User's Guide

APG Cash Drawer OPOS Application Developer's Kit

Active X Device Drivers for MCS Common Control Object (CCO) OPOSCashDrawer.OCX Support based on UPOS v1.7

ADK Release Version 3.38.1

Single Drawer USB Model 554/554A

ISO 9001 REGISTERED

OLE POS

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Section 1: Introduction

The APG Cash Drawer OLE for POS (OPOS) Application Developer's Kit (ADK) v3.38.1 Setup
Application will install all the necessary components to develop OPOS applications compliant to
UnifiedPOS (UPOS) Version 1.7 (or greater) for a single APG Cash Drawer Model 554 or Model 554A
USB cash drawer device. Open-device POS system applications are easily achieved through these drivers,
which are based on the UPOS standardization for device API functionality.

This OPOS driver is intended specifically for single USB drawer environments.

During the installation process, the Install Shield automatically configures a single instance of the USB
cash drawer device with no user interaction required. The cash drawer need not be physically connected
to the PC during the setup process.

Install Shield assigns a series of commonly used logical device names to the single cash drawer device
during installation. The Install Shield terminates after driver installation and setup of one USB cash
drawer device without launching the APG OPOS Configuration Utility.

This ADK installs and binds cash drawer service objects to the MCS Common Control Object Runtime
Library v1.7.001 or greater. The MCS Common Control Object Runtime Library may be optionally
installed by this APG OPOS ADK.

Version Summary:
OPOS ADK v3.38.1 includes an updated the service object and dependency files for successful operation
based on the 'No Sale' type transaction with the OPOS sequence of:

     1. Open Method
     2. ClaimDevice Method
     3. DeviceEnabled = true Property
     4. OpenDrawer Method (with option for DrawerOpened property retrieval)
     5. DeviceEnabled=false Property
     6. ReleaseDevice Method
     7. Close Method

OPOS application (VB/VC++/other) do not require any delays within the application code. The timing
mechanism and signaling logic is in place in the Service Object and speed optimized for:
     1. Successful OpenDrawer method operation (no misfires) prior to service close.
     2. Successful DrawerOpened property status assignment prior to service close.

The logic included in the service includes a slight delay to allow time for the service to open and close
with proper thread initialization and termination. The service takes into consideration the 554 USB
recharging state.

Operating Environment:
The following are the system environment requirements for installing the APG Cash Drawer OPOS ADK.

Computer Hardware: IBM PC/AT or compatible.

Operating System: WindowsXP, Windows POS Ready 2009

Supported Devices: APG Cash Drawers

                     APG Model 554/554A USBPro^{TM}II HID-Compatible Cash Drawer Interface
                         Single drawer support on the USB Bus

Supported Communication Ports:
                     USB Ports.

Supported Languages: Any ActiveX-enabled development environment, including:
                     Microsoft Visual Studio / VB and VC++
                     Drivers are compatible in visual and programmatic development environments.

File Descriptions and Contents after ADK Installation:

1. This ADK requires that the MCS Common Control Object Runtime Library v1.7.001or greater is installed and configured on the host PC prior to installation and configuration of this ADK – OPOSCashDrawer.OCX control object must be installed, registered, and available to this ADK.

2. APG OPOS Service Object:
- APG Device Dynamic Link Libraries
- Placed in C:\Program Files\OPOS\APG

3. APG Sample Applications:
- Visual Basic Project and Sample Application – tailored to single drawer use.
- Visual Basic Project and Sample Applications. Placed in C:\Program Files\OPOS\APG\Samples
- Visual C++ Project and Sample Applications. Placed in C:\Program Files\OPOS\APG\Samples

4. APG OPOS Trace Files, if enabled:
- Placed in C:\ APG

Support Information:
Refer to the following links as appropriate:

Download the 1.7.001 (or greater) MCS Common Control Object Runtime Library URL:
http://www.monroecs.com/oposccos_current.htm

CCO & UPOS documentation URL:
http://www.monroecs.com/opos.htm

UnifiedPOS 1.7.001 (or greater) documentation URL:
http://www.monroecs.com/unifiedpos.htm

National Retail Federation Association for Retail Technology Standards URL:
http://www.nrf-arts.org/

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Section 2: Installation

Local PC: Administrator Credentials are required.

The APG OPOS ADK Installation process automatically copies and installs all the files necessary to use the APG OPOS Application Developer's Kit Utility applications.

See below for additional detail.

Prior to the Installation or Removal of the APG OPOS ADK, make sure that no other applications are running in order to prevent an unsuccessful operation. Remove all prior versions of the APG OPOS ADK. Using Control Panel on the PC, select Add/Remove programs and click on the currently installed (previous version) of the APG OPOS ADK.

After ADK installation, the AOCUtility Application (APG OPOS Configuration Utility) is executed for immediate APG Cash Drawer device configuration and implementation.

Installation Procedure:

Download and unzip the drivers from the APG Cash Drawer website http://www.apgcashdrawer.com or insert the APG OPOS ADK Installation CD into the system CDROM drive.

Click on the Setup.EXE file icon in the destination folder to launch the APG OPOS ADK Installation procedure. Follow the prompts for a full software installation.

Instructions:

Perform a complete uninstall of the current APG OPOS drivers using the system Control Panel and its standard uninstall script. Do not do a repair and do not deploy any of the DLL's separately, individually, or manually. Allow the windows system to fully remove and unregister the current solution. Click Setup.EXE to launch the InstallShield utility. During installation, the following options are presented:

Custom Installation: if selected, the InstallShield will perform a subset installation of the ADK, including:
- The APG Service Object and all necessary DLLs for the cash drawer only

Typical Installation: if selected, the InstallShield will perform a full installation of the ADK, including:
- The APG Service Object and all necessary DLLs for the cash drawer
- The MCS Control Object v1.7 Common Control Object
- All sample applications intended for demonstration

Compact Installation: if selected, the InstallShield will perform a subset installation of the ADK, including:
- The APG Service Object and all necessary DLLs for the cash drawer
- The MCS Control Object v1.7 Common Control Object

Section 3: Modification or Removal of OPOS ADK

Local PC: Administrator Credentials are required.

The APG Cash Drawer OPOS ADK Installation Application will automatically detect that an APG OPOS ADK is currently installed. If so, the current APG OPOS ADK version is then displayed at the top of the dialog.

Three options are displayed:
1) Modify:
   This option will display the file group components to re-install. The file group options are identical to the 'Custom' Setup Type display (please refer to item 7, section 2).

2) Repair:
   This option will re-install all of the Installation files, overwriting any previously installed files.

3) Remove:
   This option will remove all of the Installation files for the APG OPOS ADK.
   Note: The shared system DLL files defined in the 'Installation Components', item 3 on Page 4, are installed in the C:\WINDOWS\SYSTEM\ folder or C:\WINDOWS\SYSTEM32\ folder as appropriate for the operating system environment. These files will not be removed if the APG OPOS ADK is removed from the system.

Once the selected task has completed, the Finish dialog will be displayed. If the Remove option is selected, the 'Unregistering OPOS Controls…' message will be displayed, indicating that the APG OPOS Controls are being unregistered and removed from the ActiveX directory.

Section 4: Device Configuration, Testing, and Demonstration

Local PC: Administrator Credentials are required.

One single Model 554 USB cash drawer device is configured by the Install Shield script. This device is visible, after installation, in the AOCUtility program. Once configured, this device definition is used to control the cash drawer from an OPOS-compliant Point of Sale software application. The APG OPOS Configuration Utility application will configure the USB cash drawer device and update the system registry as required by the APG OPOS Control and Service Objects (ActiveX modules).

Supported Devices: APG Cash Drawers

APG Model 554/554A USBPro™II HID-Compatible Cash Drawer Interface
Single drawer support on the USB Bus

This OPOS ADK solution is specifically designed for environments that use a single APG Model 554/554A USB Cash Drawer connected to the host PC.

The Install Shield automatically configures a single instance of the USB cash drawer device with no user interaction required.

The logical device names listed below are also assigned to the device during installation. The Install Shield terminates after driver installation and setup of one USB cash drawer device without launching the APG OPOS Configuration Utility.

Logical Device Names

During setup and installation, the Install Shield utility sets up a single instance of 554 cash drawer OPOS device as follows (the physical cash drawer need not be connected to the host PC):

Device Name
CD554

These Logical Device Names are assigned by the Install Shield Utility to the new CD554 device during installation:
CASHDRAWER
CASHDRAWER1
CASHDRAWERA
CD
CD1
DRAWER
DRAWER1
DRAWERA

After installation, the user may launch the AOC Utility and configure new Logical Device Names as desired.

Any single APG Model 554 USB cash drawer is supported.

Since this OPOS solution is tailored to single drawer environments, the service object binds to the first instance of an APG Model 554 USB Interface detected on the bus through the USB sub-system.

This OPOS solution provides no persistence to HID ID of the cash drawer so cash drawers may be unplugged, swapped, replaced, and reconnected at will with no adverse impact on the cash drawer definition in the service object. As a direct result, this OPOS solution supports only one APG USB cash drawer connected to the PC.

Abrupt Cable Disconnect Methodology

This OPOS solution includes improved handling of an abrupt cable disconnect and re-connect condition. After the cash drawer is enabled and operating normally, should an abrupt cable disconnect condition occur, this OPOS driver will respond as follows:

> The OPOS Service object will update the State property and the CheckHealth method - these will be set to Result Code 107 and the CheckHealthText property (CheckHealth method required prior to CheckHealthText assignment) will reflect the error code '107 - No Hardware'. All cash drawer operations will reflect this error within the method return value, State, and ResultCode properties. All non-cash drawer operations will perform as normal.

> When the cash drawer cable is reconnected to the PC, the State property and CheckHealth method are reset to Idle and successful internal CheckHealth respectively. Note that there is a slight delay upon re-establishing a connection - this delay is necessary to avoid stack queuing and to retain synchronization with the device. Upon re-connection, all cash drawer operations will proceed as normal with successful return values and codes.

For optimal results, we recommend that the POS application is structured to take advantage of the Status Update Event thread to capture drawer status. This methodology is demonstrated in the Visual Basic Sample Application provided with the ADK.

After installation is complete, the APG Cash Drawer OPOS Configuration Utility Application (AOCUtility.EXE) does not launch.

- The APG OPOS Configuration Utility Application contains configuration and setup parameters for the single USB cash drawer device type.
- The cash drawer device type will have an accompanied dialog with a description for the controls and parameter values.

1. Launch the AOCUtility.EXE application. Review the settings for the single Model 554 USB Interface Cash Drawer that was configured during installation.

Description	Value
Device Name	Model 554 USBPro(tm) Interface
Port	USB0
LDN	DrawerA
LDN	Drawer1
LDN	Drawer
LDN	CashDrawerA
LDN	CashDrawer1
LDN	CashDrawer
LDN	CD554
LDN	CD1
LDN	CD

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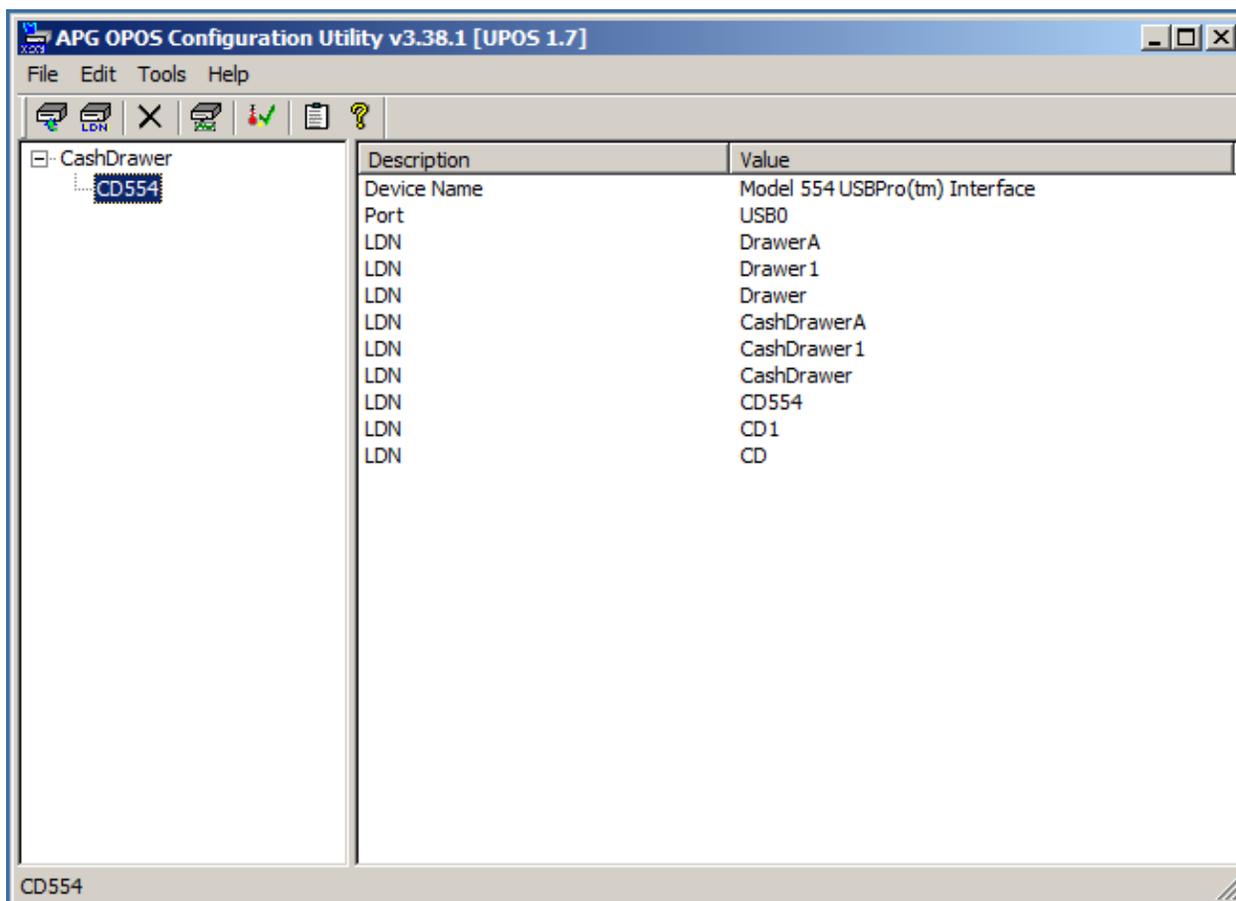
2. If desired, assign a **Logical Device Name**, or **LDN**. Enter a value in the LDN Value field and click Add. Note, LDN's may be assigned or modified at any time. To do so, Click **Add/Remove LDN**. One cash drawer may have one or more logical device names. The **Logical Device Name Setting** dialog appears as:

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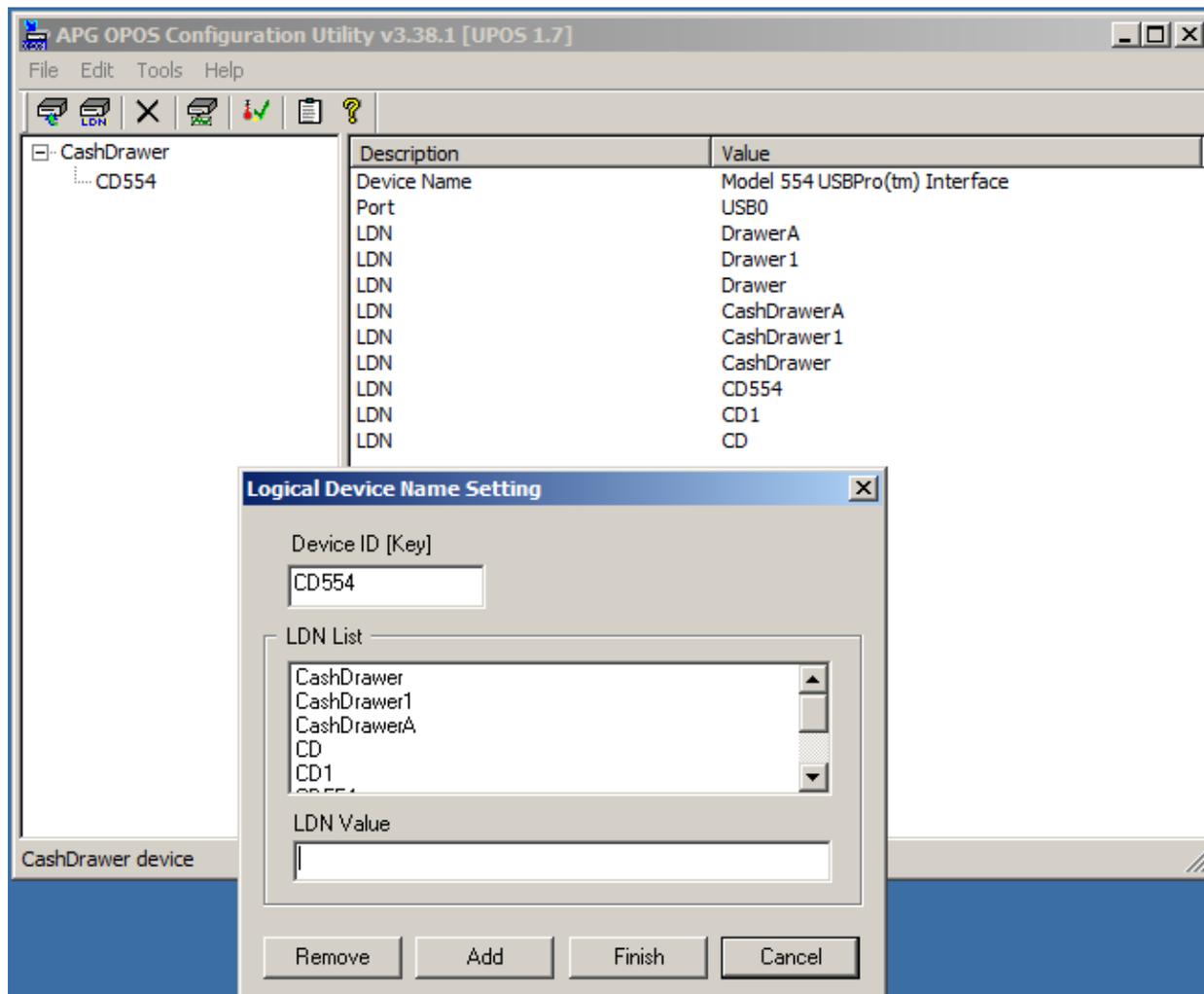
3. This OPOS ADK is specifically designed to support a single Model 554 USB Cash Drawer. Attempts to add additional drawers will respond as follows.

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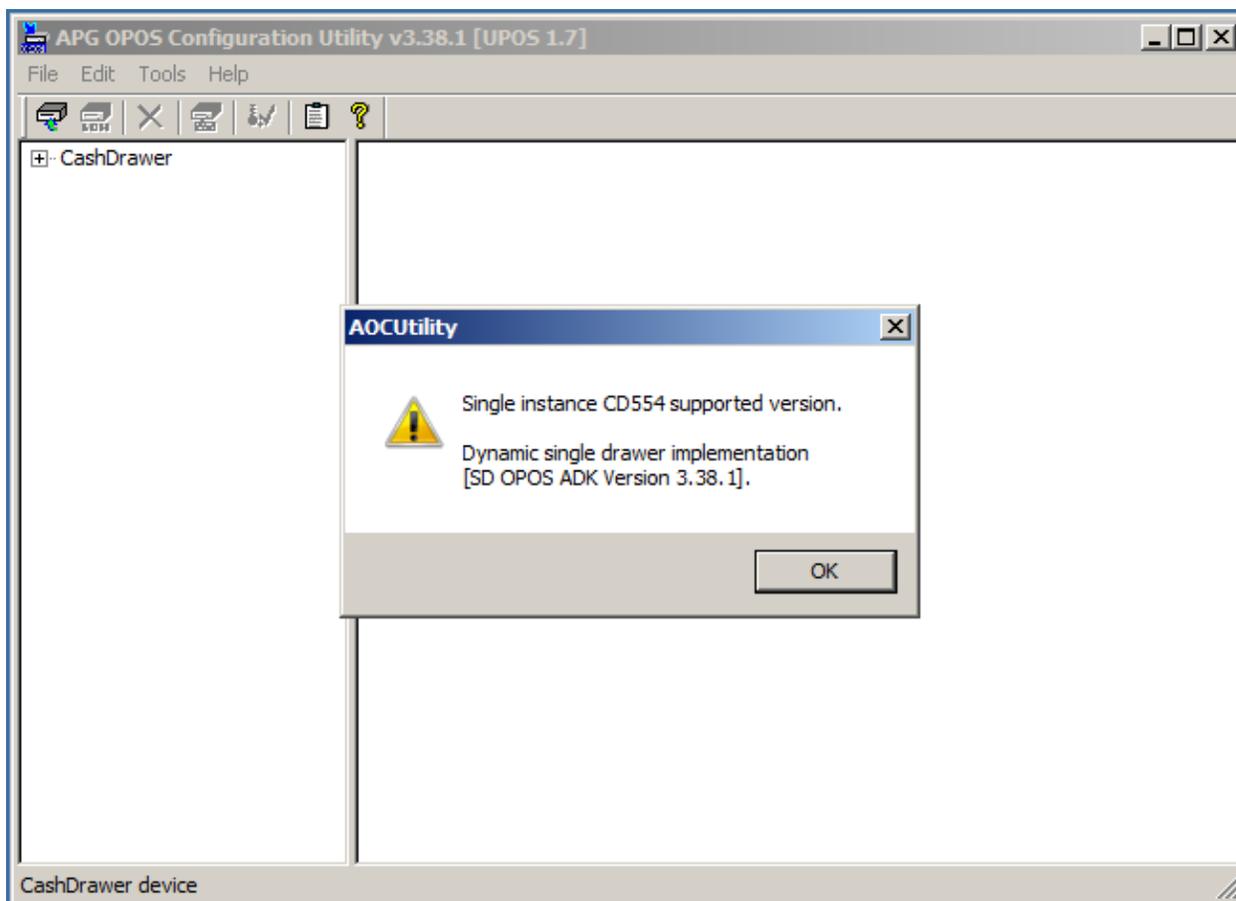
4. If desired, select the cash drawer and click the Check Heath (Interactive) Button to test the cash drawer connection and to verify drawer performance and drawer status reporting.

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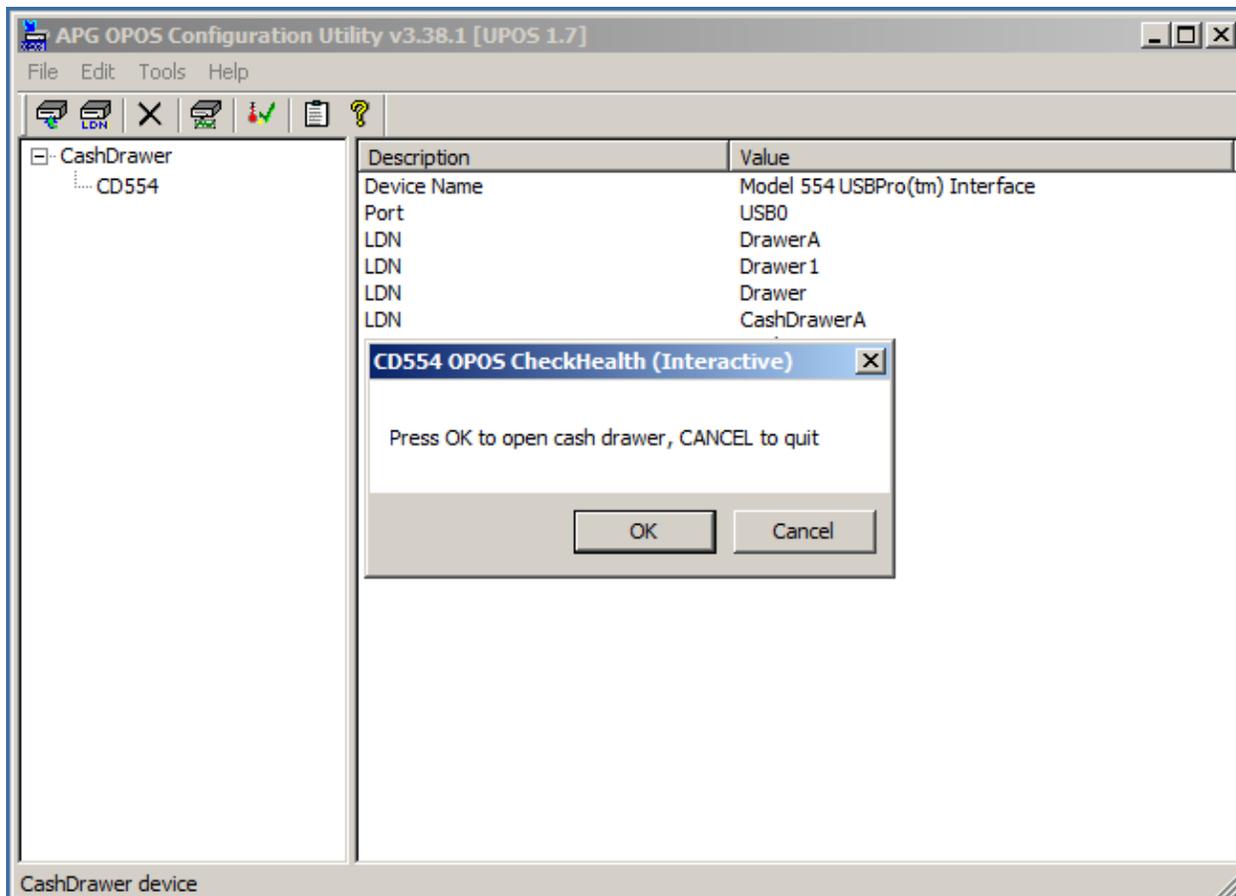
5. Click 'OK' and the cash drawer, if connected, should open. Click 'Cancel' to leave the Health Check portion of the utility.
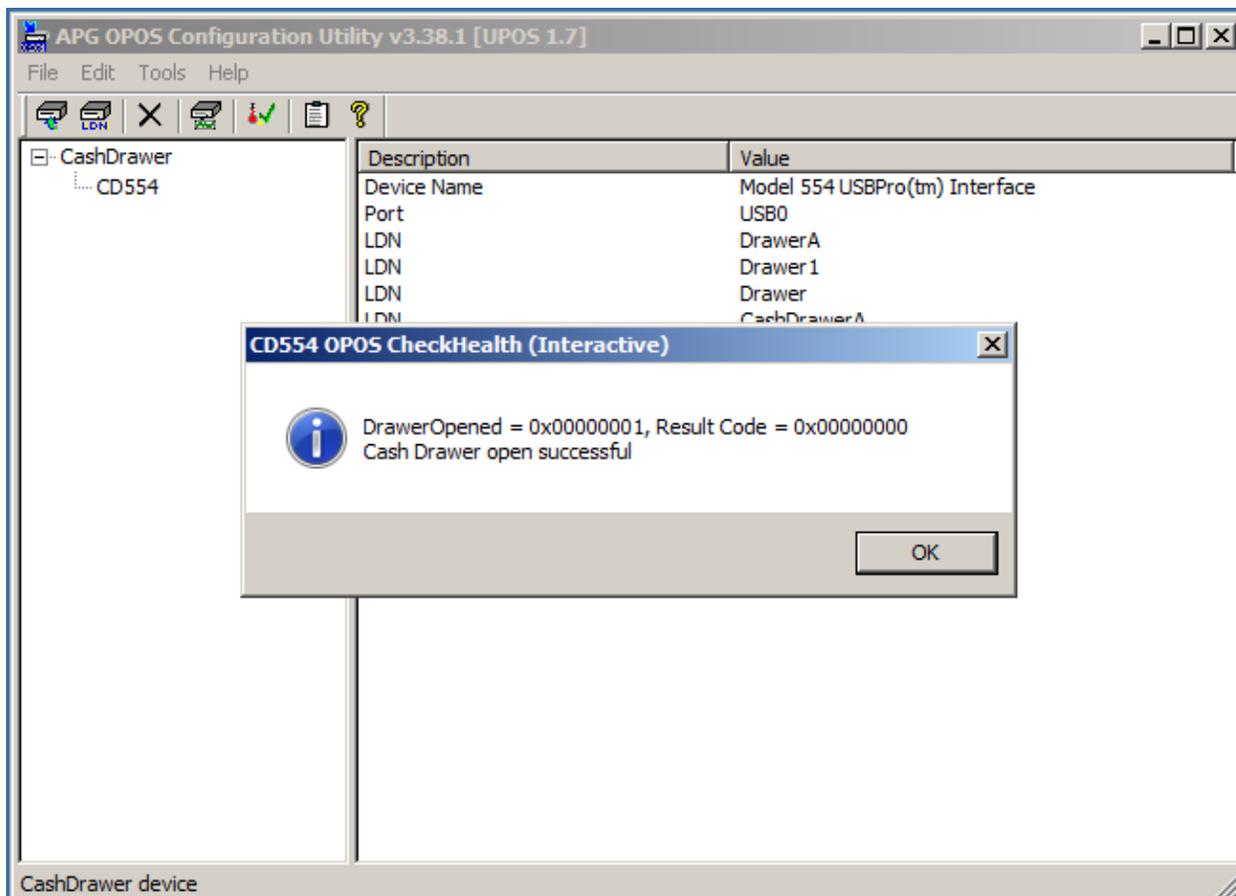
To remove the configuration of a previously installed cash drawer device, launch AOCUtility and click **Remove Cash Drawer Device.** Select the cash drawer interface product that has previously been configured on the PC to remove its setup from the System Registry.

If the cash drawer device is deleted, follow the steps to remove and re-install the ADK to add the cash drawer back into the device list.

Visual Basic and Visual C++ Sample Applications are provided with the ADK. They are located in C:\
Program Files**\OPOS\APG\Samples\VB Application\OPOSCDTest.EXE** with source code for Visual
Basic environments and **\...\OPOS\APG\Samples\VC Application\OPOSCDTest.EXE** with source
code for Visual C++ environments.

To test the cash drawer using OPOS-compliant event controls, launch the application and follow the
sequence of steps outlined in APG Doc ID M-23G-OPOS-DEMO.PDF

Section 5:   Optional Configurable Parameters

This OPOS ADK v3.38.1 includes three optional and configurable parameters that can tailor the OPOS service to specific needs, can assist with issue resolution, and can improve cash drawer performance

To view or to modify these parameters after OPOS driver installation, navigate to the system registry:

HKEY_LOCAL_MACHINE>SOFTWARE>OLEforRetail>ServiceInfo>APG OPOS ADK

Open Drawer Verification (ODV) Enabled

The OPOS service may be configured to provide a failure indication in the event of an OpenDrawer method resulting in an unopened drawer.

Registry Key	ODVEnabled	
Applies To	OPOS OpenDrawer method return value, result code, result code extended assignments	
Range	0, 1	
Value	0 [default]	No Open Drawer verification performed, always returns successful for OPOS OpenDrawer method (0=OPOS_SUCCESS)
	1	Open Drawer verification performed, returns accurately timed drawer state (status) with either successful (0=OPOS_SUCCESS) or failure (111=OPOS_E_FAILURE) for OPOS OpenDrawer method.

Redundant Drawer Kick (RDK)

The OPOS service may be configured to generate additional subsequent Drawer Kick instructions to the cash drawer.

Registry Key	RDKDelay	
Applies To	N/A	
Range	0, 100 - 3000	
Value	0 [default]	No redundant drawer kick is performed
	100 - 3000	Number of milliseconds between subsequent drawer kick instructions after the service processes its first OpenDrawer method.

Registry Key	RDKInterval	
Applies To	N/A	
Range	0 - 9	
Value	0 [default]	No redundant drawer kick is performed
	1 - 9	Number of times a subsequent and additional drawer kick instruction is sent to the cash drawer after the service receives its first OpenDrawer method.

RDKInterval and RDKDelay are linked by a logical [AND] condition. Both parameter values must be enabled by setting their values > 0 for the Redundant Drawer Kick (RDK) action to be performed by the service.

These registry entries will influence the performance of the APG OPOS Service Object and the cash drawer as follows:

The RDKInterval value represents the number of subsequent iterations that the service will send the drawer kick instruction to the cash drawer after receiving and processing the initial command from the control object and POS application.

The RDKDelay value represents the time, in milliseconds, between subsequent iterations of the drawer kick instruction.

The service will cease iterations upon receiving an Open Drawer state from the drawer (value=1) or if the defined RDKInterval (count) is reached. The RDKDelay logic is nested within the RDKInterval loop. The delay value will be the frequency in milliseconds per each sending of the Open Drawer command.

The Redundant Drawer Kick Instruction is activated when RDKDelay >0 and when the RDKInterval >0.

For example,
      RDKInterval value is set to 4
      RDKDelay interval is set to 500

1. The POS application sends the first command to open the drawer
2. The service processes that instruction and detects that the drawer did not open
3. If RDKDelay is 500 and RDKInterval is 4, the service will send up to four additional drawer open commands spaced 500 milliseconds apart.
4. The service will terminate this cycle if it detects an open drawer before the final command is sent.

Drawer Closed Status Delay (DCSDelay) Processing

The OPOS service may be configured to delay an update to the drawer closed property after the drawer has been physically closed.

This delay may be desirable to tailor the service for optimal performance with the host application when the cash drawer is closed very quickly after a prompt to open (drawer kick).

Drawer Closed Status Delay processing occurs only if the registry value is > 0 and only in a drawer state change from Open to Closed.

Drawer Closed Status Delay processing assignments and execution shall affect the DrawerOpened Property and the StatusUpdateEvents (SUE).

Registry Key	DCSDelay
Applies To	A configurable delay in Drawer Closed Status reporting to the control.
Range	0, 200 - 3000
Value	0 [default] No delay in reporting the Drawer Closed Status to the control
	200 - 3000 Number of milliseconds delay in reporting drawer closed property to the control after the cash drawer has been physically closed.

Drawer Closed Status Delay processing has no impact on a drawer state change from Closed to Open. In this instance, the sequence for updating the drawer opened property is executed immediately by the service with no intentional or configurable delay.

Drawer Closed Status Delay processing is included in trace file output if DCSDelay is enabled (value > 0). See instructions below to enable trace log file creation.

Generate Trace Logs (TraceEnabled)

The OPOS service may be configured to generate trace files that capture interactions between the control, the service and the physical cash drawer.

Registry Key   TraceEnabled

Applies To   Trace log file

Range   0 - 2

Value   0 [default]   No trace file is created. Trace logs are not created.

                1   Trace file is created and captures all (global) service activities.

                2   Trace file is created and captures only error activities.

When enabled, trace files generated by the service are placed in the C:\APG folder. One log file is created per day with the filename format:

    OPOSTraceYYDDD.log,
        Where YY will be the 2-digit year; 11, 12, ..., etc.
        The DDD is the Year Day; from 0 to 364 (zero-based)

The trace files generated by the service may assist with problem identification and issue resolution in the event of performance anomalies or unexpected errors.

Section 6:   Application Developer's Toolkit

This section provides protocol references and sample code to apply the APG Cash Drawer OPOS ADK. Refer to the Application Programmer's Guide and Control Programmer's Guide for additional OPOS-specific information.

The Association for Retail Technology Standards of the National Retail Federation develops and manages the OLE for RetailPOS standards. A vast array of technical documentation and reference materials can be found at the ARTS Home Page: http://www.nrf-arts.org/

The sequence of steps to use a cash drawer device, as defined by the OPOS standard, is:

Open Device

Enable Device

Drawer Open

Wait for Drawer Close

Disable Device

Close

Visual Basic Example:

Refer to the Visual Basic sample application folder included in the ADK for specific examples and recommended code segments for deployment.

OpenDrawer method:

The OpenDrawer method return value condition includes a successful data packet transmission and includes drawer state condition change to Open with a timeout value of 3000ms.

Return Value codes:
OPOS_SUCCESS (0) - Drawer state change to Open and successful data packet transmission.

OPOS_E_FAILURE (111) - Drawer state not changed to Open within 3000ms or unsuccessful data packet transmission.

OPOS_E_NOHARDWARE (107) - No communication with the device.

Result Code Values:

OPOS_SUCCESS (0) - Drawer state change to Open and successful data packet transmission.

OPOS_E_EXTENDED (114): Result Code Extended Value: 10001 [Persistence Thread Initialization Failure].

OPOS_E_EXTENDED (114): Result Code Extended Value: 10002 [Persistence Thread Termination Failure].

OPOS_E_EXTENDED (114): Result Code Extended Value: 10003 [Instance Thread Initialization Failure].

OPOS_E_NOHARDWARE (107) - No communication with the device.

DrawerOpened property:

The DrawerOpened return property value based on the persistent thread (listener) last received drawer state with a 1000ms validation condition for possible delayed change of state.

Return values:

TRUE- Drawer is Open.

FALSE- Drawer is Closed.

Result Code Values:

OPOS_SUCCESS (0) - Successful assignment of last drawer state (Open or Closed).

OPOS_E_EXTENDED (114): Result Code Extended Value: 10001 [Persistence Thread Initialization Failure].

OPOS_E_EXTENDED (114): Result Code Extended Value: 10002 [Persistence Thread Termination Failure].

OPOS_E_EXTENDED (114): Result Code Extended Value: 10003 Instance Thread Initialization Failure].

OPOS_E_NOHARDWARE (107) - No communication with the device.

AOCUtility:

A single instance CD554 cash drawer device is added during installation (No prior CD554 device configured). Registered listed LDN's (9 entries, per InstallShield LDN definitions) for the CD554 device (single instance).

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Software Developer's Notes:

- For maximum flexibility, include a field within the utilities, configuration, or setup section where a user could change the Device Name reference for the cash drawer should the need arise. Doing so eliminates the needs to recompile the application for a new Device Name.

- This ADK does not require that the application Claim the cash drawer device prior to enabling it and gaining access to Events, Properties, and Methods.

Capabilities:

The Cash Drawer Control has the following capability:

- Supports a command to "open" the cash drawer.

The cash drawer may have the following additional capability:

- Drawer status reporting: Can determine whether the drawer is open or closed in environments where the drawer is the only drawer accessible via a hardware port.

Device Sharing

The cash drawer is a sharable device. Its device sharing rules are:

- After opening and enabling the device, the application may access all properties and methods and will receive status update events.

- If more than one application has opened and enabled the device, all applications may access its properties and methods. Status update events are fired to all of the applications.

- If one application claims the cash drawer, then only that application may call the **OpenDrawer** and **WaitForDrawerClose** methods. This feature provides a degree of security, such that these methods may effectively be restricted to the main POS application if that application claims the device at startup.

- See the "Summary" table for precise usage prerequisites.

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Credentials:

AOC Utility installation and cash drawer device configuration (add, delete, modify) actions require modification of the registry on the local PC. The cash drawer device definition added to the environment through AOCUtility is written in files located in the C:\PROGRAM FILES\COMMON FILES\APG SHARED folder.

Administrator credentials are required to install the ADK and to add, modify, or delete the cash drawer device and information into the system registry and into files in this folder.

The OPOS drivers were specifically designed to provide standard users with the ability to run applications that reference OPOS cash drawer definitions, but they do not allow standard users to view, add, remove, or change in any way any cash drawer device definition.

The standard user may run applications that reference cash drawer devices setup by the administrator, as referenced by the device name or by the logical device name.

Standard users to not have read access to the device list when viewing them from within the AOC Utility. Unless the user had administrator credentials, the device list is blind..