X / LX COMPARISON CHART - General

Feature Set	X-Line	LX-Line	Comparison
On-Board Hardware			
Main Processor	386EX	Sitara ARM Cortex-A8	
Processor Clock Speed	25 MHz	1GHz	**40 X**
Million Instructions/Sec (MIPS)	≈11	2000	**180 X**
Non-volatile memory	1M	4G	**4,098 X**
RAM	512 KB	512 MB	**1,024 X**
Additional Memory Type	Clock Chip	Micro SD Card	
Additional Memory	1 MB	32+ GB	**32,768 X**
USB Ports	-	1	
Other Processors	-	SiLabs 8051 F580	
Graphics Engine	-	SGX530 3D	
Video Out	-	16b HDMI	
Audio	-	HDMI Interface	
On-Board Software			
Operating System	32-bit RTOS	Debian Linux	
Access/HVAC Function	Different Firmware	All Inclusive	
Sunrise / Sunset	External/Computer	Internal/DDC	
X-Line Classic Firmware	✔	✔	
Hand Held Server	✔	✔	
On-board Web Server		✔	
Android Device Server		✔	
Secure File System		✔	
Networking & Communication			
Ethernet Speed	10 Mbps	10/100 Mbps	**10 X**
Ethernet Network Security	Network Dependent	Secure Sockets	
Max Serial Comm Speed	38.4 Kbps	115 Kbps	**3 X**
Serial Protocols	Different Firmware	All Inclusive	
Internet Protocols			
TCP	✔	✔	
UDP	✔	✔	
DHCP	✔	✔	
Ping	✔	✔	
SNMP		✔	
HTTP		✔	
HTTPS		✔	
FTP		✔	
BAS Protocols/IP			
BACnet/IP		✔	
Modbus/IP		✔	

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X / LX COMPARISON CHART - Points & Control

Feature Set	X-Line	LX-Line	Comparison
Point Types			
Binary Input (Dry Contact)	✔	✔	
Binary Output (24 VDC)	✔	✔	
Voltage Input (0-10 VDC)	✔	✔	
Voltage Output (0-10 VDC)	✔	✔	
Temperature Input (10K)	✔	✔	
Resistance Input	✔	✔	
Pulse Count (10 KHz)		✔	
Pulse Width (1 msec)		✔	
Point Features			
Overvoltage Protection	24 VAC	250 VAC	**10 X**
Point Sampling Rate	3 / sec	224 / sec	**75 X**
Noise Filtering	-	Median Filter	
A/D Resolution	12-bit	12-bit	
Max Points *	500	5000+	**10 X**
Wire Check **		✔	
DDC Speed			
PID Loop Speed	100 msec	≥ 1 msec	**100 X**
% Time used on DDC	75%	3%	**25 X**

** **Max Points** and other resources vary with application. This benchmark is for typical point usage in an HVAC application.*

*** **Wire Check** is a system of automatic tools for determining wiring problems.*

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X / LX COMPARISON CHART - Accessories

Feature Set	X-Line	LX-Line	Comparison
Supported Accessories			
Computrols Hand Held	✔	✔	
Android Device		✔	
USB Memory Stick		✔	
Micro SD Card		✔	
Webcam		✔	
Keyboard		✔	
Mouse		✔	
HDMI Monitor		✔	
More to Come		...	
Accessory Features			
Local Control (Hand Held)	✔	✔	
Local Control (Android Device)		✔	
DB Backup (Micro SD Card)		✔	
View Equipment (Webcam)		✔	
Local Printer (USB Printer)		✔	
WiFi Access (USB Access Point)		✔	
Bluetooth Access (USB Bluetooth)		✔	
Local Display (HDMI Monitor)		✔	
More to Come		...	

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100% Backward Compatibility

Computrols' new LX-Line of controllers was designed to be a drop-in replacement to our time-tested X-Line controllers. Every single feature that is available on X is rolled into LX. No upgrades, no reprogramming, no missing features. To upgrade you simply unplug the old X-Line, plug in the new LX, set the IP address, and let CBAS do the rest for you. Sure there are a host of new features and advantages with the new LX. But getting started with an LX upgrade is as simple as plug-and-play.

The New and Improved LX Terminal Board

There isn't one. That's right … the LX terminal board is the exact same terminal board as on the X-Line. Our original vision of a two-board design is alive and well. The Brain Board has the latest electronics and one big connector. The Terminal Board has no electronics and all the wired connections. So a new LX controller shows up on an existing job site as just an electronics upgrade—albeit a serious upgrade. But don't worry … when they invent a screw terminal that is way better than the one we've been using for 20 years, we'll change the terminal board too.

Speed and Memory, Speed and Memory, Speed and Memory

The computer section of the LX controller is a quantum leap in processing power and storage. All the tech specs are 100's and 1000's of times better than our classic controller. Of course these are just numbers on a page. What does that mean for building control? Faster sampling, faster control, more points and way more on-board control than ever before. But that's just the beginning… The power of the LX brain opens the door to new Internet and connectivity technologies. The USB port alone is like a new technological doorway of opportunity. And this new brain power also gives Computrols a new platform that will host years of new development and opportunity. Under Computrols vision, the numbers on the page translate to real control, power and convenience.

Network Security

In a world of ever-increasing concerns over network security, the LX brings unprecedented security to an HVAC controller. Under the new LX, all the controllers and computers communicate with each other using Secure Sockets Layer (SSL). This industry standard uses asymmetric cryptography for authentication and symmetric cryptography for all subsequent communication. Rather than relying on internal network security for your BAS network, the LX can reside on any network, anywhere, anytime—even as a static IP on the real internet. And at 100 Mbps, our improved network speed makes quick work of any extra traffic required for security. You can now reduce your risk and utilize more and ore public networks by moving up to the LX.

Dedicated Processors / Stability

Besides the main "computer brain", LX controllers use a bunch of dedicated 8-bit processors for special and redundant tasks. Namely, one 50 MHz processor is used to handle each bank of 8-points, and one is used for each serial communication port. This increases the speed and stability of each of these processing tasks, while unburdening the main processor of redundant work. But this provides the LX with another benefit: Stability. Besides their primary tasks, all of the independent processors on the LX are monitoring each other. And they all have the ability to reset each other or the whole

controller. These means you'll never find an LX controller in a "locked up" state. These processors have each other's backs and ensure overall proper operation.

USB: A Doorway of Opportunity

The new LX Controllers come standard with a USB 2.0 port. This convenient and powerful port is open and ready for action on the LX. Let's start with an Android device. Although you can still use the Computrols Hand Held, the ease and power of a Nexus 7 is hard to beat. Plug and play … use your Android device to set the controller IP, view some inputs, bang around some outputs. You want to back up the database? No problem, just plug in your favorite memory stick. Webcam? WiFi? BlueTooth? Printer? You get the idea. Put inexpensive consumer devices where you need them: at the equipment. Need more ports? No problem, just add an inexpensive USB hub and plug away. The LX USB brings unprecedented convenience and flexibility to HVAC control.

Wire Check - Easy Controllers Just Got Easier

Computrols products are known in the industry for their ease-of-use and time to install. Jumbo screw terminals, two-board design, 4-in-1 points and automatic database downloading are just a few of the features that makes Computrols products so easy to install. The LX takes this philosophy to the next logical step: Wire Check. Besides the ability for each point to morph into any supported type, we've now reengineered the point circuitry to detect wiring problems and let you know when you've made a mistake:

- ▶ If you've accidently connected a relay where the LX was expecting a temperature sensor, Wire Check will tell you.
- ▶ If you connect a 0-10 VDC output, but there's a short in the wire, Wire Check will let you know.
- ▶ If you connect a 10K thermistor, but the wiring is open, Wire Check is on the case.

Whether you're using a Hand Held, Android Device or CBAS Graphics Workstation, points with bad wiring show up as such. "Wire" becomes the state of the point.

The reason Computrols clients save money on controller installation is simply that it takes less time. With LX, that time just got even shorter. LX Controllers give you the immediate feedback that your wiring is amiss. That's before you leave the mechanical room and before you notice something funny from the status and control at the front-end. Simpler than ever … Wire Check.

Standalone HVAC Control

Many Computrols clients configure a single X-Line controller to run standalone on a single equipment with no CBAS DPU. To do this the X-line is pre-configured with a laptop and left alone. But this type of standalone use has several limitations:

- ▶ There's easy way to monitor or make changes. It's not cost-effective to have specialized software available for one controller.
- ▶ History is unavailable. If there is a problem and service is required, there is no record of the problem or the conditions leading to the problem.
- ▶ No Graphics. Graphics provide the easiest user interface and due to storage limitations cannot be stored on the X-Line.

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Several features on the LX make this solution much more appealing and more practical for many installations:

On-board Web Server – Hit the LX from outside using the Internet and get to your controller remotely. Have "casual users" hit the LX from inside the facility for simple setpoint or scheduling changes.

Network Security – Leave the LX exposed to the Internet without fear of hacking or intrusion. You don't need a firewall or IT person involved.

Graphics – The LX has ample storage space for CBAS Web graphics and provides an attractive and easy interface for standalone controllers.

Graphics – Leave it unattended for months without fear of crashing or locking up.

On-board History – Using a Micro SD card, histories are cached on-board for analysis or troubleshooting whenever needed.

With its new features, the LX creates great new opportunities in the Light Commercial HVAC space.

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