PaperCut VCC Controller Manual

Contents

This manual covers the VCC Cash Controller setup. For general PaperCut MF documentation, please see the [PaperCut MF manual](#).

1 Introduction

PaperCut provides the ability to monitor printing by integrating with the print queues hosted on servers in the organization. Many organizations also like to monitor walk-up photocopier usage and manage this in the same quota/charging environment provided by PaperCut. If PaperCut is used to monitor both print and copier usage, it provides a consolidated view of print and copy activity.

Unlike printer monitoring that can be done in software, copier monitoring requires the use of third-party hardware terminal devices connected to the copier. PaperCut connects to these devices to determine how much copying is performed, and deny copier usage if the user has no credit available.

If the copier is also a printer (e.g. a multi-function device), then PaperCut also makes it possible to use hardware terminal devices as a print release station, avoiding the need for dedicated PC based release stations.

NOTE: PaperCut will work only with supported copier terminal hardware. For more information on supported hardware, contact your reseller or Authorized Solution Center for help with this. You can find their contact information in your PaperCut Admin interface on the **About** page.

2 Terminology

Term	Description
Terminal	Refers to the third-party hardware terminal connected to the copier or multi-function device. Terminals are represented in PaperCut as virtual printers, and can be configured as usual via the "Printers" or "Devices" tab.
Multi-function device (MFD)	A device that performs both printing and copying. These devices can optionally use a terminal as a print release station.
Escrow	An escrow is the amount of credit that is temporarily transferred from a PaperCut account to the terminal device. This credit is then used during the copier session and the unused proportion is transferred back into PaperCut at the end of the session. An escrow defines the maximum amount of copying that can be performed in a single session.
Price line	Different types of copying can be categorized by attributes such as paper size, duplex and other settings. Each attribute combination is assigned to a price line – similar to an item code for goods in a shop.
Value Loader	Value loader is a device that allows a user to add credit to their account in PaperCut. They can have coin and/or note acceptors to allow user to add value to their accounts.

3 How copier tracking integration works

This section provides a high-level introduction to how the copier tracking works, which will give the administrator a better grounding to configure the system and diagnose any problems that arise.

A hardware device referred to as a terminal is connected to both the copier/MFD and to the network LAN. PaperCut communicates with the terminal via the TCP network. In turn, the terminal communicates with the copier ensuring copying only takes place under controlled use.
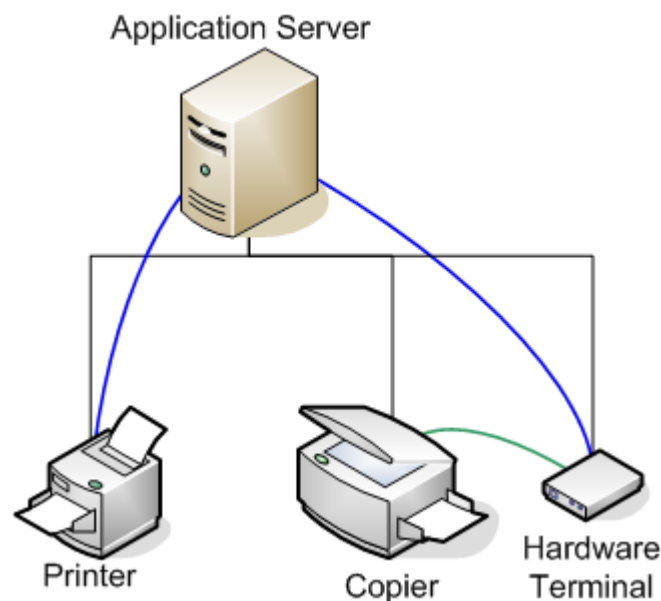

Figure 1: Hardware terminal integration

An example of what occurs during the copy process is:

- The user walks up to the copier and is requested to login at the terminal using the organization's preferred authentication method – usually a swipe card, an account number, a unique identity number or a username and password. If a unique identity number is used then it must match the "Card/Identity Number" field in the user's PaperCut User Details.
- If the user has access to charge to "Shared Accounts", they are prompted to select either their personal account or a shared account they have access to.
- If the selected account has credit available, the copier is enabled.
- The user performs copying until they cancel their session or run out of available credit.
- PaperCut then logs the copy details in its database and deducts the cost from the selected account.

Some terminals may also support release station functionality. This is similar to PaperCut's Release Station software however the interface is provided by the terminal, avoiding the need for a dedicated release station PC located next to the printer/copier. In the case of using a terminal as a print release station the following process occurs:

- User is requested to login to the terminal using a swipe card, account number or user name password. If an account number is used, then it must match the "Card/Identity Number" field in the user's PaperCut User Details.
- The user is presented with a list of print jobs being held by the release station.
- The user selects which jobs to print, and PaperCut will allow these documents to be printed.
- The user is charged for the print jobs and the print job details are logged in the database.

For multi-function devices (MFD) that act as both a printer and a copier, the process works in a similar way, however after logging in, the user must select whether they want to perform copying or printing.

4 Setup Phase 1: Device/Hardware Setup

To use devices with PaperCut, they must first be setup and connected to the network. The specific configuration steps required depends on the terminal device being used, but it usually involves:

- Connecting the device to the photocopier (if monitoring photocopying)

- Connecting the terminal device to the network (and assigning it a network address).

Once the terminal device is configured and on the network, proceed to Setup Phase 2 to setup the terminal device within PaperCut.

The remainder of this section provides a quick start guide for specific hardware terminals. It is not intended to replace the documentation provided by the hardware terminal manufacturer/supplier, but is intended to streamline the setup of the terminal devices for use with PaperCut.

4.1 Networking/Firewall Configuration

Ensure that your networking/firewall configuration allows outbound connections from the PaperCut server to the VCC devices on ports 1234, and 1235.

Note: The Windows Firewall does not block outbound connections, so no configuration is required.

4.2 IP Address Allocation

The VCC terminal is a server. It connects to the network and then accepts connections from the PaperCut system. In this respects it is very similar to a network server. For security reasons and in-line with network server best practice, the terminals should be allocated a static IP address. We recommend selecting the addresses carefully and following the same checks and procedures as you would for any server:

- Ensure the address is outside your IP DHCP allocation range.
- Ensure the IP is not, and will not, be used by any other device.
- Follow the same procedure and care as used when allocating IPs to other servers such as file servers.

Larger networks with many terminals should consider:

- Hosting terminals on a separate detected IP subnet range (simplifies management and avoids collisions).
- Carefully recording the IP addresses allocated and where the corresponding terminals are physically located.

4.3 Virtual Cash Controller (VCC) Quick Start Guide

This quick start guide describes how to connect the VCC devices to the network. It does not cover connecting the VCC to a photocopier.

1. Plug in the VCC Controller into the power supply. When powered and completed start-up, the device's display should show "Temporarily off-line waiting for network".

2. Plug in the Ethernet network cable to the back of the device. If the device connects to the network, a green LED on the terminal will light (VCC Only).

3. The next step is to assign the device a network address. You must assign a static IP address to the device (see "IP Address Allocation" section above).

4. Put the device into offline mode by unplugging the Ethernet cable.

5. Swipe the "Parameters card" that came with the terminal device. The display will read: Enter offline / Set IP

6. Use the Up/Down keys to select **Set IP**, and press **Enter**

7. Use the +/- keys to select **Static IP**, and press **Enter**

8. Enter the IP address of the PaperCut server, and press **Enter**. If this is not set correctly PaperCut will not be permitted to connect to the device.

9. Enter the network subnet mask, and press **Enter**

10. Enter the network gateway IP if required to communicate with the PaperCut server. If a gateway is not required set this to 255.255.255.255. Then press **Enter**

11. Enter the IP address to assign to this device (see "IP Address Allocation" section above), and press **Enter**

12. If prompted for the reader and controller ports, leave the default values (1234 and 1235 respectively) by pressing **Enter** for each.

13. The device will then prompt with the message: Press Enter or C/CE to Exit. Press **Enter** to confirm the changes

14. The device will reboot to make the requested changes.

15. Reconnect the Ethernet network cable and check that the green LED it lit. Also verify the IP address is set correctly by pinging the device from the PaperCut server. E.g. ping [device-ip].

16. To monitor photo-copying, the VCC terminal then must be connected to the copier device. Please contact the manufacturer/supplier for details.

For more information see the VCC documentation which is available from:
http://www.virtualcash.biz/downloads/vcc_manual.pdf

5 Setup Phase 2: PaperCut Configuration

Once the terminal devices are connected to the network, some configuration changes are required in PaperCut to enable terminal device integration.

5.1   Enable External Device Integration

By default PaperCut is configured to monitor printers. To enable integration with external terminal devices:

1. Navigate to the Options tab
2. Select the Advanced tab
3. Enable the "Enable device integration (for supported devices only)" option
4. Press the Apply button

When enabled, PaperCut adds new features to the user interface to support external device integration. For example, a "Devices" tab will appear across the top of the admin interface.

5.2   Connecting to a Device

Devices are configured in PaperCut in the Devices tab. If a device is used to monitor photocopying then it is treated as a virtual printer. PaperCut "devices" are conceptually similar to printers because they monitor copying jobs performed by users and allow the administrator to configure copying costs, etc. This also means that you can make use of all of the built-in reports and ensure that copier and printer management is consolidated in one view.

PaperCut creates printers automatically because it knows which printers exist on the system. Terminal devices however need to be manually created and configured by the administrator.

> **Important:** Before setting up the terminal in PaperCut, it is important to setup the terminal and attach it to the network and assign the device a network address. To perform photocopier monitoring, the terminal must also be connected to the copier. A quick start guide for connecting terminal devices is outlined in "Setup Phase 1" above.

To create a new device inside PaperCut:

1. Confirm that the terminal is set up as per the manufacturer's directions. The device will need an IP address assigned and should be reachable from the PaperCut server.
2. Navigate to the "Devices" tab
3. Click the "Create Device" action link on the left (see screenshot below)
4. Complete the details of the device:
    a. Device name – unique name of the device
    b. Hostname/IP – the address of the device on the network
    c. Location (Optional) – describes where the copier/device is located
    d. Type – the type of device. There are 2 types of VCC controllers supported:
        i. VCC Controller (Standard) - for the standard controller
        ii. VCC Controller (Touchscreen) – for the Alpha touchscreen controller
    e. Function – choose whether this device is a copier or a print release station. Only the functions supported by the selected device type will be listed.
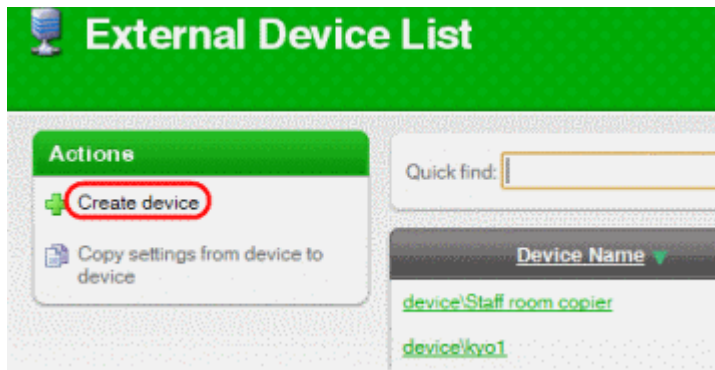5. Press the OK button, and the device will be created.
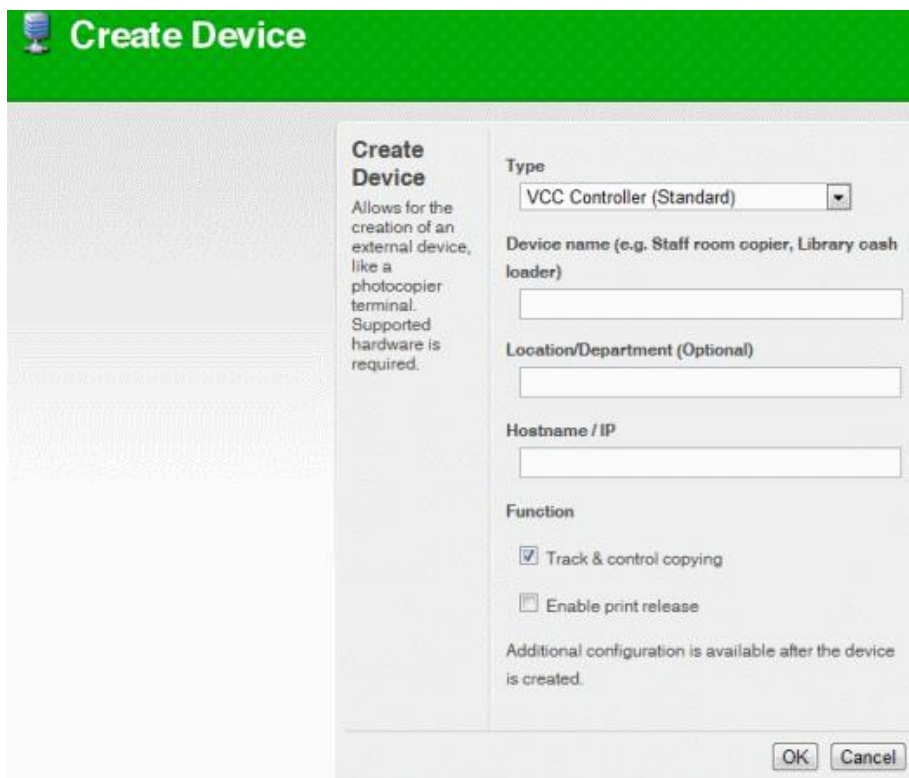
Figure 2: Create device action

Figure 3: Create device screen

Once the device is created, check that PaperCut has successfully connected to the device. The "Device Status" is displayed on the "Device List" page or at the bottom of the "External Device Configuration" section for the device. In the event that a connection could not be established, an error is displayed in this status display. If the device connects successfully, the status will display text: "Started - Awaiting user login".

NOTE: It may take to 30 seconds to create the connection. Press the "[Refresh]" link to see the updated status.

If PaperCut fails to connect to the device, troubleshooting will be required to determine the cause. Some suggestions include:

- Check that the terminal hostname / IP address is correct

- Check that firewalls are configured to allow connections to the terminal (ports 1234 and 1235).
- Try pinging the terminal device from the PaperCut server. E.g.

    ping 192.168.1.50

- Try connecting to the terminal device on the port the terminal is listening on.

    E.g.   telnet 192.168.1.50 1234

5.3   Configuring the Terminal Device for Copying

Once the device is created and PaperCut is connecting to the device, additional configuration can be performed. It is important to configure how each price line maps to physical attributes of the copy job.   Each price line represents a particular set of attributes (See screenshot below):

- Paper size
- Color/grayscale
- Duplex/single-sided

Figure 4: Terminal copier configuration

The per-page costs are also listed to the right of the each price line. The cost is calculated using the costs defined on the device. The costs options can be modified on the "Advanced Charging" tab.

The mapping between price lines and these attributes varies between the terminal device, the copier used and the way they are connected. The terminal vendor can usually provide this information.

If the price line mapping is not known, then it is easy to determine it through experimentation. To do this:

1. Enable the "Debug mode (displays price lines counts in copy log)" option. This will log the line counts in the copy logs.
2. Press Apply to apply this setting change.
3. Perform a test copy using of one type of copy (e.g. LETTER, Grayscale, Single-sided) on the connected device.
4. Check the logs for the device (on the "Recent Jobs" tab). The line count information will be logged in the document name column.
5. Make a note of the price line for this set of attributes, and repeat for other copy attributes (e.g. color, duplex, or different paper sizes).
6. Go back to the configuration page for the device and set the paper size, color and duplex option for each of the price lines.

NOTE: Some copiers and the terminal hardware may not make use of all available price lines. This is dependent on the capabilities of the copier and terminal hardware.

NOTE 2: If using a Virtual Cash Controller (VCC), this is configured to only use 2 price lines by default. If your copier and harness support more price lines, the VCC "steering" mode must be enabled. This can be done by setting the "ext-device.vcc.vend-params" to "1,0,0" in the device's "Advanced Config" tab as described in "Virtual Cash Controller Configuration" below. You may also need to make some jumper setting changes on the VCC hardware itself. See the VCC hardware documentation for more information.

5.3.1 Copy pricing

The next step is to define the costs. Costs are defined using the standard PaperCut cost models. For example, the default "simple" cost model assigns a cost per page which is the same for all types of copying (color, duplex, different paper sizes, etc). To change the cost models, and pricing, select the "Advanced Charging" tab on the device details screen. The options are self-explanatory, but if more information is required, see the documentation on configuring printing costs.

5.4 Configuring the Terminal Device for Release Station

If the terminal device is connected to an MFD that also acts as a printer, it may be desirable to also use the terminal as a release station interface. In this mode it is necessary to tell PaperCut what printers the terminal acts as a release station for. (See the printer selection control shown in the screenshot below) Normally the terminal will only act as a release station for the queue associated with the attached MFD, however in may be advantageous to assign queues of other nearby printers.
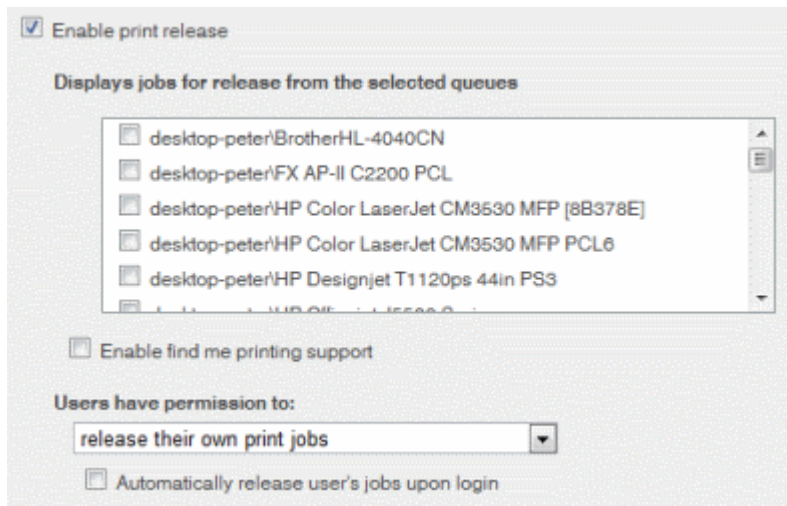
Figure 5: Release station configuration for the terminal

Multiple printers should be selected when the terminal is acting as a release station for multiple printers (or even for multiple print queues that send jobs to the same printer).

When a user logs into a release station terminal, the terminal will show jobs held for that user on the print queues that have been selected in the device configuration.

If "Automatically release user's jobs upon login" is checked and a user has jobs held in release station for printers associated with the terminal then all those jobs will be released when the user logs in to the terminal.

5.5   Configuring User Identity Numbers

To allow the user to authenticate at the terminal hardware a unique number may be assigned to each user.   The number might represent a student identity number, a secret ID number only known to the user, or a serial number of a swipe card. This number must be entered in the "Card/Identity Number" field in the User Details page.   It is also possible to bulk import these numbers using the "Bulk User Import" tool. See the section "Batch User Import and Update" in the user manual.

If an attempt is made to login to a terminal and there is no matching card/identity number in the system, the user will be show a message notifying them that their identity could not be determined.

The exception to this will be for card login when self-association with existing user is enabled. In this case, there will be prompt to associate the card with an existing user account.
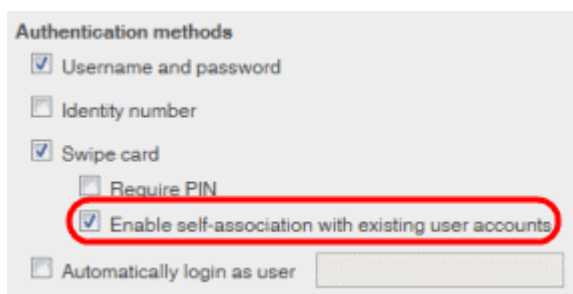

Figure 6: Swipe card self-association

5.6   User Charging Options

When a user performs a print job, they have the option to charge printing to their own personal account, or allocate it to a "Shared Account" (e.g. the Science Department). The options available on the copier terminal mirror the options presented to the user in the popup window displayed during standard PC printing. By default, users can only charge to their own personal account. To change the options available to the user, the "Account Selection" options should be changed for the user.

These options are discussed in the "Shared Accounts" section of the PaperCut manual.

5.7   Copier Session Behavior

When PaperCut starts a copier session, the default behavior is to allow the user to use their entire balance in a single copier session. In most circumstances this is the most logical behavior, however sometimes administrators want to set an upper limit on the amount of copying that can be done in a single session so that the copiers can be shared fairly between waiting users. This amount is referred to as an Escrow.

To set an upper limit on the amount of credit that can be used in a single copier session:

1. Navigate to the Options tab.
2. Select the "Config Editor (advanced)" action from the top left.
3. Edit the config key: ext-device.max-escrow   and set the maximum amount of credit for a copier session.   Values less than or equal to zero indicate that the user's entire balance is available.
4. Press the "Update" button next to the key.

NOTE: This does not apply to unrestricted accounts, as these have an unlimited amount of credit.

By default, PaperCut will not deduct the escrow amount from the user's account at the beginning of a copier transaction. This means that it is possible for the user account to go into a negative balance if they are printing at the same time as copying. PaperCut can be configured to deduct the escrow amount from the user's account at the start of a copier session. This amount will be returned to the user (less the cost of the copying) at the end of the session.   When this is enabled, users will not be able to print while they are copying.

To change the configuration to deduct the escrow at the start of the copier session:

1. Navigate to the Options tab.
2. Select the "Config Editor (advanced)" action from the top left.
3. Edit the config key: ext-device.deduct-escrow   and set the value to "Y".
4. Press the "Update" button next to the key.

6 Advanced Device Configuration

Third-party terminals sometimes require some additional configuration or may offer additional feature configuration. For example, changing timeout parameters or settings to change how the device interacts with the copier.

The following section describes various vendor specific configuration settings. To edit the settings for a particular device:

1. On the "Devices" tab, select the device to configure.
2. Select the "Advanced Config" tab.
3. Find the property to edit, change the value and press the "Update" button

6.1   Virtual Cash Controller Configuration

The default settings for the Virtual Cash Controller are usually sufficient.

The more technical settings are documented in more detail in the VCC documentation, and it is recommended to review this before make changes.

Configuration Setting	Description
ext-device.card-no-regex	See chapter 6.3 "Configuring Swipe Card Readers"
ext-device.card-self-association.use-secondary-card-number	Select whether user self-association should occupy the primary or secondary card number. It overrides the global setting unless the keyword "GLOBAL" is specified. This is useful when there is a mix of different non-configurable card readers that read different numbers from an ID card. Set to "Y" to use the secondary card number, "N" to use the primary card number. Default: "GLOBAL" to defer to the global configuration option.

ext-device.vcc.account-code-keypad-mode	Determines whether the user can enter numeric or alphanumeric character for account code entry. • 0 – numeric only • 1 – alphanumeric starting in numeric mode • 2 – alphanumeric starting in lowercase alpha numeric • 3 – alphanumeric starting in uppercase alpha numeric Default: 0 (numeric only) NOTE: On the Alpha/Touchscreen modes 1 & 2 start show the qwerty keyboard in lowercase mode.
ext-device.vcc.copier-timeout-secs	Specifies the time (in seconds) of how long a copier session will be kept open when no copying is occurring. The maximum value is 3200 seconds. Default: 60
ext-device.vcc.copier-warmup-secs	Specifies the time (in seconds) for the copier attached to the terminal to warm up. Values should be in the range of 0 to 90 in increments of 10 seconds. Default: 40
ext-device.vcc.login-keypad-mode	Determines whether user can enter numeric or alphanumeric characters for the login. Valid values are: • 0 – numeric only • 1 – alphanumeric starting in numeric mode • 2 – alphanumeric starting in lowercase alpha numeric • 3 – alphanumeric starting in uppercase alpha numeric Default: 0 (numeric only) NOTE: On the Alpha/Touchscreen modes 1 & 2 start show the qwerty keyboard in lowercase mode.

ext-device.vcc.release-job-desc-format	Defines the format of the job description used for the release station jobs. The format may contain the following replacements:
	
	• %docname% - the document name
	• %username% - the user that printed
	• %client% - the client/workstation
	• %cost% - the cost of the job
	• %printer% - the printer name
	• %pages% - the number of pages
	• %datetime% - the date and time of job
	• %time% - the time of the job
	
	The default format is:
	   VCC: %cost% - %docname%
	   Alpha: %docname%
	
	To use the default set to "DEFAULT".

ext-device.vcc.use-encryption	Determines if encryption is enabled between the server and the terminal (Y/N). Default: Y
ext-device.vcc.vend-params	Sets the "Vending Interface Parameters" on the device. The 3 comma separated values can be 0 or 1, and represent the standard/steering mode, and leading/trailing edge settings for relays 1 and 2. In "standard" mode the controller can only record/monitor two copier price-lines. In "steering" mode, the controller can monitor up to 8 price-lines. The choice of these modes depends on how the controller is interfaced with the copier. The VCC supplier can assist with this configuration. To change to "steering mode" set the first zero to "1". Please see the VCC documentation, for details. Default: 0,0,0

ext-device.vcc.vend-timing.1	Comma separated list of timings used to interface with the printer. The four values are sense time, blind time, reset time, eject delay. These times are specified in 100^{ths} of seconds (in 0.05 second increments). E.g. the last significant number must be either a 0 or 5. The maximum value for these timings is 3000 (which represents 30 seconds). See VCC documentation for more information. Default: 5,5,50,50
ext-device.vcc.vend-timing.2	See above, same as "vend-timing.2". Default: 5,5,50,50
ext-device-msg.code-parent	The text displayed when entering the parent account code. Default: * Account code *
ext-device-msg.code-sub	The text displayed when entering the sub/child account code. Default: * Sub-account code *
ext-device-msg.enter-code-parent	The text displayed to prompt user to enter the parent account code. Default: Enter the account code
ext-device-msg.enter-code-sub	The text displayed to prompt user to enter the sub/child account code. Default: Enter the sub-account code
ext-device-msg.login-id-number	The text to display when the ID number is entered using the keypad. Default: * * ID Number * *
ext-device-msg.login-prompt	The text to display when requesting login. The text will be automatically wrapped on the display. To force text to a new-line use: \n Default: DEFAULT Note: If this value is set to DEFAULT then the login text will be generated automatically based on the Authentication method(s) selected in the Summary tab.

ext-device-msg.select-account	The text to display when choosing the account to charge. The text will be automatically wrapped on the display. To force text to a new-line use: \n Default: Select account\n(Use %UP%%DOWN% to select)
ext-device-msg.select-account-code	The text displayed to select account using a code/pin. Default: Select account\n(Using pin/code)
ext-device-msg.select-account-list	The text displayed to select account from list. Default: Select account\n(Choose from list)
ext-device-msg.select-account-personal	The text displayed for the personal account. Default: My personal account

6.2 Configuring a local IP address for VCC connections

This configuration is only required when the server running PaperCut is assigned multiple IP address and all communication to the VCC devices must use a specific IP address.   An example of where this might be used would include when running PaperCut on a cluster and all communications to the VCC should use the cluster IP address not the physical IP address.

NOTE: On most clusters the cluster IP address will be configured as the default IP address when the particular node is active, so this configuration is not required.

To force VCC devices to use a specific local connection:

1. Login to the PaperCut admin interface
2. Navigate to the "Options" tab and choose "Config Editor (Advanced)" from the actions links on the left.
3. Scroll to the bottom of the page to the "Add new" section and add the following name:
        ext-device.vcc.local-ip-address

    set the value to the IP address you want to use.
4. Press the "Add" button.   And confirm the new entry appeared by searching for the entry.

For this setting to take effect PaperCut needs to re-establish the connections to the VCC devices. The simplest way to achieve this is to restart the PaperCut application server service.

6.3 Configuring Swipe Card Readers

Swipe cards contain numbers which are used to identify users according to the card number configured in the User Details screen under "Card/Identity" number. Some readers report information in addition to the number encoded on the card, such as checksums. PaperCut can treat these cases in two ways:

- A typical case is the checksum being reported after the card number, separated by an equals sign, such as in `5235092385=8`. PaperCut can handle this case by default; it will extract the number before the equal sign as the card number: `5235092385`.
- For some cases, a "regular expression" *may* be required that will filter the card number from the complete string of characters reported by the card reader. Documentation on regular expressions can be found on the Internet, e.g. at www.regular-expressions.info.
    - The regular expression must be fashioned so that the card number is returned as the first match group.
    - Usually one regular expression will be used for all the devices managed by PaperCut; this must be entered in the "Config editor (advanced)" which you will find on the Options tab under Actions. The key is called "ext-device.card-no-regex".
    - The global setting however can be overridden on a per-device basis: The key "ext-device.card-no-regex" can also be found on the "Advanced Config" tab

in the device details screen. This setting will override the global setting unless the keyword "GLOBAL" is specified.

- o PaperCut will gladly assist in producing a regular expression when supplied with a few sample outputs from your card reader. Contact your reseller or Authorized Solution Center for help with this. You can find their contact information in your PaperCut Admin interface on the **About** page.
- o If you would like to write your own regular expressions, here are some examples:
  - Use the first 10 characters (any character): `(.{10})`
  - Use the first 19 digits: `(\d{19})`
  - Extract the digits from between the two "=" characters in "123453=292929=1221": `\d*=(\d*)=\d*`