XICATO® (X) GalaXi™

DATA SHEET

XIG-0101: Xicato Intelligent Gateway

About Xicato

Xicato designs and develops light sources and control electronics that enable architects, designers and building managers to create beautiful, smart spaces in which people love to live and work. With thousands of installations around the globe, Xicato continues to be a leading supplier of high quality lighting solutions. Xicato is defining the future of intelligent light sources by integrating electronics, software and connectivity. Founded in 2007, Xicato's headquarters is based in Silicon Valley and the company has offices in Hong Kong, Europe and the US.

For further information, visit www.xicato.com.

ABOUT THIS DOCUMENT

This is just one of many documents and tools available from Xicato to assist lighting designers, specifiers, and luminaire manufacturers in understanding and using Xicato products. These include Datasheets, Test reports, including third party LM-80, UL, CE, and FCC, Accessory selection tools for heatsinks, optics, and drivers, CAD files and drawings, IES files, Application and Technical Notes, Training presentations, Sales brochures, Technical whitepapers, and much more.

Go to the Xicato website under Support / Documents and Tools, or contact your local Xicato representative for more information

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GENERAL DESCRIPTION

XIG – THE XICATO INTELLIGENT GATEWAY

The Xicato Intelligent Gateway (XIG) is a small, robust appliance that provides wired or wireless IP access to a wireless Bluetooth Low Energy (BLE) network of Xicato GalaXi™ devices and software, including XIM modules, drivers (XID), sensors (XIS), switches, and protocol bridges built by Xicato and Xicato GalaXi partners. XIG integrates Xicato GalaXi firmware and software into a standard, Linux-based computing platform with a custom Xicato printed circuit board assembly (PCBA).

Xicato GalaXi products employ wireless Bluetooth Mesh communication for peer-to-peer interaction, improving system performance and reliability. GalaXi lighting nodes contain embedded intelligence… there is no single point of network failure… and can be programmed by standard computers and mobile devices to respond to sensors, switches, and schedules, as well as mobile and remote commands. XIG provides remote monitoring, control, configuration and management functions, as well as general range extension. It also enables interaction with building management systems and third party lighting control systems through its open HTTP protocol interface.

XIG can be powered using standard AC-DC transformers with 15W capacity, operating at 9V to 48V. This allows it to be adapted to a standard lighting track, including 48V track capable of powering XIM Gen4 modules.

XIG allows end users to monitor and control a virtually unlimited number of BLE devices over any geographic distance (see Figure 1), as long as they have access to the private local area network connected to the XIG(s).
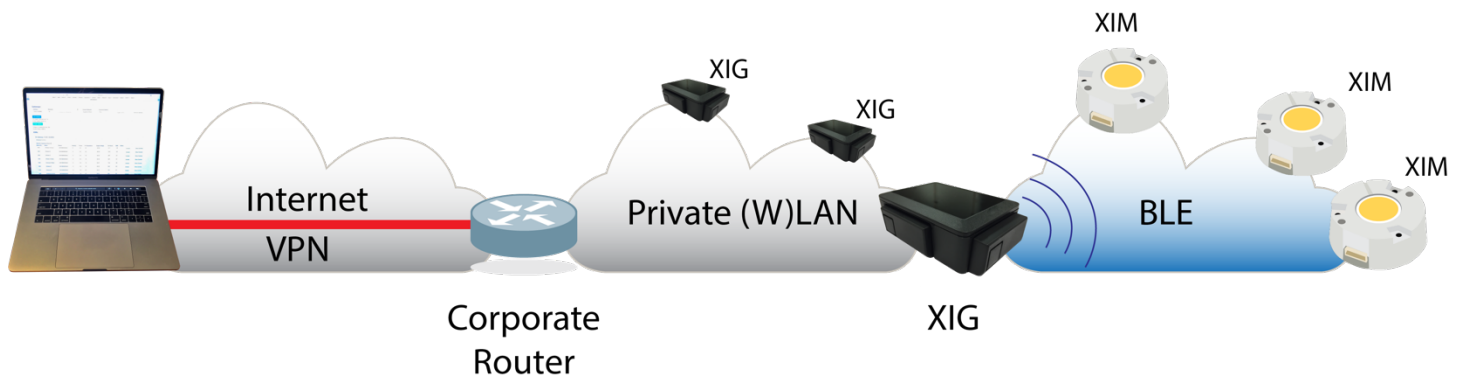

Figure 1: XIG access over Internet VPN

XIG INTERFACE

OPEN HTTP OR EMBEDDED BROWSER INTERFACE

XIG communicates on the IP network using an open, standard HTTP API interface that is available free of charge from Xicato. The HTTP interface enables any building management system (BMS), enterprise management system (EMS) or 3rd party lighting control system to control the GalaXi network as a subset of a larger, multi-vendor network that might include HVAC, audio-visual, or other environmental controls.

For convenience, Xicato has integrated an Apache web server that is accessible using any standard browser. Users simply enter the IP address of an XIG in their local area network – or over an Internet VPN – and the XIG provides the interface. Access is secure – users must log into the network – and up to 5 levels of security can be defined to enable e.g. administrator, manager, and user access.

A typical XIG screen is shown in Figure 2.

XIM XIG Dashboard   +

XIG Dashboard V2.3.17   Gateways   Devices   Unified Physical

Gateways

Address ↓	Modules ↕	Networks ↕	CPU Temp. ↕			Username ↕			
10.50.1.62:8000	83	4	51.5	Update Token	Logout	admin	UG	DG	Remove Gateway

Add Gateway

Tick length in seconds (min. 1s):
[Seconds]

Timeout in milliseconds (max. 30s):
[Milliseconds]

Current update interval: 5s   Current timeout: 5000ms

Pause Updating

Networks

Unsecured

Devices (61) (Power Consumption: 209.40W)

Device ID ↓	Name ↕	Device ↕	Intensity ↕	Power ↕	Temperature ↕	Supply Voltage ↕	On Hours ↕	RSSI ↕	Status	Last Update ↕			Remove?				
1	Brian Track (R)	XIM19803020A5A	9.4	2.3	30	48.4	5359	-76		13:57:27	Indicate	Show Controls	x	G	S	N	FW
8	EE Track (R)	XIM19953013A5A	0	0.3	23	48.88	11019	-74		16:03:31	Indicate	Show Controls	x	G	S	N	FW
10	50mm 3000lm AS	XIM19803030A5A	0	0.3	30	48.4	11780	-78		10:54:29	Indicate	Show Controls	x	G	S	N	FW
88	Table Lamp	XIM09803007A6A	0	0.4	23	48.4	2157	-46		16:03:34	Indicate	Show Controls	x	G	S	N	FW
101	Front Window 1	XIM19803020A5A	100	17.7	39	47.42	821	-48		16:33:01	Indicate	Show Controls	x	G	S	N	FW
103	MSL RAAM	XIM19953013A6A	0	0.4	50	48	0	-79		18:04:18	Indicate	Show Controls	x	G	S	N	FW
107	Front Entrance 1 (R)	XIM19803020A5A	0	0.3	21	48.58	1071	-53		16:03:32	Indicate	Show Controls	x	G	S	N	FW
109	Aaron's Cube (R)	XIM19953013A5A	0	0.2	23	48.63	1336	-75		16:03:35	Indicate	Show Controls	x	G	S	N	FW
111	Andy Desk	XIM09953013A5A	0	0.3	21	48.02	3952	-79		11:15:08	Indicate	Show Controls	x	G	S	N	FW
998	Experience Room 2	XIM09803007A6A	0.11	0.4	21	48.38	2136	-53		10:11:30	Indicate	Show Controls	x	G	S	N	FW
999	Experience Room	XIM19953520A6A	0.1	0.4	23	48.15	3525	-47		17:40:34	Indicate	Show Controls	x	G	S	N	FW
1001	Eulum Bridge	XIB01-C1A4-DIM	0	0	42	0	37	-58	Input Voltage Not Yet Measured	11:37:17	Indicate	Show Controls	x	G	S	N	FW
1002	XID Driver	XID01-25C1D6P07-A6	0	0.3	28	47.88	43	-63		11:37:18	Indicate	Show Controls	x	G	S	N	FW
1003	XIM Module	XIM19803013A5A	0	0.3	27	48.1	44	-48		11:37:22	Indicate	Show Controls	x	G	S	N	FW
2001	Eulum Bridge	XIB01-C1A4-DIM	1	0	37	0	97	-59	Input Voltage Not Yet Measured	17:18:49	Indicate	Show Controls	x	G	S	N	FW
2002	B 2	XID01-25C1D6P07-A6	5	0.7	30	48.4	100	-77		09:21:20	Indicate	Show Controls	x	G	S	N	FW
2003	XIM Module	XIM19803013A5A	5	0.7	37	48.05	100	-48		17:18:51	Indicate	Show Controls	x	G	S	N	FW
2249	test test test	XCVD01-C4-A4	5	0	31	0	1403	-79	Input Voltage Not Yet	16:18:43	Indicate	Show Controls	x	G	S	N	FW

Figure 2: XIG web browser dashboard showing module operational data

MONITORING FEATURES

MULTIPLE GATEWAY VISIBILITY

An XIM network has almost unlimited scalability. It can be configured with over 4 billion separately secure networks, each of which can contain over 32,000 devices, for a total capacity of over 140 trillion nodes! Large networks may take the form of multi-story office buildings with multiple tenants, each of which has one or more secure network zones. Or it may be a corporate or university campus, where different secure networks are assigned to different buildings or departments. Or it may encompass an entire multi-site, geographically distributed enterprise or property management portfolio. This makes an IP gateway such as XIG absolutely essential for proper management.

To simplify the user experience, the XIG interface allows you to add a second, third, or more additional XIG to the browser interface. Devices can be grouped in a "Unified" view, where devices seen by all gateways are on a single list, sorted by secure network; or in "Physical" view, sorted by both XIG and secure network, in a list that can scroll indefinitely in a single browser window.

DEVICE REAL-TIME DATA MONITORING

XIG monitors devices within its radio range as well as more distant devices communicating through a Bluetooth Mesh, tracking real-time data and enabling access to historical data stored in GalaXi devices. Real-time data includes:

- Unique Device ID
- Device Name
- Device Model
- Lighting Intensity
- LED Temperature (°C)

- Power Consumption (W)
- Module Supply Voltage (V)
- Total Operating Hours
- Received Signal Strength Indication (RSSI)

- Device Status
- Total power consumption of viewed devices

Temperature monitoring allows users to proactively maintain modules that have been incorrectly installed in hostile ambient temperature environments. Supply voltage monitoring allows users to detect when a power supply is mismatched, or when it is nearing end of life. Operating hour monitoring allows users to anticipate when LED modules are nearing the end of their initial warranty period (50,000 hours).

Users can set refresh intervals for how frequently the data is updated, and can switch between secure networks in the XIG's Bluetooth domain.

DETAILED DEVICE DATA RETRIEVAL

XIG can also retrieve data stored in devices in non-volatile memory, including:

- Hardware version
- Base Firmware revision
- Bluetooth Firmware revision
- Bluetooth address

- Module color temperature
- Module CRI
- Module maximum luminous flux
- Programmed flux

- Power on/off cycles
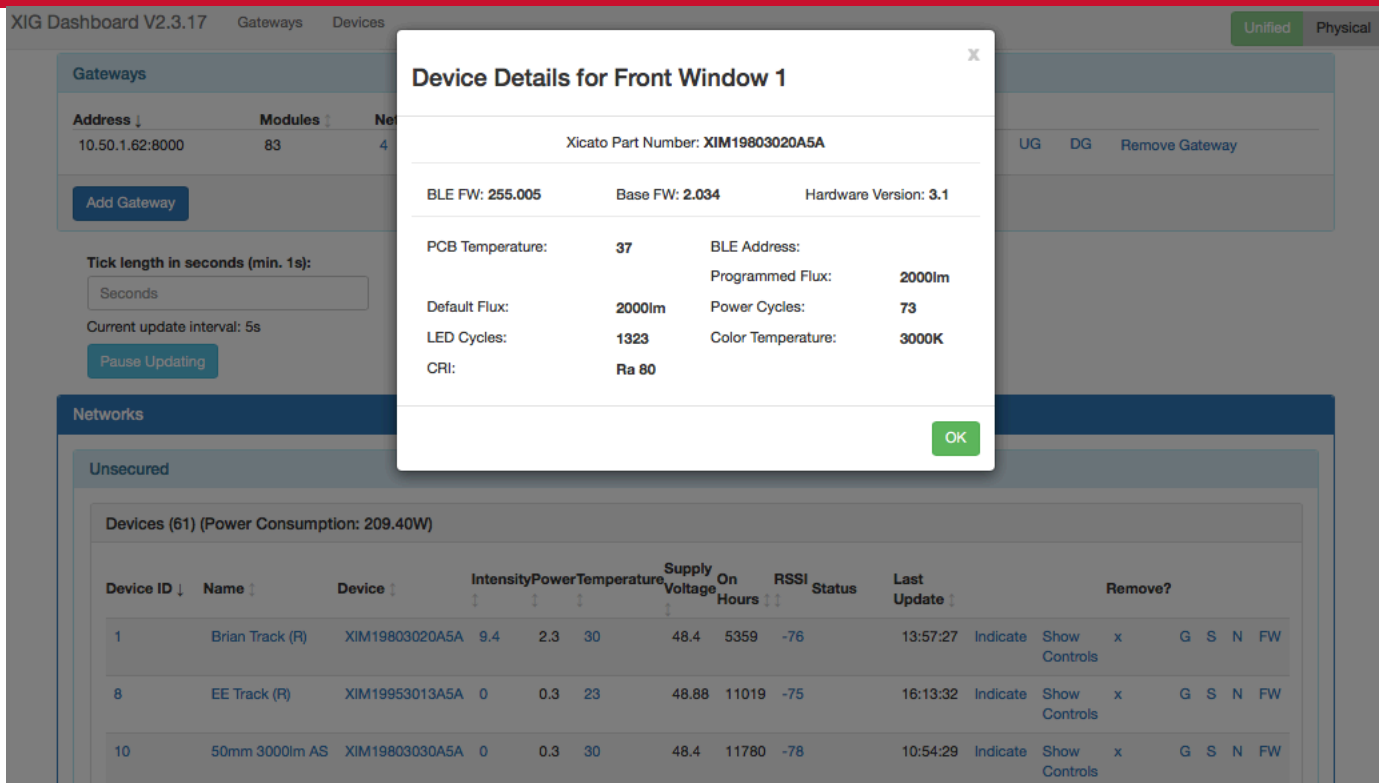- LED commanded on/off cycles
- PCB temperature

Figure 3: Device Details dialog

SENSOR DATA MONITORING

By expanding the Sensors Dashboard, users can monitor data coming from GalaXi sensors, including both device health data and sensed environmental conditions such as occupancy (motion), temperature, relative humidity, and lux level (see Figure 4, below). From the list, administrators can see and change the network membership of each sensor by clicking "N". They can also see and update device firmware revision by clicking "FW".

Figure 4: Sensor Dashboard

CONTROL FEATURES

DEVICE CONTROL

XIG allows a remote user to control individual devices within the XIG's BLE domain by clicking on Show Controls in the Devices dashboard. Commands can include:

- Simple on/off,
- Fixed dim level
- Scene commands

Users can also set fade time – how quickly the device or device group achieves the requested dim level.
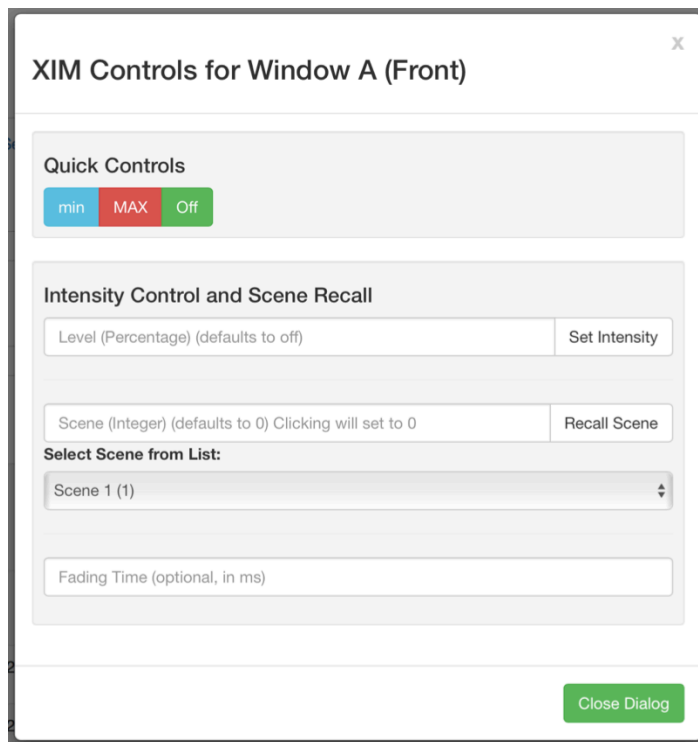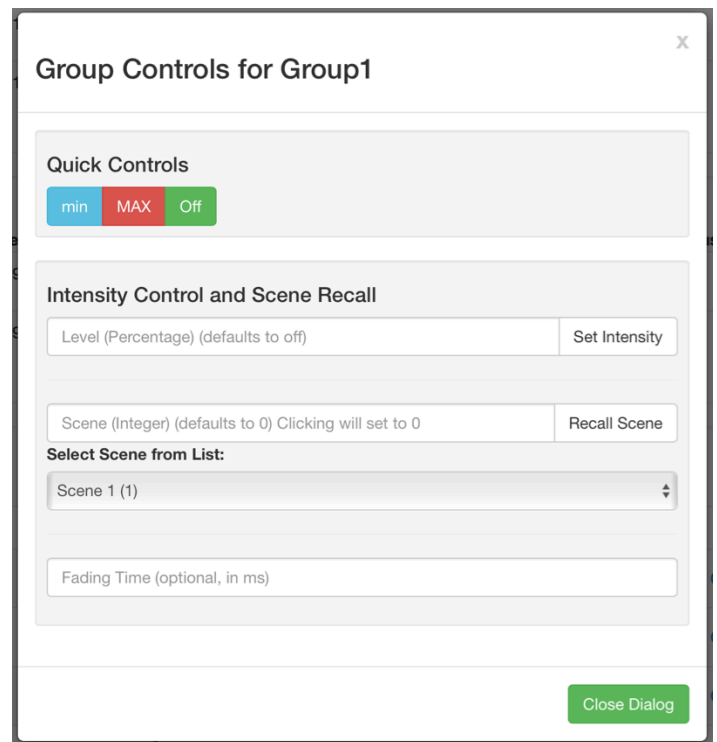

Figure 5: XIG individual light control

Figure 6: XIG group light control

GROUP CONTROL

Access to the Group Control dialog is through the Groups list, which is expanded by clicking on Groups in the XIG web interface (See Figure 7, below), and clicking on "Show Controls".

Figure 7: XIG screen showing named and unnamed groups with device counts

GROUP CONFIGURATION

Each secure GalaXi network can be configured with up to 16,383 groups. Users can configure (add or delete) device group membership remotely through the XIG. Each device can be a member of up to 16 groups, and stores the group numbers internally. Group numbers become, in effect, another shared name for the device in addition to its unique DeviceID. Figure 8 shows the Group Configuration dialog box, which is accessed by clicking on the "G" in the web dashboard.

SCENE CONFIGURATION

Each secure GalaXi network can be configured with up to 64,535 groups. Users can configure up to 32 scenes in each device through the XIG by clicking on the "S" in the web dashboard. Each scene has a scene number, a target intensity level (0-100%), a fade rate (time in seconds it takes to achieve the target intensity from its current intensity level), and a delay time (the time it waits before beginning its fade). Users can store names for Scenes in the XIG, which appear in the Scene List pull-down. Figure 9 shows the Scene Configuration dialog box.

Figure 8: Group Configuration dialog

Figure 9: Scene Configuration dialog

NETWORK AND DEVICE MANAGEMENT FEATURES

NETWORK TIME DISTRIBUTION

XIG synchronizes its time clock to a network timeserver, and sends a periodic network time synchronization signal into the Bluetooth network to ensure the coordination of scheduled behavior between XIM modules. To avoid errors, be sure there is only one network time synchronization source per network.

FIRMWARE UPDATES

Administrators can efficiently update device firmware by distributing firmware loads to XIG for distributed, sequential updates. This saves a great deal of time, especially in large installations with hundreds or thousands of nodes, by allowing updates to occur in parallel in multiple locations.

GATEWAY ADMINISTRATION AND MANAGEMENT FEATURES

With the use of the XIG Administration Panel, users who have the XIG administration password, can:

- Change the XIG login password that allows users to access monitoring and control
- Set XIG time zone
- Distribute XIG Firmware updates over the IP network – update the Bluetooth capabilities of the XIG
- Distribute XIG Software updates over the IP network – update feature capabilities of the XIG, bug fixes, etc.
- Program secure network keys into XIG – determine what devices are visible in the Bluetooth network
- Configure the XIG Wi-Fi interface
- Change the XIG host name – allows use of a unique name instead of a fixed IP address in DHCP environments, allowing use of Bonjour, Zeroconf, or mDNS for device discovery in the LAN
- Get the XIG's IP configuration information
- Set the XIG's fixed IP address
- Reboot the XIG system (shut down and restart the XIG operating system)
- See detailed status information on the XIG (total uptime, etc.)
- Kill the XIG Apache server process
- Collect logs from the XIG for diagnosis and debugging

ORDERING GUIDE

Part Number	Description
XIG-0101	Xicato Intelligent Gateway

MECHANICAL SPECIFICATIONS

See photo on next page.

Module Housing	ABS Plastic (Acrylonitrile butadiene styrene)
Dimensions	114mm x 79mm x 36mm (4.5" x 3.1" x 1.4")
Weight	156 grams (5.5 oz.)
Shipping weight	302 grams (10.7 oz.)
Operating Temperature	≤ 45°C
Storage Temperature	-40°C to +85°C

ELECTRICAL SPECIFICATIONS

Power Supply	15W minimum at 12V to 48V Phoenix PTSM connector
Processors	1.2 GHz 64-bit quad-core ARM Cortex-A53 CPU
Memory	1 GB LPDDR2 RAM, 900 MHz
Physical I/O Interfaces	Ethernet port (10/100, RJ-45)
Wireless I/O	Bluetooth Low Energy (BLE) 802.11n Wireless LAN (WiFi)

WIRELESS SPECIFICATIONS

Processor	ARM Cortex M0, 32-bit, 48 MHz
Protocol	Bluetooth 4.1
Spectral band	2.4 GHz
Bandwidth	1 Mbps
Channels	40
Transmission Power	-18 dBm to +9.5 dBm
Receive Sensitivity	-95 dBm
RSSI Resolution	1 dB resolution
Signal to Noise Ratio (SNR)	> 5:1
Transmission Range	Up to 400 meters, line of sight (LOS)
FCC Certification	FCC DSS Part 15C Spread Spectrum Transmitter, pending

ENVIRONMENTAL SAFETY

RoHS compliant

Lead content: None
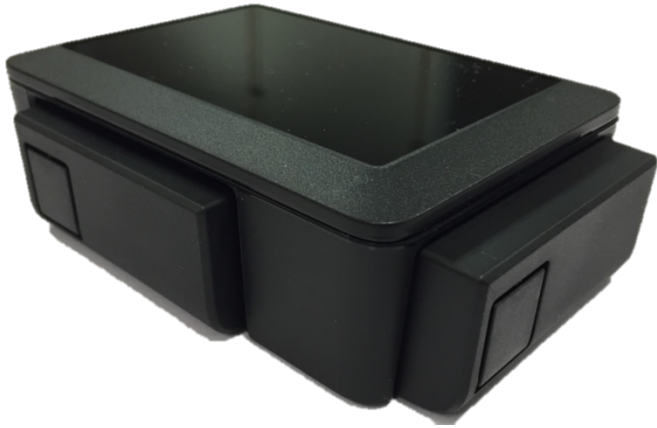Mercury content: None
UV or IRC Emissions: None

Figure 10: XIG housing

Figure 11: XIG bottom, showing keyhole mounting holes