Esterline Control & Communication Systems
Esterline BVBA
President Kennedypark 35A
B-8500 Kortrijk

Tel: +32 56 23 3067
www.esterline.com

White Paper

Featuring CODIS Products

Codis MDP-471/4
The power of experience in ATC displays

1. INTRODUCTION

A decade and a half ago, the first plans for a 2Kx2K LCD display for Air Traffic Control (ATC) usage took shape in the heads of some creative Esterline-minds. Today we are ready for the fourth generation of its sort. Yes, the Codis MDP-471/4 is ready to go.

It wasn't a coincidence that Isis, the goddess of navigation in ancient Egyptian times, has been chosen as a symbol for the world's most widely accepted ATC display ever. With over 12,000 MDP-471 units fielded, Esterline has proven to be a technology leader, an early adapter of LCD technology and a trendsetter for the use of LCD technology in industrial and niche markets.

Not only does Esterline deliver LCD displays for ATC, the company is also active in other specialty markets such as Defense (rugged displays for wheeled and tracked vehicles and cabin mission displays for fixed and rotary winged crafts) and Avionics (flight critical displays for EFIS systems and mission cockpit displays with touch screen and NVS compliancy).

2. WHAT HAS CHANGED IN THE WORLD OF MAIN ATC DISPLAYS?

Throughout the past two decades, changes in the world of ATC displays have been minimal. The biggest step forward has been the move from CRT to LCD technology, with the introduction of Esterline's first MDP-471 LCD 2Kx2K display back in 2000.

Esterline always looks to integrate state-of-the-art technology into its products, relentlessly bearing in mind product validation and safety. The MDP-471 display has gradually evolved over the years. We have been frontrunners in the switch from the early-days IPS technology, towards the SPVA LCD alignment structured panels. Furthermore, we have successfully integrated the Ethernet interface into the MDP-471 electronic platform as a standard means of communication for display device control and monitoring.

By using a clever backlight tray system, Esterline enabled the smooth evolution from CCFL towards LED-based backlight displays inside the existing mechanical envelop. The MDP-471 has proven itself able to improve performances gradually, while bearing backward compatibility in mind at all times. Many customers consider this continuity to be one of the key features of our system.

3. THE NEXT STEP

The results of Upstream Marketing activity conducted in the autumn of 2012 confirm the value of non-change. Key customers worldwide were invited to participate in a questionnaire and brainstorming exercise, leading to the conclusion that ATC will remain on the square 2Kx2K format for years to come.

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Parallel to our own research at Esterline, customers and organizations have evaluated alternative sizes and formats of LCD displays for the main ATC radar screen over the past few years. These exercises all look to validate the ability of embedding ATC onto one single piece of glass. The overall conclusions confirm that bigger sizes and non-square displays have some negative by-effects: Human factor issues, such as neck strain and eye fatigue for ATCOs (Air Traffic Controllers) because of larger screen sizes; optical performance anomalies with regards to color shifting effects on the far ends of the display; reflections of the large screen areas. Handling and installation issues due to heavier weight and size, raising the need for installation (lifting) equipment. Software and HMI re-writing and re-qualification. Safety qualification and acceptance of major changes to an air traffic management (ATM) system.

The Codis MDP-471/4 is a byword for continuity and the use of proven concepts. The development team has taken the above trends and advice into account in fine tuning its product. While we await the next big thing in the world of display manufacturing, ATC remains safe, sound and secure on the square 2K format.

4. Codis MDP-471/4 IN DETAIL

With Codis MDP-471/4 planned to be available for sales in Q1 of 2014, Esterline confirms its continued investment in the main ATC display market segment. Our renewed platform interface board sets a benchmark for excellent image processing for a next generation of displays throughout the different Esterline display divisions. A newly contracted LCD manufacturer will provide full exclusive deliveries for 28” LCD panel based on IPS pro technology.

4.1. LONGEVITY

Both the integrated logistic support (ILS) service towards customers’ engineering department and a meticulous obsolescence management throughout the company’s divisions have proven to be of the utmost importance. The ever-growing demand for updates and improved components manifests itself in shorter product life cycles and better availability.

Down the years, Esterline has maintained the MDP-471 and has managed to overcome obsolete parts. When the LCD module supplier decided to terminate its production line, Esterline was well and timely informed. This allowed the company to come up with a solution in the form of a new, exclusive LCD partner. Thanks to these efforts, Esterline is again able to guarantee its customers a long term available product. As a result, as of next January the new Codis MDP-471/4 brings nothing but benefits.

4.2. MORE VIDEO INPUTS & CONNECTIVITY

Besides an active area of 28” in the diagonal (HxV 20”x20”) and a 2048x2048 resolution, the new Codis MDP-471/4 also brings increased connectivity. Two dual link DVIs and two Display Ports accommodate existing and future graphic card interfaces. With optimal Ethernet connectivity and both USB upstream and downstream connections the Codis MDP-471/4 can be integrated in any ATM system.

The mandatory backward compatibility, of course, didn’t slip our attention, with an analog interface (RGB and HV duly impedance matched with the standard in use for ATC), a 15 Pin DDM control interface and a RS232. Moreover, a GPIO (general purpose input/output) interface is ready to accommodate future features, such as input switching through external ‘hard’ buttons.

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4.3. BEST LCD PANEL EVER

The value of choosing an experienced LCD partner has resulted in an outstanding optical performance. The Codis MDP-471/4 delivers an unseen color gamut and saturation. The IPS-pro TFT module brings super wide viewing angles: HV 178° with CR≥ 10- and a typical contrast of 1200:1. The optical stack has been carefully designed and results in a sublime brightness uniformity on the white, gray and black video content.

The anti-glare treated front polarizer, together with new LCD technology, counters the need for protective front glass for reasons of electromagnetic interference. The Codis MDP-471/4 meets the EN and FCC limit B levels. Upon specific customer request, an optional front glass is also available.

The unique LCD production process allows to limit the number of bright sub-pixels to 0. This guarantees zero (0) bright dots on-screen and contributes to the safety aspects of the Controller Working Position (CWP) environment.

4.4. CONTEMPORARY DESIGN

Understanding our customer's drive to move towards an open and modern architecture in the Area Control Centers, we paid special attention to the design of the display. You will surely notice the slim and neatly finished design of the plastic covers, hiding the cabling on the top side, through the display stand, down to the lower part of the furniture.

Not only does the display sport the perfect looks, the product design is optimized to allow a fanless integration. High optical efficiency leads to less power consumption and less heat to absorb.

4.5. GREEN CONCEPT

An Area Control Center is a critical infrastructure. Uptime and guaranteed service are of the utmost importance. Hence the need to implement and integrate spare CWPs in the ATM architecture.

In our effort to reduce the energy cost of an ATM system we made the Codis MDP-471/4 extremely energy efficient. In standard operations – at 60-80 cd/m² settings on the ATCO side – the display consumes a mere 50 W, while full brightness energy consumption does not exceed 100 W.

The spare and redundant CWPs consume energy without being used. We have paid attention and made sure that the Codis MDP-471/4 consumes virtually no energy when inactive. A specific powercontroller function monitors the display inputs and will awake the unit when sync on the video signal returns. Codis MDP-471/4 foresees DPMS and stand-by modes. Further technical specifications will be released in due time.

4.6. BACKWARD COMPATIBILITY

A much appreciated feature of the MDP-471 product line is its availability and backward compatibility, combined with a continually improving performance. Ever since the mass introduction of MDP-471 in 2000, Esterline has always kept the adagio 'form fit function' in mind. The new Codis MDP-471/4 has some design changes, i.e. the connectors are now on the top side and the outline is smaller, thanks to a smaller bezel.

To overcome console integration issues, Esterline has developed a mechanical kit that mimics the outline and mounting points of the former MDP-471. To overcome electrical and signaling issues, Esterline kept the analog video interface and the serial communication alive.

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5. MARKET INTRODUCTION

The new Codis MDP-471/4 will be on stage for the public for the first time during the ATCA 2013 event on October 20th in Washington DC (US). At this event, the hard- and software novelties of Esterline will be addressed in detail.

While early birds will be able to place an order for limited quantities in November/December of this year, the Codis MDP-471/4 is planned to be available for general sale at the beginning of 2014. The production ramp-up is scheduled for January 2014 and is expected to be at mass production rate in March 2014.

The timed introduction of Codis MDP-471/4 and the compatibility (backward and forward), ensures that future projects will use the latest and greatest. At the same time, the install base continuity is guaranteed. Esterline customers will be offered a support package to ensure worry-free operations and good service towards their own customers.

6. CONCLUSION

The Codis MDP-471/4 development and related investments confirm Esterline's leadership position in the ATC 2Kx2K main display market. Our exclusive partnership with an experienced LCD supplier, using a new generation production line, will help preserve Esterline's market share throughout the next decade. Esterline remains available for the 2K CRT replacement programs, as well as for new and ongoing installations.

About Danny Buysens

Danny Buysens is part of the Product Management team of the Control & Communication Systems platform of Esterline nv.

Danny Buysens started his career in 1992 as Project leader at VSK Electronics leading teams for study, implementation and follow up on electronic security related project/programs such as access control, fire detection and central management systems for monitoring and control.

Danny Buysens joined Barco in 1999 as ATC Support engineer World Wide and has been involved in graphic computer boards (image processing, as well as radar and video acquisition) and LCD display technologies. Danny has held various positions starting from Product Support Engineering to Product & Market Manager with Barco D&A civil division.

Danny transferred into the Esterline group and keeps up his current responsibilities for the air traffic control market.

About Esterline

Esterline Corporation is a leading global supplier to the aerospace and defense industry specializing in three core areas: Avionics & Controls, Sensors & Systems, and Advanced Materials. The company employs approximately 12,000 people and operates manufacturing facilities in over a dozen countries worldwide. Esterline is headquartered in Bellevue, Wash., and trades on the New York Stock Exchange under the symbol ESL.

Esterline Control and Communication Systems is the leading international provider of HMI technologies, safety-critical software, and audio and data solutions for high-reliability applications in aerospace, defense, and other specialized industries.
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