# KNOWLEDGE BINDER – PAX2 SERIES





Copyright © 2012 Red Lion Controls LP.

All Rights Reserved Worldwide.

The information contained herein is provided in good faith, but is subject to change without notice. It is supplied with no warranty whatsoever, and does not represent a commitment on the part of Red Lion Controls. Companies, names and data used as examples herein are fictitious unless otherwise stated. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, without the express written permission of Red Lion Controls

All trademarks are acknowledged as the property of their respective owners.

Written by Jeff Thornton.

# **TABLE OF CONTENTS**

MARKET POSITIONING	5
THE PAX2 Series	5
PAX2A – ANALOG INPUT	6
PAX2D – DIGITAL INPUT	6
PAX2S – Strain Gage	6
PAX2C – TEMPERATURE/PROCESS CONTROLLER	6
FEATURES/BENEFITS	7
Display	7
Universal Capability	7
UPDATE RATES	8
COMMUNICATION	8
OPTION CARDS	8
WHAT MAKES THE PAX2 METERS DIFFERENT	8
Flex Bus	8
New Programming structure	10
CRIMSON PROGRAMMING	11
FIRMWARE UPDATES	11
EXISTING PRODUCTS	11
THE MARKET	12
THE SALE (HOOK'EM)	12
CONCLUSION	
PAX2A COMPETITORS	13
PAX2D COMPETITORS	13
PAX2S COMPETITORS	14
PAX2C COMPETITORS	14
SELLING TOOLS	15
Collateral	15
Brochure	
Software	15
Bulletins	
DEMO UNITS	
Application Evandure /Success Stodies	15

# MARKET POSITIONING

Being recognized as the market leader for panel meters is quite an honor. Maintaining the position however involves hard work and a number of key elements. Those elements include having the right product, maintaining the highest quality standards, and providing exceptional deliveries. Combine these with outstanding Tech Support and a great distribution channel and you have all the ingredients for our current success.

To maintain our leading position we always have to better our products. Products like the PAX meters, CUB5 products and even the LD Series are second to none in today's market. But our goal is to be the "Last Man Standing" in the panel meter market, and if we are to accomplish it, we need to continue to innovate. We believe the release of the PAX2 Series will again put Red Lion and our distributor partners in a position that no competitor can match.

## THE PAX2 SERIES

Almost every one of your customers struggles to have the right meter for the job at hand. Customers have to stock this meter for that machine and that meter for this machine, tying up unnecessary inventory dollars or rarely having the right product. And even after you have the meter installed and functioning, there are always changes. What if you could have a meter that would solve all your applications?

We are proud to introduce the new PAX2 Series of products, a solution like none other. The feature set and flexibility of these new meters will have an immediate impact on customers as well as having competitors reeling for years to come.

This new series is designed around the fact that we need to increase the capability and flexibility of this meter. But that is just the start! The design concept has to allow for future as well. Now that's a tall order as none of us know what the future holds, but see how the PAX2 Panel Meters offer just that.

Currently we have 4 planned models for the PAX2 Series, an Analog model, a digital model, a strain gage model and finally the process controller model. They will all carry the same basic feature set.

- Dual Line Display
- Display Color Change Capability/Tri-color
- Custom Units Mnemonics
- Universal Power Supply
- USB Programming/Communications Port
- Built-in Modbus Communications
- D/A Conversion Rates Up to 160/Second
- Uses Existing PAX Plug-in Option Cards (Setpoint, Retransmitted Analog and Communication)

# PAX2A - ANALOG INPUT

In addition to the above, the PAX2A features a universal input. Simply put the meter accepts DC current, DC voltage, process, thermocouples, RTDs, and resistance signals. This is like having a PAXD, PAXP and PAXT all in the same meter. The dual line display allows the user to view a process flow and perform a totalization as the same time.

# PAX2D - DIGITAL INPUT

This meter is similar to the PAXI with the exception of course that it is in a PAX2 package. Inputs can come from proximity, magnetic, photo eyes, rotary pulse generators, switches or relay contacts as well. Using the dual line display user can view both a rate and count display of a machine and two different machines at the same time. A third display allows math functions to be performed on the rate or count values expanding the meter's capability even more.

#### PAX2S - STRAIN GAGE

Originally thought to be part of the PAX2A, PC board space and parts cost caused us to separate this meter from the PAX2A. So if you need to measure or monitor load cells, strain gages or pressure sensors, this meter is the right choice. Now both ingredient and batch weights can be maintained and viewed on the same display.

## PAX2C - TEMPERATURE/PROCESS CONTROLLER





This is a brand new meter, unlike anything offered in the market today. We are taking the modular concept of plug-in option cards and applying it to the controller products. The full PID controller will allow customers to add temperature/process control options like remote setpoint, heater/current monitor, and motorized valve positioner as plug-in option cards. No controller on the market offers this type of flexibility. Besides the upgrade capability, think of the stocking implication as well. No more stocking 7 or 8 models to service your applications, one meter and a hand full of option cards will cover it all. **This is huge!** And before you ask, yes the PAX2C accepts all the same option cards as the regular PAX Meters. So where do you plug-in the temperature option cards? These option cards will plug into something we are calling the Flex Bus. This will be a separate set of connectors on a bus different from the standard option cards we now use, more on Flex Bus a bit later.

Now you have an idea of what the PAX2 Series is about, let's now look at some of the features and functions in a bit more detail.

# FEATURES/BENEFITS

## **DISPLAY**

The dual display is ideal for showing two separate values, like displaying the flow rate of gallons/minute and totalizing the gallons on the other. The top line display is 0.7" high, six digits and the bottom line display is 0.35" high, nine digits. Most competitors offer a second line display that is only a six-digit display or even less, on line two which quickly limits the numeric value especially when used for large totalizing applications. The top line has color change capability that is tied to the setpoints. Three colors are available, green, orange and red allowing an operator to determine a fault condition without being close enough to read the meter's actual value. In addition to the color change, a color flash (switch between colors) can also be programmed, see setpoint programming for details.

The programmable units' mnemonics for line 1 can also changes color. It is programmable for up to three characters of letters or numbers. Line 2 always is displayed in the color green. The 9 digit display can either be programmed to display a value or a custom units label or any combination thereof. The lower right side of the display, next to line 2 is the setpoint output status and these are always displayed in the color red.

In the programming of the meter, users can adjust the contrast and intensity. Intensity can be a key factor in some application like dark rooms or onboard ships running at night. Contrast helps with one of the issues of an LCD display, the viewing angle. If the installation of a meter is too high or low on a panel, the LCD display may become difficult to read. Not with the new PAX2 Series, simply adjust the contrast until the display becomes readable.

The PAX2C is the only meter in the series not to offer the above display format. It will have two 4 digit displays capable of showing various selectable parameters. Both displays offer custom units label capability as well as an active bar graph providing the user a visual display of both displays. The display area and display color are completely user programmable. The PAX2C will also be available in a horizontal and vertical display format.

### **UNIVERSAL CAPABILITY**

One of the most important features of the PAX2 is its universal capability, including the universal input and power supply. Whether the sensor is an RTD, Thermocouple, Process Signal, DC Current, DC Voltage, or Resistance, they all connect to a PAX2A meter. Simply use the four input terminals, which are used in various combinations to accomplish the proper connection to this analog meter. The PAX2D, digital meter also has universal capability for sensors with a pulsed output. Magnetic, proximity, rotary pulse generators, photo eyes, limit switches, or simple switch contacts can all serve as an input to this meter. The PAX2S accepts strain gage, load cells, or pressure sensors as an input, while the PAX2C can accommodate process signals, voltages, currents, thermocouples and RTDs as inputs to this meter. Just think of all the application you can do with 3 meters and a single controller.

Don't forget the universal power supply, AC or DC, just plug it in. The wide ranging specification includes 50 to 250 VAC or 21.6 to 250 VDC. Polarity does not even matter.

With this universal capability; distributors, OEMs, and customers do not have to stock multiple part numbers to gain access to all of the input and power supply combinations. Throw in the plug-in option card capability and inventories can be significantly reduced. In fact, one OEM customer will use one PAX2A and three option cards to replace 25-stocked meters from one of our competitors. Significant savings are realized with this product and it is all based on universal capability and flexibility of the option cards!

#### **UPDATE RATES**

The display update time for the existing meters on the market today are usually fixed between 5 to 20 readings per second. With the PAX2 Series the internal analog to digital conversion rate is adjustable from 5 to 160 times per second. This will allow fast response times and tight control of the setpoints or analog outputs when required.

#### COMMUNICATION

The PAX2 offers Modbus Protocol as the standard output. Customers can choose between the following communication cards; RS232, RS485, DeviceNet and Profibus. In addition, the PAX2 has a built-in USB Communication Port that may be used as a programming port, or you can use it as a virtual communication port.

## **OPTION CARDS**

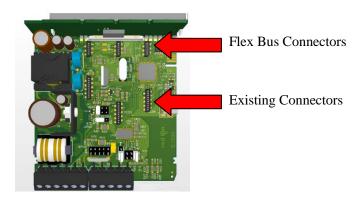
Much like the existing PAX meters, the PAX2 can use our existing option cards, one of the widest selections of option cards on the market today. Simply plug-and-play to change your meters capabilities and the best thing is these cards can be added or changed today or years down the road. Since the PAX2 Series is already in the Modbus format, all the communication cards with the exception of the Modbus Communication card are active.

The PAX2 meters will have even more capability in some part numbers featuring a new bus called, Flex Bus, an additional set of connector that allows the use of the Smart Cards. Smart Cards are option cards that add intelligence to the meter. Read on to learn about Flex Bus and Flex Cards.

# WHAT MAKES THE PAX2 METERS DIFFERENT

#### **FLEX BUS**

Flex Bus is an additional set of connectors in the PAX2 meters that allow additional option cards called Flex Cards to be installed into the meter expanding its capability even further. Please note there are two part numbers for each model, with the exception of the PAX2C. One part number is the base model and does not offer Flex Bus and the second includes it. All the PAX2C meters have Flex Bus as a standard offering. More on the Flex Cards in the next section.



The way Flex Bus works is for those part numbers with Flex Bus, you get a second set of option card connectors and a much faster processor. The Flex Cards will simply plug into these connector and interface to the meter over a RS485 bus, or Flex Bus. The advantage of the Flex Bus connectors is that they are all keyed exactly the same for all three card slots. Thus, a Flex Card can be plugged into any of the three slots and become fully operational.

For example, if you have a setpoint card and a communication card installed in the meter, you can use the analog card slot to install a Flex Card. You can use more than one Flex Card in the meter at a time. In fact, you can have all three slots filled with Flex Cards.

While the bus expands the meter capability, please note that it has to communicate to the meter and then receive feedback from the meter. This certainly works for applications looking to monitor multiple inputs, however if you use additional output cards, please be aware of the communication latencies that could cause minor delays in control applications. It is highly recommended that you order the specific meter you need for control purposes and use Flex Cards for those variables that you are looking to monitor.

Remember all the existing PAX option cards can still be used. They still plug into the same connectors as they have done in the past.

The only PAX2 model that will have the Flex Bus as a standard offering is the PAX2C. This is to support options for the temperature/process controllers like heater current, remote setpoint and motorized valve position. The PAX2A, PAX2D and PAX2S will have two version, one with Flex Bus and one without.

#### Flex Cards

So what's a Flex Card you ask? A Flex Card can be an input or output card that extends the meters capability. In the case of an input card, it is basically a complete meter on an option card. The card accepts the input, scales it and converts the signal to value that can be read on the bus. These values are than available to be display on one of the display lines or for the meter to take some kind of action. As for the outputs, it is a way to extend the meters control capability by adding additional relays or another analog output that functions through the bus. As stated earlier, caution should be used as communication latencies can be a factor when using these relays for control applications.

We will have Flex Cards for count/rate inputs, analog inputs, retransmitted analog outputs, relay outputs and the already mentioned temperature/process option cards. This selection of cards allows the meter to be customized to almost any application. Two analog inputs, an analog and digital input, three digital inputs, two analog outputs, or 8 relays outputs are all possible from one meter. For example; you can use a PAX2A and have the top display monitoring GPM from your pump. Add another analog input Flex Card and you can monitor a second pump on the bottom line. You can add three analog input Flex Cards and monitor up to 4 locations from one meter.

Or you can take a PAX2D, display and control conveyor speed on the top line. Selecting an analog input card you can monitor an ultrasonic 4 to 20 mA sensor measuring material in a production tank at the same time.

#### **Future Cards**

As we mentioned earlier, this meter series was built for the future as well. We have the possibility of accepting an output from any device by designing a new Flex Card. Many times in the past we have been asked to develop a meter for a special input we do not currently offer. The cost, engineering time and minimum number to support the project usually puts an end to the requests. With this new platform of Flex Cards, we no longer have to develop a whole meter; we just need to develop a new Flex Card. This drops the costs, design time, and minimum quantities to numbers that can be positioned for an easy win. Basically if we can fit it on the card, it should work. When we complete a new Flex Card, we will add it to the offering continuing our push to stay on top of the panel meter manufacturers.

#### **New Programming Structure**

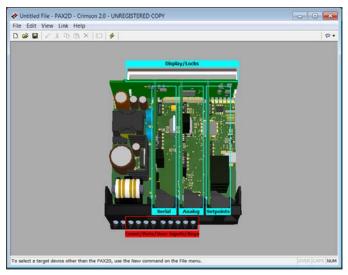
The PAX menu structure has been changed slightly to accommodate Flex Bus. The actual programming of each module will still reassemble a standard PAX, but the way you access the programming menus is where the real change occurs. Grouping of Inputs, Outputs, Ports and Display programming changes the way you access the information. Basically, all the Input Functions are under the Input Programming. By that I mean the count input, rate input, and user inputs, are all sub menus of the Input Programming. The same for the Output programming, analog output and setpoints are all sub menus of the Output Programming structure. All Display functions are under the Display Menu. The actual parameter programming closely mirrors the existing PAX style of programming.

The reason for the change is to support the Flex Bus and Flex Card program. As you add additional Flex Cards, their programming will appear under the appropriate menu. If you add an Analog Input Flex Card, the programming will automatically appear as an additional sub menu in the Input programming. No matter how many input Flex Cards you add, each just adds an additional programming loop under the Input programming. It works the same for the Output programming as well, each Output Flex Card added simply adds another menu under the Output programming.

### **CRIMSON PROGRAMMING**

We have made some changes here as well. No longer will you see the programming boxes you have become accustom to using. Now you will see an actual meter and you can click on the part of the meter you wish to program.

Giving a simple click on the input terminals and you will have access to the input programming. The input programming will have the count input, rate input and user input programming just like the button style of programming. It works the same for the Display programming as well. The difference comes with the card slots. Once the card slot is clicked on, a drop down menu will appear and the user can select the device they are installing into that slot. Each slot has fixed connectors for the existing PAX setpoint, analog and communication option cards as we know it today.



For the enhanced models of the PAX2 which offer the Flex Bus connections, the drop down menus will include the Flex Cards available, either for the input or output depending on the option card selected. Or you can make it even easier by installing all the option cards, regular or Flex, connect to the computer running Crimson and do an upload (extract) in the software and the option cards will be automatically populated.

#### FIRMWARE UPDATES

The PAX2 can easily have its firmware updated in the field. This new feature will allow user with older models access to newly released code by simply connecting to the Crimson Software. Units with Flex Bus can be easily updated to accept new Flex Cards. Consult the literature or contact the factory for details on updating the firmware.

### **EXISTING PRODUCTS**

By now you have realized some of the changes we made to support the new PAX2 Series. So what happens to the existing meters? Well the PAX2A will be retooled so that it has the same programming structure as the rest of the PAX2 Series. Undoubtedly there will be some customers that will have to change the way they program their meters if they buy a new one. They can also upload new firmware so their existing meters will program like the new versions.

What about the existing PAX meters? There are no plans to discontinue any PAX meters. In fact, in the future you will see some additional option cards introduced that will expand their capability as well. We have a large user base of PAX meters, so they will be around for a long time.

## THE MARKET

For years people have been saying the panel meter market is dying. Well there is some half truth to that as the market is certainly not growing. But that said, our sales in panel meters state otherwise. In fact, we have some channel partners providing us some pretty nice growth in the past 24 months. When selling more commodity-like products; meters, sensors or even power supplies, you still need to sell them to your customers; however it is a different type of sale.

# THE SALE (HOOK'EM)

Selling these products is not an everyday event, but I will guarantee you they are purchased every day. You need to institute the "hook'em method" of sales. This simply means selling the customer on the meter or other items once and they will usually continue to buy that same product, when they have a good experience. Best of all you get the repeating sales without all the additional effort. It is important to remember, local visual displays are not going to disappear anytime soon and neither are the sales dollars they generate. So position yourself to get all your customers business, not just a particular project. You will make more money in the long run.

I have often heard over the years, "I just don't have time to sell a panel meter" or the famous "That's old technology." Neither could be further from the truth. Let's address the first excuse. As most panel meter users are repeat customers, it is not about a single panel meter sale, it is about "all" the panel meters that customer buys from this point forward. Taking the time to introduce our meters and the additional Red Lion values to the customer will wrap that business up for quite a long time. This will increase your sales and allow you to focus on other business opportunities while still banking dollars every day. As for the old technology, meters are the best solution for low level machine control. They are simple to install and use, meaning any maintenance person can do the job. No need for a high dollar system integrator or PLC specialist. Applying communication to the panel meters extends their capability as a reporting device or even as a systems control. Take the G3 products for instance; they can hold recipes that can contain the programming parameters of the meters. Simply pressing a button on the G3 and it can download a new program to the meter easily setting it up for a new production run. This easy plug-and-play connection capability is a huge Red Lion advantage.

#### Conclusion

With the CUB5 Meters, PAX Meters, and LD Series, you have products that no competitor can match. Now you add the PAX2 Series and we are unreachable. From a sales perspective, take the time to get each and every customer hooked on the Red Lion meters and you will see how they continue to buy meters even when you are not around. All you have to do is plant the seeds and watch your sales dollars grow. Start growing them today.

# **PAX2A COMPETITORS**

	Precision Digital	Omron	Newport	Red Lion
	529B62. \$	± 49393	~ <b>4002</b> ~4002 ••••	313604 896032058 12
	PD6200	K3HB-X	i8DH	PAX2A
Display Size	0.6" (15 mm), 0.46" (12 mm) Sunlight Readable LED Display	0.56" (14 mm), 0.19" (5 mm) Backlight LCD Display	0.83" (21 mm), 0.40" (10 mm) LED Display	0.7" (18 mm), 0.35" (9 mm) Backlight LCD Display
Display Capability	6/6 Digits	5/5 Digits	4/4 Digits	6/9 Digits
Display Colors	Red	Red and Green	Red, Amber and Green	Red, Orange and Green
Custom Units	No	Stickers	No	User Programmable
A/D Conversion Rate	5 Readings/Second	50 Readings/Second	3 Readings/Second	160 Readings/Second
Power Supply	Universal Power	AC and DC Models, Specify When Ordering	AC and DC Models, Specify When Ordering	Unversal Power
Inputs	Universal Analog, No Temperature	Specify When ordering	Universal Temperature and Process	Universal Temperature and Process
Field Installable Option Cards	No, Must Specify When Ordering	Yes	No, Must Specify When Ordering	Yes
Setpoints	4 Setpoints	4 Setpoints	2 Setpoints Max (Included)	4 Setpoints
Communication	RS232 and RS485, via External Module	RS232, RS485, and DeviceNet	RS232, RS485 and Ethernet	RS232, RS485, USB, Modbus, DeviceNet, and Profibus
Retransmitted Analog Output	Yes	Yes, But Eliminates Communication	Yes, Limits Setpoints to a Single Output	Yes
Price	\$299.00	\$265.00	\$340.00	\$325.00

# **PAX2D COMPETITORS**



# **PAX2S COMPETITORS**

	Precision Digital	Omron	Newport	Red Lion
	19.4580 PD691	K3H5-V	**4002 9 * * * iS8DH22	996032068 \$ PAX2S
Display Size	0.56" (14 mm) LED Display	0.56" (14 mm), 0.19" (5 mm) Backlight LCD Display	0.83" (21 mm), 0.40" (10 mm) LED Display	0.7" (18 mm), 0.35" (9 mm) Backlight LCD Display
Display Capability	4 1/2 Digits	5/5 Digits	4/4 Digits	6/9 Digits
Display Colors	Red	Red and Green	Red, Amber and Green	Red, Orange and Green
Custom Units	No	Stickers	No	User Programmable
A/D Conversion Rate	5 Readings/Second	50 Readings/Second	3 Readings/Second	160 Readings/Second
Power Supply	AC Power, No DC	AC and DC Models, Specify When Ordering	AC and DC Models, Specify When Ordering	Unversal Power
Excitation	5 V or 10 V @ 50 mA	10 V @ 100 mA, 5V @ 100 mA (w/Comms)	5 V @ 40 mA or 10 V @ 60 mA (eliminates Comms)	5 V @ 65 mA or 10 V @ 125mA
Inputs	0-30 mV, 0-200 mV, +/- 15 mV and +/- 100 mV	0-200 mV, 0-20 mV, +/- 100 mV, and +/- 200 mV	0-100 mV and -100-1 mV	+/- 24 mV and +/- 240 mV
Field Installable Option Cards	No, Must Specify When Ordering	Yes 😃	No, Must Specify When Ordering	Yes
Setpoints	4 Setpoints	2 Setpoints	2 Setpoints	4 Setpoints
Communication	None	RS232, RS485, and DeviceNet	RS232, RS485 and Ethernet	RS232, RS485, USB, Modbus, DeviceNet, and Profibus
Price	\$359.00	\$510.00	\$400.00	\$430.00

# **PAX2C COMPETITORS**

	Watlow	Eurotherm	Omron	Red Lion
	320 320 320	3208	200	691 800 PX2C
Display Size	0.45" (11.4 mm), 0.37" (9.5 mm) LED Display	0.52" (13 mm), 0.22" (6 mm) LCD Display	0.71 " (18 mm), 0.6" (15 mm), 0.28" (7 mm) LCD display	0.44" (11.2 mm), 0.24" (6 mm) Tri-Color LCD Display
Display Capability	4/4 Digits	4/5 Digits	4/4/4 Digits	4/4 Digits
Display Colors	Red/Green	Green Red Alarm Indicator	White/Green/Yellow Fixed	Red/Orange/Green Color Changing
Bargraph	No 😩	Yes	No 😚	Yes 😬
Custom Units	Fixed	Scrolling Text	Fixed <b>(</b>	Yes 😬
Inputs	Universal, Thermister Model	Universal	Universal	Universal
Power Supply	AC and DC Models, Specify When Ordering	AC and DC Models, Specify When Ordering	AC and DC Models, Specify When Ordering	Universal Power
Ramp Soak	Yes, Must Specify When Ordering	Yes, Must Specify When Ordering	Yes	Yes
Field Installable Option Cards	No, Must Specify When Ordering	No, Must Specify When Ordering	No, Must Specify When Ordering	Yes 😃
Alarms	4	4	8	16
Field Installable Communication	No, Must Specify When Ordering	No, Must Specify When Ordering	No, Must Specify When Ordering	Yes
Communication	RS485 Standard, Modbus, DeviceNet, Profibus and Ethernet	Modbus	RS485	Modbus, DeviceNet and Profibus
Configuration Port	No 📀	No 😩	Yes	Yes
Price	\$311.00	\$420.00	\$355.00	\$350.00

SELLING TOOLS PAX2A KNOWLEDGE BINDER

# **SELLING TOOLS**

Various tools are provided in order to help you sell the PAX2 Series.

#### COLLATERAL

#### **BROCHURE**

The PAX2 brochure is under development and not currently available.

#### **S**OFTWARE

Crimson is available as a free download from...

http://www.redlion.net/Support/Downloads/SoftwareLibrary/Crimson2.html

If you already have Crimson 2 installed, and your computer has access to the Internet, you can make sure you always have the latest released build by clicking Help – Check for Updates.



#### **BULLETINS**

The bulletin for the PAX2A can be found at...

http://www.redlion.net/Products/DigitalandAnalog/DigitalPanelMeters/DCCurrent/PAX2A.html

The bulletin for the PAX2D can be found at...

http://www.redlion.net/Products/DigitalandAnalog/Counters/CounterRate/PAX2D.html

The bulletin for the PAX2S can be found at...

http://www.redlion.net/Products/DigitalandAnalog/DigitalPanelMeters/StrainGage/PAX2S.html

The bulletin for the PAX2C can be found at...

http://www.redlion.net/Products/ProcessControl/PIDControllers/PanelMounted/PAX2C.html

#### **DEMO UNITS**

Seeing is believing, so we have a couple ways to get a demo of the new PAX2 Series.

# Application Examples/Success Stories

Send us your application and we will publish them here!