



xCeed[®] (DE-4200) Controller User's Guide

ePic KDS & ConnectSmart Kitchen

From *front to back*,
with **QSR** you're **connected**
connected

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IMPORTANT SAFETY INSTRUCTIONS

- Read these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this appliance near water. To reduce the risk of fire or shock, do not expose this appliance to rain or moisture.
- Clean only with a dry cloth.
- Do not install near any heat sources, such as radiators, heat registers, stoves, or other apparatus that produce heat. This appliance is intended for operation within an ambient temperature not exceeding 45°C (113°F).
- Do not defeat the safety purpose of the grounding-type plug. A grounding type plug has two blades, and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched.
- Do not remove cover. No user serviceable parts inside. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Features

1

This following table details the features and specifications of QSR Automations' DE-4200 xCeed controller.

Feature	Description
Target processor	CPU Freescale iMX6 DualLite (Cortex A9, 1.0Ghz, dual core) Benchmarking shows 3x-4x performance increases over DE-4100.
External Ports	HDMI (up to 1080P), Ethernet (10/100/1000), dual and single USB, power. (HDMI has powered output so a non-powered VGA converter may be used.)
Bluetooth	BLE - not full Bluetooth host, but includes Nordic for direct communication with new BLE keypad. New LED in front of controller indicates whether keypad is paired or not.
RAM	2GB (four times that of the DE-4100 controller)
Internal Storage	4GB eMMC Flash. A micro SD flash receptacle is also at the front of the PCB. May be eliminated in future revisions.
USB	<ul style="list-style-type: none"> • Full power USB (USB 2.0 high-speed), 2 Front, 1 back • Switch (software) to turn off USB for security reasons • USB boot option • Extra internal USB header for debug or recovery of a bricked board.
Diagnostics	<ul style="list-style-type: none"> • Monitor ID and status (EDID accommodation) • Keypad status and firmware version (reports QSR Keypad, PC Keyboard, or None) • Ethernet status, including link status/speed. • Temperature sensor , both board and CPU
VESA standard video timings (EDID Interface)	Extended settings for increased monitor compatibility.
Touch Capable	Accommodation for both ELO and Dell PCAP touch monitors. This in addition to ELO standard SAW APR, and Resistive models.

Feature	Description
Power circuit protection	Additional internal protection provides higher allowable voltage tolerances. This has been added to circumvent the problems experienced when someone would plug in a higher powered supply into a QSR board. Now, it works with an Epson power supply even though it provides 4X the voltage. Likewise, it will handle spikes in a restaurant while previous versions might have suffered a blown board.
Rotated video support	There is driver level support for a rotated video display so that Windows will manage a portrait or landscape mode display.
Operating Systems	Windows Embedded Compact 7 (initially) then Yocto Linux as the standard will be available to run this appliance. Same utilities available through both.
MISC	No PS2 No DB9 Serial HDMI No VGA Audio - Line-level stereo audio output. Enclosure Footprint is identical to DE-4100

Device Control Settings

2

Overview

All device management and control should typically occur through the use of ControlPoint. The DE-4200 is a kitchen system appliance and QSR's ControlPoint and Deviceagent.exe have both been updated to reflect the changes and additions to the xCeed controller and its' OS to properly manage the devices when deployed.

ControlPoint is an application that is used to manage QSR controllers, including setting up and configuring the xCeed and eXpert models for use with the ePic KDS and ConnectSmart Kitchen (CSK) applications. This chapter provides some details and new features for ControlPoint pertaining to the xCeed controller.

Operating System

The DE4200 is originally released from Production with a WEC7 operating system. However, the controller is expected to be primarily a Linux device for the remainder of its service life.

In either case, the OS design uses a persistent Hive Registry. In addition, only the items under the directory "Hard Disk" will be persistent. That is, only changes made under that structure will remain following a reboot.

An OS reboot can be affected using the ControlPoint's Reboot Device button or simply powering the device off and then on again. QSRDeviceagent will also use this functionality in instances calling for a reboot, e.g. a change in video resolution, display orientation, or OS upgrade.

Setting Video Resolution

ControlPoint can be used to gather information on the current video mode and its timing details. The list shown is actually reported by the monitors and should be immediately available for use.

NOTE: The bootloader and display driver now support custom video modes. Custom video mode information contains pixel clocks, horizontal and vertical active porch sync, and other information. There are limits to what video modes iMX6 can generate, but typically as long as the pixel clock requirements are not too high (e.g. 1280 x1024), it is extremely flexible. An independent phase lock loop (PLL) is used for the purposes of pixel clock generation. This can match a desired pixel clock frequency to within 0.25 MHz and has no effect on CPU, bus, and frequency. (This is an improvement over previous controllers). All other active porch sync, and polarity information is programmed based on the custom mode settings. These settings will also be available through the xCeed2Mgr.exe shown in chapter 3 below.

Rotating the Display

Display rotation allows rotating the display 0 (none), 90°, 180°, or 270°, and uses the video rotation settings on the Device Details form (**Tools** ☐ **Device Details**) to change these settings.

This is a setting of the video driver and does not affect the bootloader splash screen. It is stored in the registry. Rotating to 90° or 270° will result in a portrait Windows desktop with the start menu on the side of the monitor. A 90° or 270° rotation is memory bandwidth intensive due to memory movement behind the scenes, so it does affect performance some but offers the advantage of more vertical space that might be an advantage for display of certain information such as kitchen line items. Because this is a registry setting, the system will reboot to put it into effect.

The File System

The directory structure of the xCeed is set up comparably to its predecessor. That is, only one directory off of the root will allow persistent data. To be consistent with the prior xCeed, this directory is also called “Hard Disk.” If a secondary storage device is detected (i.e. from a USB drive), the OS will assign it a directory name of “USB Disk” and will also be persistent.

Update OS Image

To update the CE image on an xCeed device, you must first copy the CE “.bin” file to a shared folder on the source computer where the file can be downloaded from.

The same facility in ControlPoint can be used as was used with the preceding xCeed controller. An alternative would be to simply copy the nk.bin to the “Hard Disk” directory and reboot.

In the Mapped Drive Settings area of the Update CE Image form (**Tools** ☐ **Update Device CE Image**), specify a username and a password with access to the shared drive where the “.bin” file is located.

NOTE: If using ControlPoint to update the image, once the download has initiated, a full screen window will appear on the controller showing the status of the CE image update. It is important that the controller not be powered off or disconnected from the network in any way until the download has completed. Disconnecting or stopping a download in progress will render the controller inoperable. There is also built in protection where the xCeed process will first make a backup (.bak) of the OS file and then receive the new one. The OS will get applied upon subsequent bootup. Note that in the xCeed there are actually three OS files. For the most part, only the nk.bin file will change. There is also an MLO and an EBOOTSD.NB0 file. In order for the controller to be boot, the MLO file **MUST** be the first file on the flash, occupying the first sectors.

It will be possible to replace the WEC7 image with a production Linux image. Those details are currently TBD.

Controlling USB Behavior

The USB is full power USB 2.0 high-speed. It will recognize plugged in devices. For security purposes, a software setting is available (either through xCeed2MGR or ControlPoint) to enable or disable the USB port. For USB Host, select *Disable* or *Enable*. The button changes depending on your selection. QSR Automations, Inc. If a USB host is working, it will recognize keyboard, mouse, hot plug, unplug, etc. If a USB drive is plugged in, the OS will report its' root as "USB Disk".

Be careful with this. USB can be turned off for security reasons but that will also mean you will have NO local access to the controller. This also means that any attached touchscreen monitor will not register touches. The only recourse to turn USB back on, then, would be to use ControlPoint or a VNC session.

Operating Temperature

Internal Board Temperature

The ambient air temperature inside the controller enclosure from the on-board and the CPU temperature sensors can be displayed the temperature in Fahrenheit. Though not recommended, this has been tested in heat up to about 90 °C, and frozen to about -30 °C, and the results held up reasonably well. This read-only value can be seen in ControlPoint's diagnostics or in the xCeed2Mgr dialog screen.

Controller Operating Temperature

There is a maximum temperature range for the CPU of 0°-75 °C. However, some other components on the board don't have quite that range. Instead, their temperature range is an estimated 0°-45 °C

KP-9000 BLE Keypad Support

The DE-4200 directly supports QSR's KP-9000 keypad with its *onboard* BLE radio. This will mimic the operation and functionality of the KP-9000D BLE dongle. So, pairing and un-pairing a keypad will work exactly the same. Note, however, that using a BLE dongle in this device will cause a conflict with the onboard BLE support and the keypad will not properly function.

Command Line Utilities

3

The following are command line utilities that provide some level of reporting and control directly on the device. Note, however, that most reporting, setup, and configuration capabilities can be and should be exercised through ControlPoint.

SetDellTouchMode.exe – Created for the built-in Dell PCAP monitor driver, this utility sets options for 'Mousemode' or 'ClickonTouch'.

In Mousemode, a touch-down report is not made until a touch-up is indicated.

ClickOnTouch will cause a touch up to be reported on initial touch.

Note, also, that the Dell PCAP monitors will be calibrated by using CE's "Stylus" utility accessed from Control Panel. ELO drivers are also present in the WEC7 image and can coexist with the Dell. The ELO touch will be managed through the ELO utility in Control Panel. The ELO driver is set to ClickOnTouch by default.

ListVideoModes.exe – This lists the video modes reported through the monitor's EDID. Use the "Mode #" next to the resolution you want as a parameter to the "SetVideoMode" utility. If the "VideoMode=0" then you need to use the "SetCustomVideoMode" utility with the corresponding Line # to set the resolution.

SetVideoMode.exe – use Mode # from "ListVideoMode" to set the corresponding resolution.

SetCustomVideoMode.exe - use List # from "ListVideoMode" where "VideoMode=0" to set the corresponding custom resolution.

TestGetTemp.exe – this will show the output of the temperature sensors on the board and in the CPU.

ReadEDID.exe – technical dump of what the monitor is reporting on its setup. Will probably only be used to debug issues.

RotateDisplay.exe – with an angle parameter (0. 90. 180. 270), the screen will be rotated (left) upon next reboot.

Hwutil.exe <option> Note that is a utility that was ported (unchanged) from CE6. The only valid functions to use are the following:

OSUpdate <new os> - parm is path and name of new OS image to be applied.

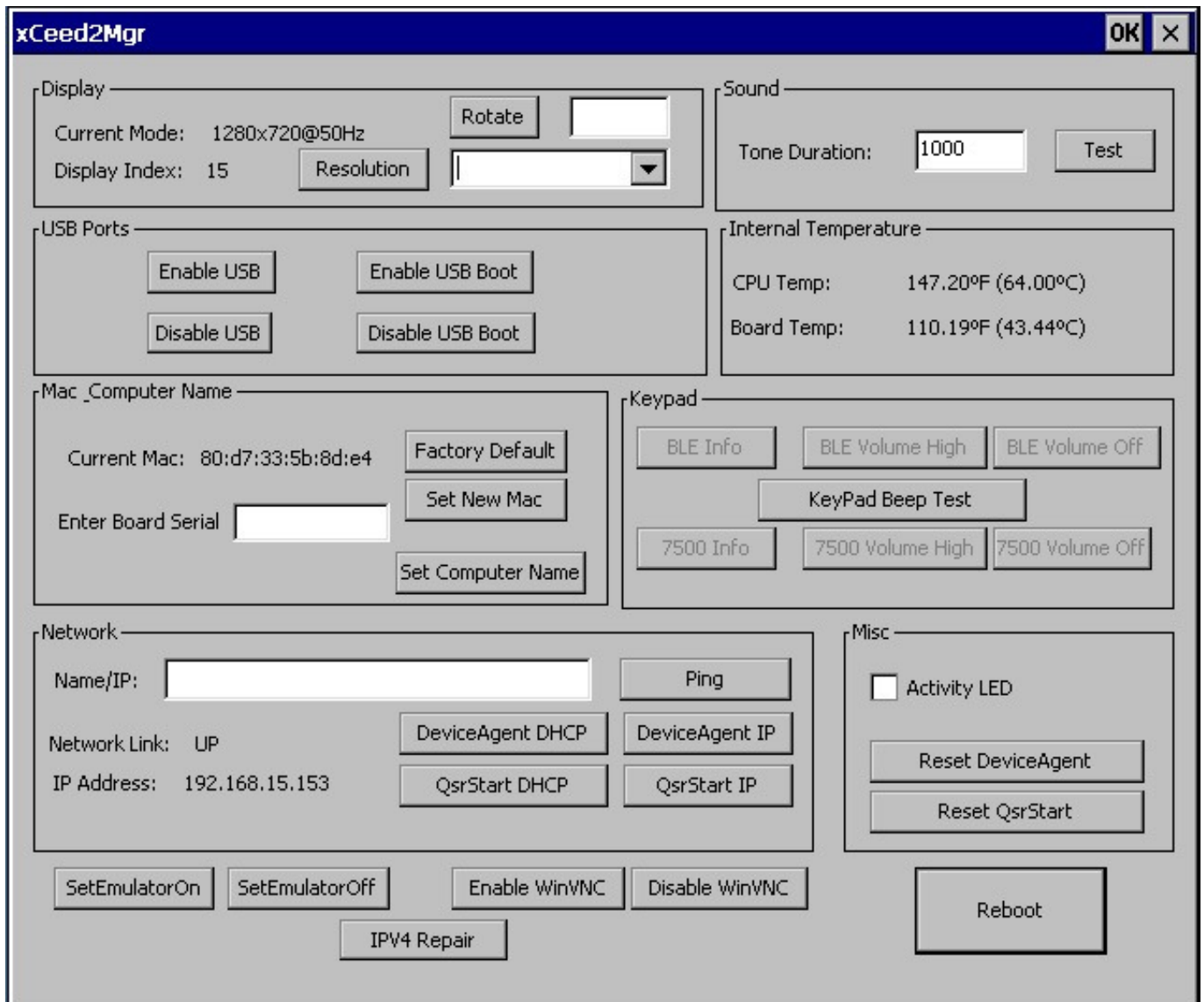
Reset <1> - forces a hardware reboot

Blefw <device> - provides firmware stats for USB dongle <0>, BLE dongle <1>, BLE keypad <2>.

Temp <location> - provides the onboard temperature of '0' board or '1' CPU.

xCeed2Mgr.exe – this built-in utility will present a GUI that provides access to various controls, settings, and diagnostics. It is meant as a staging and diagnostic tool for the Production and Support teams but can be generally used onsite, as well. Again, though, ControlPoint is the preferred method for managing the configuration of QSR devices on a network.

The interface should be fairly self-explanatory and is represented below.





xCeed (DE-4200) Kitchen Controller Specifications **4**

Physical	1.75"x7.25"x6.88" (HxWxD) Plastic Enclosure
Weight	16 ounces
Power	External Switching Power Supply Input: 100–240VAC, 50–60Hz Output: 9VDC, 1.7A Regulated Power Surge and Overvoltage Protection
Interfaces	1 Locking Power 3 USB 2.0. 1 Rear, 2 Front (switched) 1 HDMI+ 1 Audio port
Bluetooth	BLE for QSR BLE keypad support only
Network	10/100/1000 mb Network port
CPU	Freescale iMx6 Dual Core
Video	Wide Screen, 1080p Rotated Video Support
Memory	2GB SD-RAM
Storage	Micro SD Flash Memory, 4GB eMMC
Operating Systems	Linux, WEC7 (interim)
Environmental	0° to 60° Celsius On Board Temperature Sensors
Certification	FCC Part 15, Class A EN55022 (1944) Class A CCC (Pending) MIC (Pending) BSMI (Pending) C-Tick (Pending)

Appendix A: Device Compliance Information

Warning: Changes or modifications to this device not expressly approved by QSR Automations, Inc. could void the user's authority to operate the equipment.

Federal Communications Commission (FCC) Statement

FCC ID NUMBER	
xCeed DE-4200	<u>2AJX7XCEED2</u>

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Innovation, Science, and Economic Development (ISED) Canada Statement

IC ID Number	
xCeed DE-4200	<u>21998-XCEED2</u>

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with IC RSS_102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Cet équipement est conforme aux limites d'exposition aux radiations IC CNR_102 établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

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