Display Monitoring

eCLOUD

**Explore the future
of connected and
intelligent displays**

e))COUNT
embedded

eCLOUD)))

The world's first cloud for flatpanel controllers comes from eCOUNT embedded and offers full connectivity to enable central parameterization and constant monitoring of the operational status of displays. This brings two clear advantages: higher ease of use and lower maintenance costs.

Industrial-grade OEM flat panels are used in many types of implementations:

- They are integrated, for example, in large-scale digital signage solutions operating at heights of 2-5 meters to display flight information at airports, system catering menus or commercials in the best possible resolution and quality under often adverse environmental and lighting conditions.

- In medical technology, they hang over operating tables. For this purpose, they must be adapted among other things to the specific requirements of endoscopic devices and equipped with real-time monitoring of video signals in order to trigger an alarm when the image freezes. In industrial manu facturing, they are used with RFID readers to identify operators or scan goods.

- They are also embedded in many other industrial devices, machines and systems. Here, they often have very specific formats and resolutions, which usually do not correspond to the native output signal of an embedded computing system, for example because low-cost LVDS displays continue to be used.

That's why every OEM needs an application-specific controller that provides the necessary intelligence to process the respective video signals. It further supports display peripherals, such as the provision of sound and touchscreen functions and RFID readers, as well as the definition and storage of user-specific parameters such as brightness, contrast, gamma correction and color representation.

Intuitive IP based user interface

Wherever much configuration and parameterization is required, a user-friendly interface is highly welcome. Parameterizing a monitor via an on-screen display is only the minimum requirement in such cases. These days, OEMs and users want a lot more. The operator of a system catering menu board does not want to climb up a ladder to manually optimize the settings. He prefers a contactless method. A remote control would work, but it is all too easily lost, especially if used only sporadically. A better solution would be to provide an app for smartphones and tablets with a local WLAN or Bluetooth connection, similar to modern state-of-the-art TV sets. However, for the operator of several branches such a solution is not good enough. He wants to be able to distribute the settings to all stores with a few clicks. It goes without saying that it is not only the operators who demand this; OEMs from many other sectors also appreciate the same level of comfort. They too want to be able to centrally monitor and conveniently configure their settings, such as the luminosity of the display when a set threshold is exceeded or undercut, and parameterize alarm scenarios, for example, to send an SMS to a service technician if the image source fails.

Thanks to the eCOUNT eCLOUD for flatpanel controllers, there's no more need to climb ladders to configure your monitors. You can simply use your smartphone instead

A central cloud for all distributed user interfaces

Today, the use of proprietary programming devices that require special cables for the connection of devices and costly on-site service is an unpopular solution. Instead, users and OEMs want to be able to leverage clouds and navigate a monitor via IP addresses to centrally manage and maintain their displays. Ideally, the cloud provides an HTML-based, responsive interface so you can use any client that supports a browser, from smartphones to tablets to desktop PCs. Everything can then be connected to this central cloud – from new displays in a wide variety of locations, alarm management systems with escalation routines and acknowledgment functions, to the integration of back office, ERP and CRM systems as well as content delivery platforms.

Now with optional integrated RFID reader

For this purpose, eCOUNT embedded has developed a device-independent cloud solution with HTML interface for intelligent flat panel display controllers. This solution is first made available for the new CRTtoLCD-91 flat panel controller with 4K UHD support. As an industry first, the solution also integrates an optional RFID reader, making it possible for the display controller, and therefore also the flat screen of a system, to assume a central role in authorization management. Since device, machine and system functions are nowadays almost exclusively accessed via touch displays and their peripherals, this is a highly efficient solution. For example, systems can be configured to boot by default with the screen off, and only turn on the display and/or touch function when an approved tag is detected.

Once it is possible to centrally monitor the display usage or to manage authorization and user-dependent configurations centrally via clouds, even payment systems for pay-per-use applications can be connected. But OEMs do not have to go all that far in order to profit from the easy connection of display controllers to the cloud.

With the eCOUNT eCLOUD for display controllers, you can administer distributed flat screens centrally and save costs.

Monitoring and management made easy

For example, the ability to track display temperature to avoid damage from overheating by proactively dimming the display is a very efficient way to make predictive maintenance even more effective. If the GPIOs that are part of the flat screen can also be configured and/or reset remotely, installation becomes more efficient as well: All that's needed is an on-site mechanic. The system can be conveniently configured from a cloud workstation anywhere in the world. By tracking switch operation and other analog inputs, it is also possible to gain valuable insights into the usage of the flat screens and their applications, plus the systems can always be kept up to date via remote firmware updates. By tracking operating times along with temperatures, predictive maintenance can be planned much more precisely with the help of MTBF calculations. The more distributed systems are installed, the more OEMs and operators benefit from a central cloud as it simply provides more convenience and services at more affordable prices.

Managing the RFID reader in the cloud

When the optional RFID reader for the display controller is also connected to the cloud, there are many more benefits. The use of specific RFID tags can then be authorized or denied from a central location, which makes authentication and authorization management highly efficient – for example, by grading into categories of simple users, experts and maintenance personnel. When RFID tag usage is tracked, OEMs can also develop completely new deployment scenarios, such as the above mentioned pay-per-use model. However, the RFID reader can also be used to simply call up a user's preconfigured personal monitor settings, for example by selecting the desired settings from a step-by-step questionnaire via a cloud interface. Such individual settings are particularly popular in the medical field, because color perception differs from person to person, so that one doctor may prefer a completely different configuration than the other. It is also easy to activate a DICOM Part 14 compliant display, for example to detect a carcinoma beyond doubt. When such configurations can be managed centrally, it becomes possible to assign them to specific endoscopic devices or even diagnostic situations. Being able to centrally manage and distribute such settings opens up potential for new services.

A remote flat screen management system is also important in complicated installation conditions.

Many use cases

So there are many OEM-specific uses for cloud-connected display controllers. A flat screen could even be used to log production data from customer projects, which could then be visualized via the cloud and passed on to ERP systems. A cloud-connected flat screen can be so much more than a touch-based graphics interface for man-machine communication. Providers of cloud-connected display controllers are therefore opening up entirely new, purely software-based sales opportunities for OEMs.

Version 1.0 now available

Version 1.0 of the eCOUNT eCLOUD for flatpanel controllers supports the 30 most popular features. These include input selection, mode, temperature, operating hour counter, power-on and, of course, all API functions such as backlight, brightness, contrast and audio volume as well as panel info and reset. The values for input, backlight, brightness and contrast, as well as the basic information stored in the function calls Crt2Lcd_PanelInfo, Crt2Lcd_ModeInfo, Crt2Lcd_Version, are sent to the cloud regularly.

When the RFID reader is integrated, the scope of functions expands to include additional commands that can be triggered from the IoT platform for resetting the

reader (READER_DEVICE_RESET), antenna calibration (READER_CAL_ANTENA), control of and information on reading process and signal strength (READER_SCAN_CARD, READER_SELECT_CARD, READER_DESELECT_CARD, READER_RSSI, READER_CARD_TYPE) and switching the RFID reader off (READER_POWER_DOWN). Other information that is also regularly transmitted automatically includes: the number of scanned tags, two temperature values, information from GPIOs 1-5 and the analog-to-digital converter, acceleration and position values of the integrated gyroscope sensor (MEMS XYZ), as well as current power consumption, date and time of the integrated real-time clock (RTC).

In the future, the cloud will be extended in version 2.0 and 3.0 to include further functions. Scheduled for release by the middle or end of 2018, version 2.0 will provide full support of all display controller and RFID reader APIs along with campaign management for the distribution of new settings or firmware. 2G/3G/4G interfaces will be supported, as well as a software development kit for the cloud gateway with integrated rule engine. As a result, this version will support all functions required for first field deployments. Version 3, which will go into development from the second half of 2018, will include interfaces to ERP solutions such as SAP or SQL, as well as dedicated apps for iOS and Android. At that point, the extended management portal with customizable dashboards and widgets will also become available.

A remote management system for flat-panel displays offers many advantages in medical applications.

Free cloud hosting choice

The new eCLOUD for intelligent display controllers from eCOUNT embedded can be used with private or public clouds. Interfaces to all leading common cloud platforms such as Amazon, Google or Microsoft Azure are being added step by step. Upon request, eCOUNT embedded can also provide additional, customer-specific cloud interfaces, so OEMs can always use their own specific cloud environment. The roadmap already includes solutions from embedded computing vendors such the WISE-PaaS Edge Intelligence Platform from Advantech, or the embedded cloud from S&T and Kontron. This paves the way for rapid deployment of eCOUNT embedded display controllers to the cloud environments of leading embedded and automation vendors.

Connection of the intelligent display controllers to the cloud currently works particularly well with the arm mbed IoT platform as an open source solution, and the ATLAS x2x cloud that is exclusively available in Germany as a commercial solution for the highest security requirements. eCOUNT embedded decided to provide ready-to-use function blocks for these two cloud platforms, hence functional dashboards with rich functionality are already available today.

Secure cloud connection via WLAN or Bluetooth

Needless to say, such a cloud connection must provide a high level of security. The communication between the display controller and the central cloud is therefore designed to meet the latest security standards and TLS 1.2 encrypted. A particularly hack-proof solution uses the logic node of the controllers, connecting it to the WLAN or Bluetooth interface for data exchange with the cloud. Based on an ARM Cortex M4 microcontroller, this solution offers significantly less attack potential than x86 systems. Besides, with this interface, only the core functions of the display are vulnerable, not the applications on the embedded systems themselves. These are usually connected in such a way that makes access impossible. So, even if an attempted attack on the display controllers were successful, it would not lead to sustained damage or data leakage in the actual applications.

The eCLOUD dashboards for the flatpanel controllers and RFID readers can be configured as needed.

Fully bidirectional connection

The cloud connection follows the WebSocket protocol, which guarantees that client and server can actively communicate with each other at any time. WebSocket supports a wide range of data models: Everything is possible, from binary and JSon to XML. Unlike http connections, which require a request from a client to trigger an action on the server, the WebSocket protocol enables the server to use a connection previously opened by the client at any time. The client – i.e. the intelligent display controller – does not have to actively request a specific action.

The world's first display controller with its own cloud

The world's first intelligent flatpanel controller with eCLOUD support from eCOUNT embedded is the new 4K CRTtoLCD-91 board. Based on the Himax HX6310-A scaler chip, it supports flat panel displays with 4K-UHD up to 3840×2160@60Hz. Thanks to content-dependent backlight control and new scaling algorithms, displays – even of non-native 4K content – are exceptionally brilliant and sharp.

First optional HF RFID readers with NFC and WiFi support for cloud connection are available and can be mounted onto the controller board. Later this year, a UHF RFID reader with a range of up to 10 meters will be added as an ideal option for logistics applications. The RFID reader enables user authorization management or the identification of RFID tagged goods of all kinds. The cloud connection, which is designed as a powerful, ready-to-use, end-to-end solution, can be customized and/or expanded as needed. With a comprehensive range of on-screen display functions, as well as extended configuration and scripting options for OEM-specific designs, the intelligent LCD controller board also provides all features OEMs need to develop custom monitors, displays and control panels.

For the connection of flat panel displays, there are 8 VbyOne lanes @ 3.75 Gbps/lane, or 4 eDP 1.2a lanes @ 5.4 Gbps/lane. RGB color formats up to 30-bit depth and CYbCr (420/422/444) are supported. Graphics and HDCP 1.4/2.2 protected content is handled via DisplayPort 1.4 or DVI/HDMI 2.0.
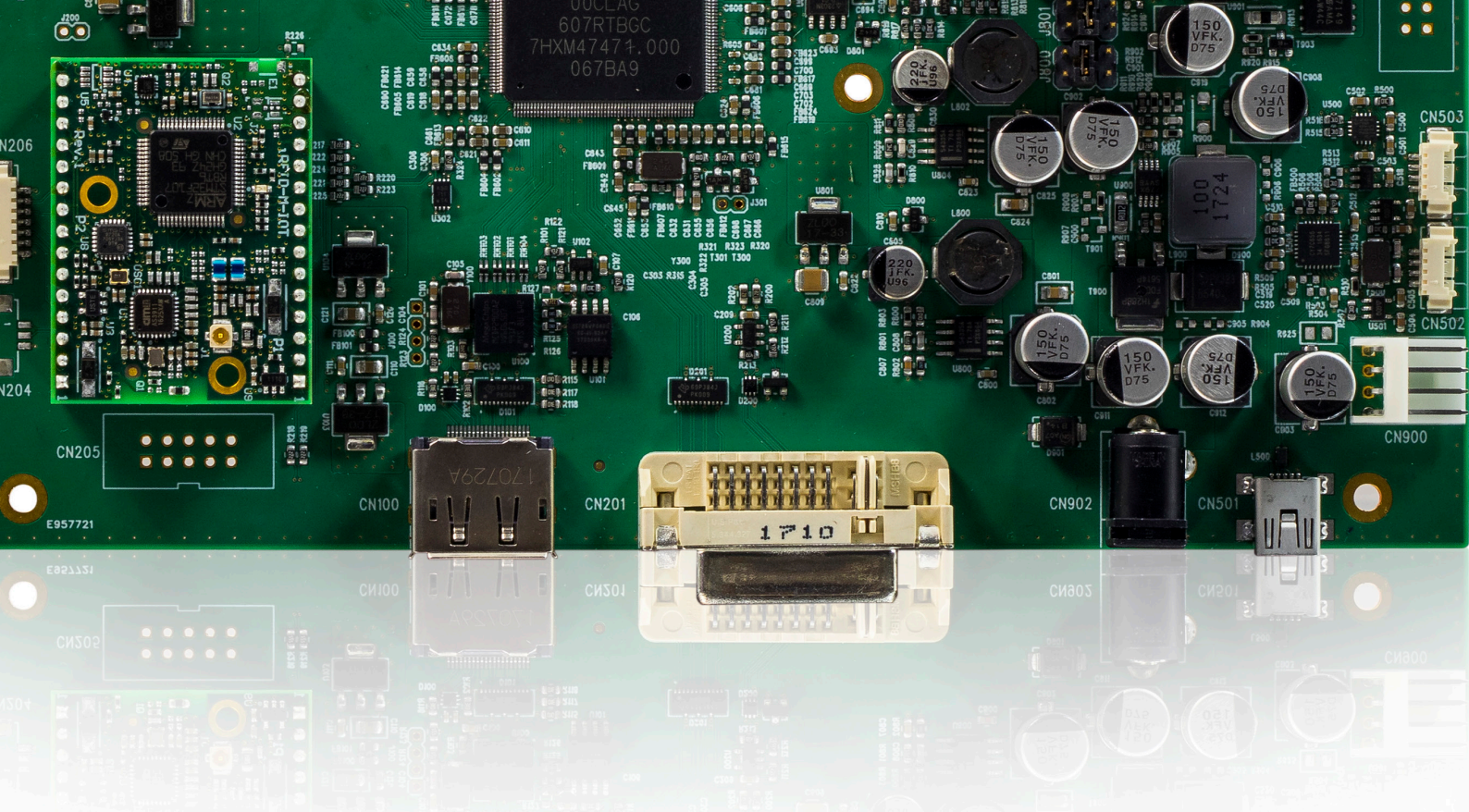
Muliple interfaces

Additional interfaces include Dolby 7.1 audio and analog stereo sound, dual USB for touch functionality as well as keyboard/mouse and 1x USB for client connection to embedded computer systems. Digital and analog GPIOs – e.g. for fan control and intrusion detection – as well as a serial interface (USB to RS232) for industrial peripherals complete the range of interfaces. Power is supplied via 12-24 VDC wide-range mains supply, which allows control of large displays up to 8A and backlights up to 3.5A.

Ready to run

The new display controller is now also available with extensive optional accessories, ranging from a keypad with infrared-receiver and ambient light sensor for situational brightness control, to RFID support, Bluetooth Low Energy (BLE) and WiFi IoT modules for cloud connectivity. Off-the-shelf cable sets for flat panels and eCOUNT embedded's customer-specific integration support further simplify the integration process.

For more information on the new CRTtoLCD-91 LCD flatpanel controller and how OEMs use it to design custom monitors, displays and control panels, see here.

More information on the eCOUNT eCLOUD for flatpanel controllers to be introduced at embedded world will be available here.

For full information on the supported APIs from version 2.0 onwards, register and download the API reference guide for flatpanel controllers and RFID readers.

About eCOUNT embedded

eCOUNT embedded is a manufacturer of flatpanel controllers, RFID readers and BLE to WiFi gateway platforms and accessories with optional IIoT and cloud connectivity. The company focuses on application-ready solution platforms for OEMs and embedded computer manufacturers that can be individually adapted to customer-specific requirements. Custom development and production include the design of customized monitor, display and control panels, RFID solutions and their assembly.