparently to expand the device. Another disadvantage of expansion cards is that they can be removed, eliminating any guarantee of availability.

ROM Crafter Customization Packages

ROM Crafter is designed to create customization packages for PalmOS devices. A package is a standard PalmOS application that can be loaded onto the device via HotSync, Beaming, Email attachment or an expansion card. When the customization package is run, it updates the device by removing unwanted applications from the System ROM, and installs packaged applications and databases to RAM and the Expansion ROM.

When a **ROM Crafter** package executes on a Palm OS device, the first step performed is to update the System ROM. This allows selected built-in applications, databases, extra languages and system libraries to be removed. Items that can be removed from the System ROM have been pre-tested for stability and compatibility by Brayder Technologies Inc. This greatly reduces the amount of testing required when deploying a modified device.

Once the update of the System ROM is complete, **ROM Crafter** can update the Expansion ROM. Any storage space recovered from the System ROM is automatically used to increase the storage area of the Expansion ROM. **ROM Crafter** will then add items to the Expansion ROM that were selected during package creation. These items are extracted from the package and moved into the Expansion ROM. Applications will be visible in the launcher and all items will be available after a battery failure or hard reset.

Next, **ROM Crafter** installs selected items into RAM. The decision about whether to place an item in RAM or Expansion ROM is important. Some applications and most databases need to be in RAM in order to work correctly on a PalmOS device. When it is not necessary to store an item in RAM, the decision may be based on whether or not it is a critical component. Expansion ROM is a more limited resource than RAM and may not have the available space for all applications

All items installed into RAM are backed up into Expansion ROM. This allows items that need to be in RAM to be placed in RAM, while providing the ROM-based advantage of protection against battery failure and hard resets. When the device is rebooted after a battery failure or hard reset, items backed up to Expansion ROM are automatically restored to RAM.

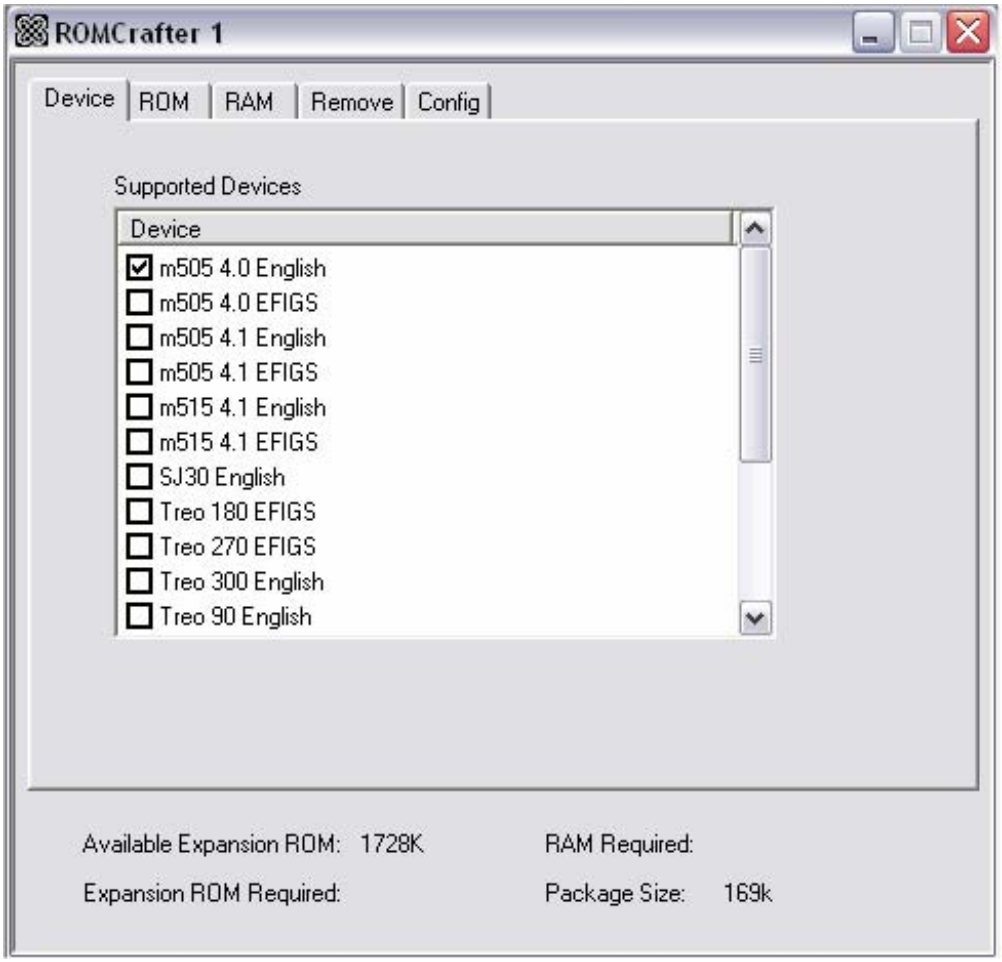
Using ROM Crafter

This section describes how to work with **ROM Crafter**.

Create a New Customization Package

The first time you run **ROM Crafter**, you will need to choose “New” to create a new customization package. The package is configured using five panels that expose different aspects of the customization package.

Device Panel



The Device panel is the first to configure in a ROM Crafter customization package. This panel is used to select the target device(s) for the package. Any combination of supported devices can be targeted by a single package. However, each device has a different amount of available Expansion ROM. Thus, when a package targets multiple devices, it is important to make sure that it will fit onto the device with the least amount of Expansion ROM.

The field "Available Expansion ROM" displays the minimum Expansion ROM that is available among the selected devices. This amount can increase if items are removed using the Remove panel.

As items are added to the Expansion ROM install list, their size will be added to the "Expansion ROM Required" field. For a package to install correctly, the "Expansion ROM Required" field must be less than the "Available Expansion ROM" field.

The amount of free space on the selected device(s) is also affected by the “Removed Applications” and the Languages deleted.

ROM Crafter currently supports the devices listed in the following table. If a device is not listed here, please contact us as to availability.

Palm Solutions

- m500
- m505
- m515
- i705
- Tungsten C
- Tungsten T
- Tungsten T2
- Tungsten T3
- Tungsten W

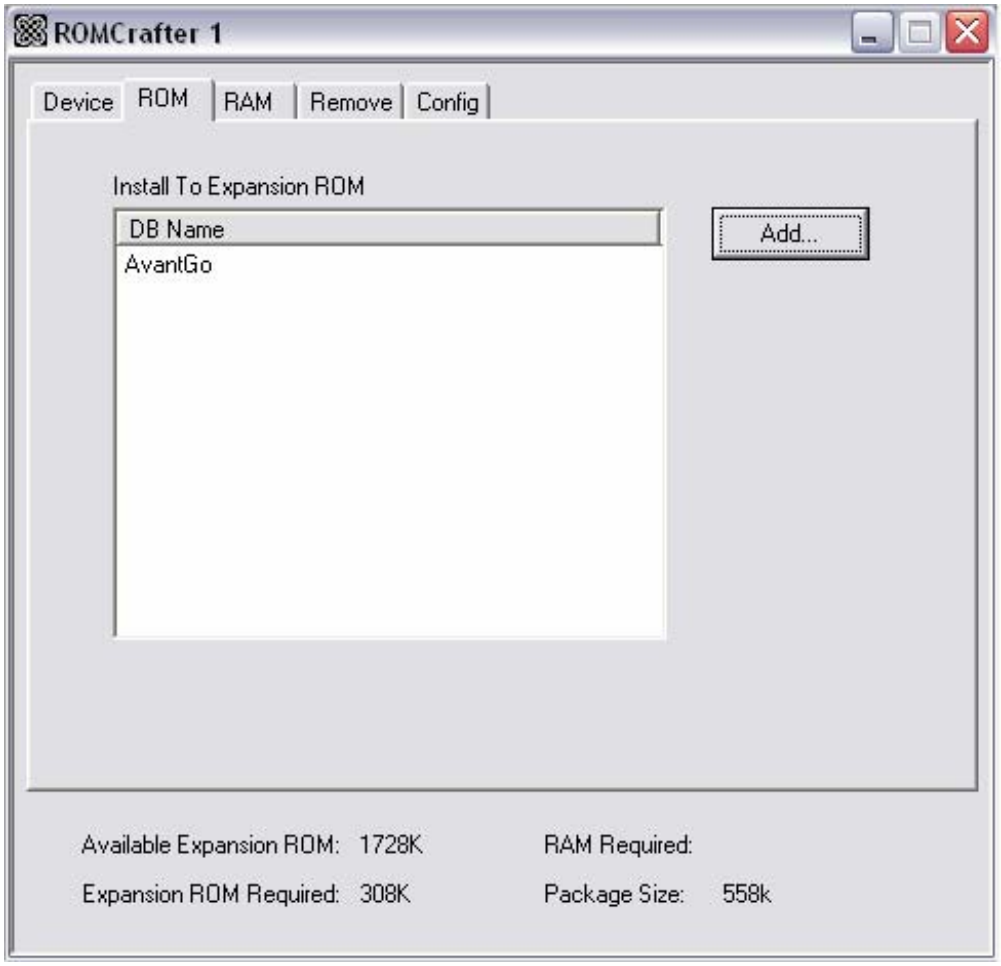
Handspring

- Treo 90
- Treo 180
- Treo 270
- Treo 300

Kyocera

- 7135

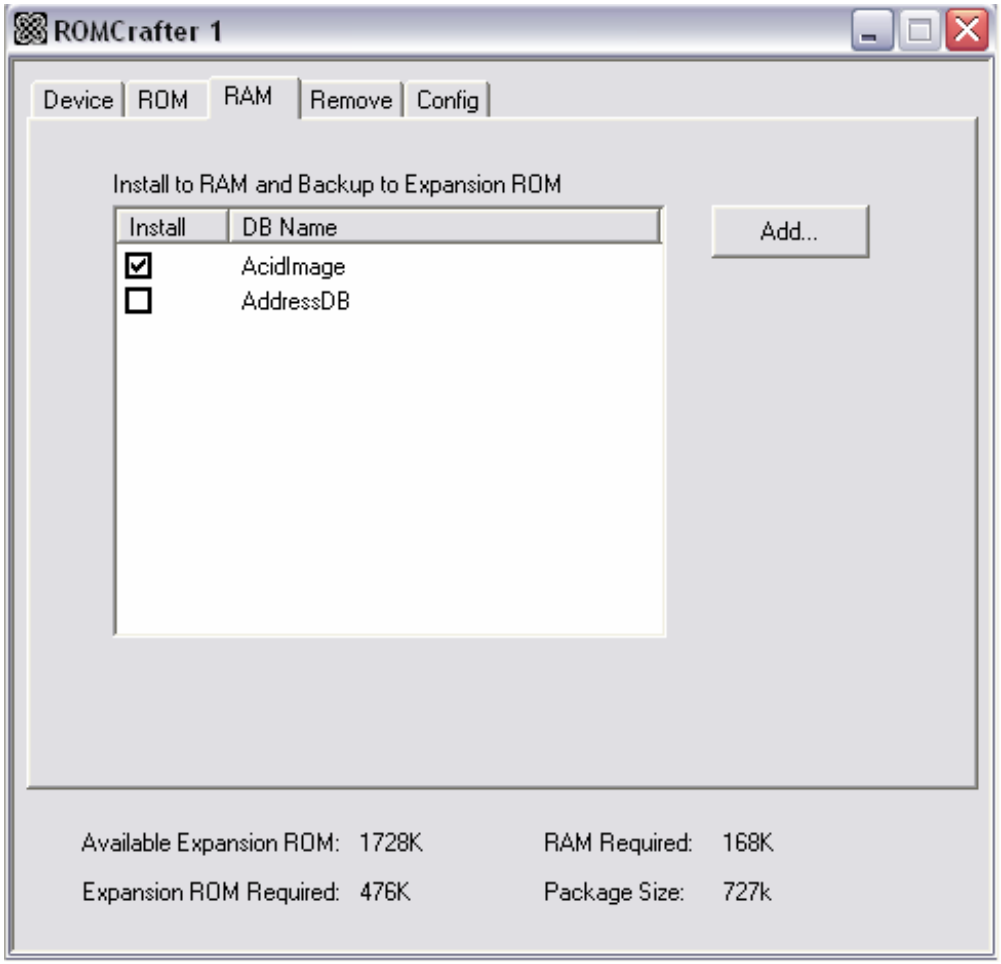
ROM Panel



The ROM panel is used to select items to install into Expansion ROM. Items are added to the list through the "Add..." button. Both prc's and pdb's can be added. Applications (.prc's) should work correctly in Expansion ROM. However, not all databases (.pdb's) will work correctly. If a database is "Opened for Update" by the application program, then that database cannot be installed into Expansion ROM and will need to be installed using the RAM panel. Even if a database is only used for reading and no updates are performed, it is the Open parameter that determines whether the database can be housed in Expansion ROM.

To remove an item from the install list, select it and tap the 'Del' key.

RAM Panel



The RAM panel is used to select items to install into RAM and back up to Expansion ROM. Items are added to the list through the "Add..." button. Both .prc's and .pdb's can be added. By default, items are installed into RAM.

The Install parameter can be overridden by unselecting the "Install" flag

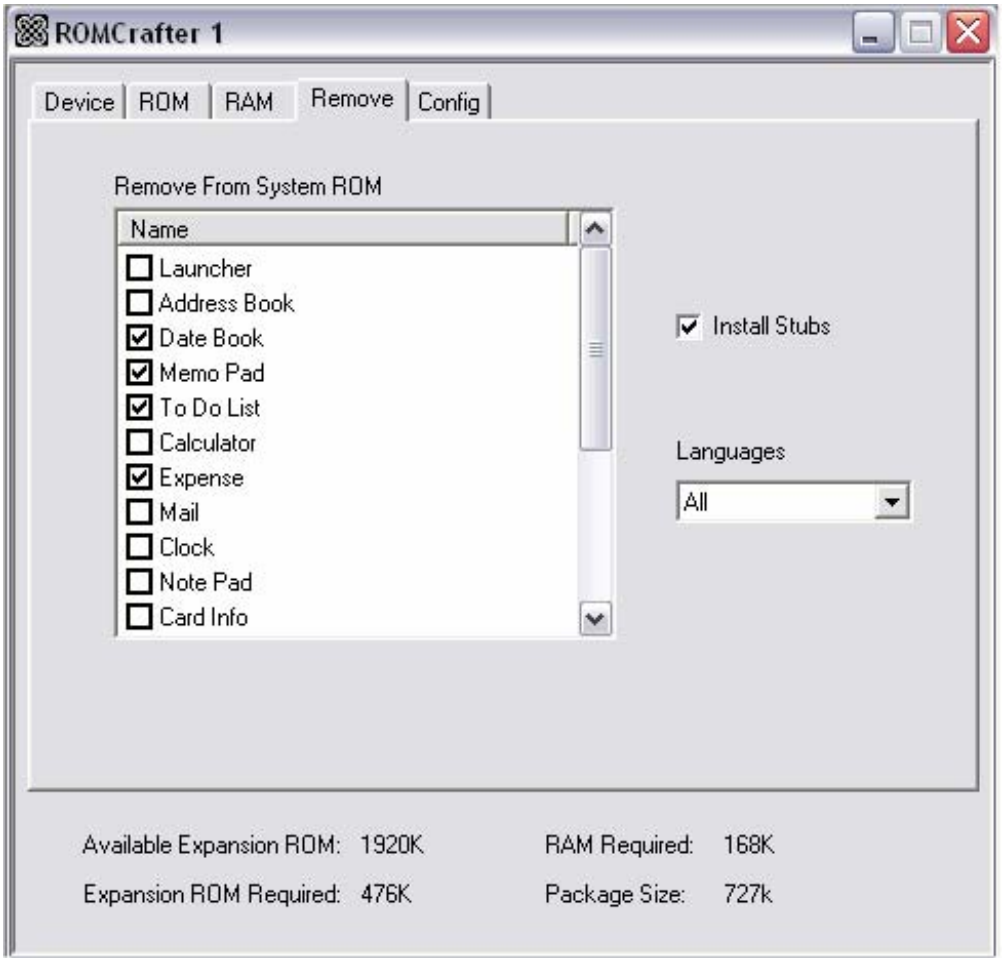
Items installed to RAM are also backed-up during installation. Backed-up items will be automatically restored to RAM after a Hard Reset or a battery failure.

If the "Install" flag is not selected, then the item is not included in the customization package, but it will still be added to the list of items to backup to Expansion ROM. System Files, or other pre-existing configuration files that should not be overwritten during installation can be backed-up this way.

For example, the user or developer might want to backup the Saved Preferences file that is on a device from RAM to Expansion ROM when a ROM Crafter package is installed, but not actually include a new Saved Preferences file in the package. So if Saved Preferences is selected in the RAM Add list and the Install box for Saved Preferences is un-checked, at the time of the ROM Crafter execution on the device, the Saved Preferences file on that device will be backed up to Expansion ROM, and subsequently restored to RAM in case of a device hard reset.

To remove an item from the install list, select it and tap the 'Del' key.

Remove Panel



The Remove panel is used to select items to remove from the System ROM area. As items are removed from the System ROM area, the recovered space is added to the Expansion ROM area.

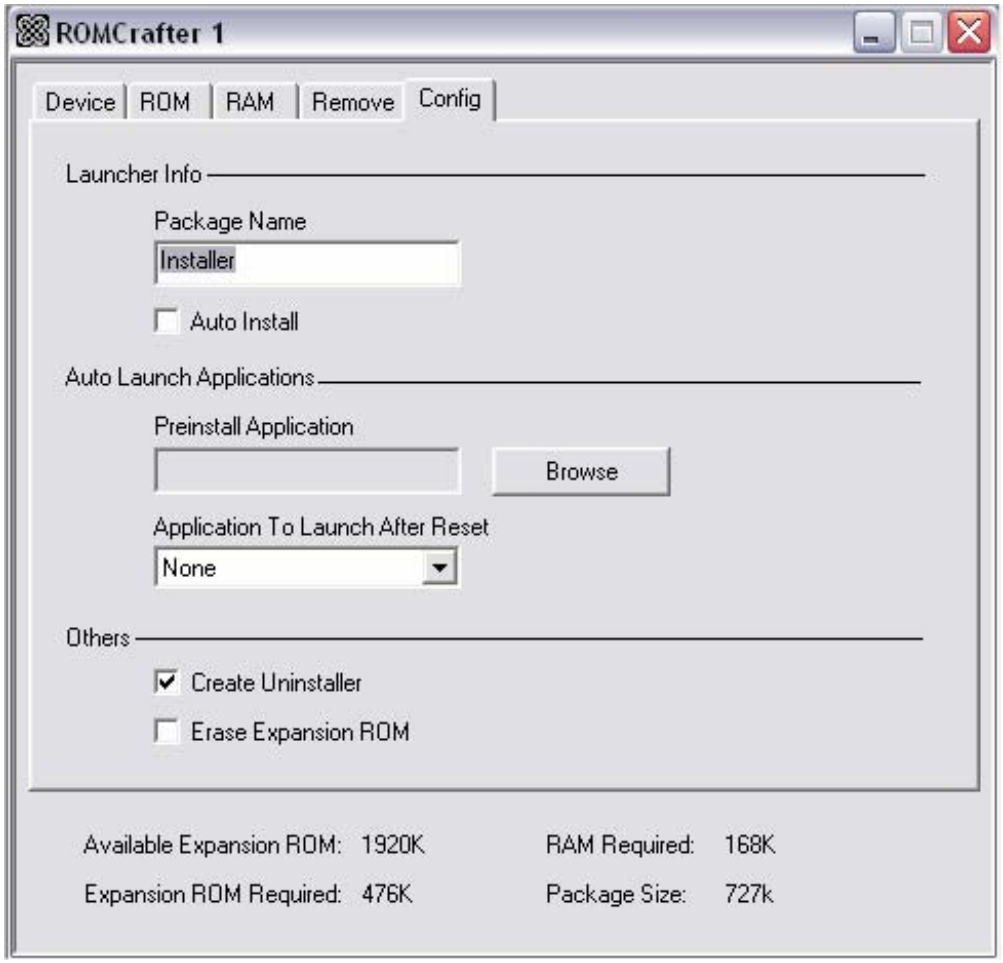
The list of available items to remove is the combination of available items from each of the target devices, so not every application in the list may actually exist on the target device(s). As items are removed, the "Available Expansion ROM" field is updated to reflect the increase in Expansion ROM space.

The "Install Stubs" option is set by default. This option installs a HotSync "stub" for many of the removed items. This allows the HotSync conduit to continue working for a removed item. This is useful if an item is being replaced by a third party application, which depends upon the behavior of the default conduit. For example, if the To-Do List is replaced by a third-party version, the built-in To-Do List application is replaced by a small stub, which makes sure that the To-Do HotSync conduit still runs during a HotSync. This allows the third-party application to work correctly with HotSync.

If HotSync stubs are not required, unselecting "Install Stubs" will provide the maximum possible Expansion ROM space.

On some devices, more than one language is supported. On a PalmOS device with more than one language installed, the active language can be selected after a Hard Reset. Thus, the device is essentially limited to only one language. **ROM Crafter** makes it possible to remove the unused languages to increase the available Expansion ROM space.

Config Panel



The Config Panel is used to configure specific features of the customization package.

Package Name

This field is used to change the name of the package displayed by the PalmOS launcher.

Auto Install

The Auto Install flag is used to create an auto-installing package. By default, a package must be loaded onto a device, launched, and then a button must be tapped to start the customization process. If this flag is set, the package will auto-install after being HotSync'ed to the device, or run from an expansion card.

Preinstall Application

The Preinstall field is used to select an application to run before the customization begins. This application effectively decides if the customization process proceeds. It can be used to capture a registration code or initialize a configuration. A simple Preinstall application can be found in the Example Code of this distribution.

The Preinstall application is sublaunched using the "romcrafterAppLaunchCmdPreInstall" launch code. Because it is sublaunched, no globals may be used during the preinstall process.

Application To Launch After Reset

The Launch After Reset dropdown makes it possible to choose an installed application to launch after every reset on the PalmOS device. Rather than always displaying the Prefs after a reset, the device will launch this application.

After a Hard Reset, the standard Setup application will be launched. If the Setup/Welcome application has been removed, then this application will be launched instead. In this case, it is necessary to make sure that the digitizer is initialized. This will require either displaying the digitizer calibration panel, or restoring previously saved calibration data.

Create Uninstaller

The Create Uninstaller flag forces **ROM Crafter** to create an Uninstall application along with the customization package. The Uninstaller will be saved in the same directory as the customization package and will have the same name, with the suffix "-Uninstaller".

The uninstaller only removes the items and backups installed into Expansion ROM. It does not restore items that have been removed from System ROM.

Erase Expansion ROM

The Erase Expansion ROM flag causes the customization package to remove all existing items in Expansion ROM before installing the package. This can be used to install overtop of an existing installation.

Saving the ROM Crafter Package

When all panels have been completed, the ROM Crafter package can be saved by clicking the “File” popdown entry in the upper left corner of the ROM Crafter window, then selecting “Save As”. ROM Crafter will save the package as a *.prc format file. The default name for the package prc is “ROMCrafter.prc”. The developer can choose any name desired. Any Windows folder can be selected for housing the new ROM Crafter package.

Deploying Customization Packages

A customization package can be deployed to a device in the same way that a Palm application can be deployed. The most common methods are HotSync, Expansion cards, beaming, Server Synchronization programs, and email attachments. The choice of method will depend upon the number of devices being updated and where they are located. If the devices have already been deployed to the field, then there are fewer options available than if they are all at a single location.

Before Customizing A Device

Before using **ROM Crafter** to customize a device, **ROM Imager** should be used to capture a backup of the ROM. This only needs to be executed once for each type of device. Should the need arise; the ROM backup can be used by **ROM Imager** to restore the device to its original state.

HotSync

When using an Enterprise HotSync tool, the customization package created by **ROM Crafter** can be deployed to each of the target devices. If the "Auto Install" flag is set, the package will automatically update the device after the HotSync. Otherwise, the end user must start the customization package and choose to install it.

Expansion Card

To use an Expansion Card to customize a device, create a customize package using **ROM Crafter**. Select the "Auto Install" flag on the Config Panel, so that the package will install automatically. Using a card reader, store the resulting package in the /Palm directory with the name "Start.prc". Inserting the card into a device will cause the customization package to be automatically run.

Email Attachment

If the target devices have email and attachment support, the package can be sent as an attachment to each of the target devices. Users would have to be instructed to save and run the attachment on the device.

Customizing Devices Using ROM Imager

ROM Imager can be used to customize a large number of devices relatively quickly. The developer can create a master ROM image using ROM Crafter. Then they can backup that new ROM image to their PC or to an SD card. And finally, they can load the new ROM image to devices by placing the device(s) in a cradle while in debug mode. **ROM Imager** can load a ROM image file to up to eight (8) devices concurrently over serial or USB connections, thus speeding up a new deployment significantly. ROM Imager can also restore ROM images from an SD card.

For details on the ROM Crafter Imager component, please see the ROM Imager Users Guide manual.