

XB24-API-080 Datasheet



DiGi Electronics Part Number	XB24-API-080-DG
Manufacturer	Digi
Manufacturer Product Number	XB24-API-080
Description	RF TXRX MODULE XBEE24 2.4GHZ ANT
Detailed Description	Transceiver Module

<https://www.DiGi-Electronics.com>

This model XB24-API-080 is available at DiGi Electronics.

DiGi Electronics offers a global database of semiconductor and electronic component datasheets.

We welcome your inquiries regarding pricing, lead time, or other product-related questions.

 [Request a Quote](#)

 [Datasheet Search](#)



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

XB24-API-080

Series:

-

DiGi-Electronics Programmable:

Not Verified

Protocol:

-

Frequency:

-

Power - Output:

-

Serial Interfaces:

-

Utilized IC / Part:

-

Voltage - Supply:

-

Current - Transmitting:

-

Operating Temperature:

-

Manufacturer:

Digi

Product Status:

Obsolete

RF Family/Standard:

-

Modulation:

-

Data Rate:

-

Sensitivity:

-

Antenna Type:

-

Memory Size:

-

Current - Receiving:

-

Mounting Type:

-

Package / Case:

-

Environmental & Export classification

Moisture Sensitivity Level (MSL):

Vendor Undefined

ECCN:

OBSOLETE

REACH Status:

REACH Unaffected

HTSUS:

0000.00.0000

Map Your Digi XBee IoT Network with Digi XCTU

Digi XCTU® software has a wide range of integrated tools and features for managing Digi XBee® devices on your IoT network. For example, you can quickly and easily configure Digi XBee devices using XCTU. And other Digi XBee network management tools in XCTU let you map your network, test the communication range between modules, program intelligent edge networking behaviors into your modules using MicroPython, perform mass firmware updates and more.

This whitepaper will do a deep-dive into network mapping, a method for visualizing your network and manipulating the connectivity between devices.

MAPPING YOUR DIGI XBEE NETWORK

Digi XCTU can display a map of your entire wireless IoT network in a single graphical layout, including all connections. The network mapping function of Digi XCTU lets you explore your entire system wirelessly, and for free. The maps display full Digi XBee IoT networks live, in real time.

The map indicates each node, and all pathways between radio nodes are shown with their respective signal strengths.

Additionally, you can reconfigure your Digi XBee device connections right from the map, making it easy to experiment with and optimize your network.

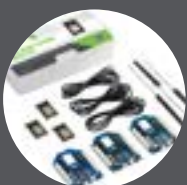
A variety of layout and filtering tools help focus on what interests you most. Network maps can be exported as images or as data tables, for



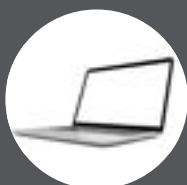
use in spreadsheets, reports and more.

Let's talk about how to set up and explore a Zigbee network map hands-on. Once you learn these simple methodologies, you can add "wireless cartographer" to your resumé.

PARTS REQUIRED



DIGI KIT, P/N
XK3-Z8S-WZM



LAPTOP OR
DESKTOP
COMPUTER



DIGI XCTU

Note: our examples show a network of 17 digi xbee modules, to illustrate the powerful mapping feature of digi xctu. We recommend adding more modules to your test network too, if you have them.

Map Your Digi XBee IoT Network with Digi XCTU (continued)

RF PROTOCOLS SUPPORTED

The following guide demonstrates how to set up and map a Zigbee network. It will work with a variety of Digi XBee devices. For example, we created our larger network with a heterogeneous mix of Digi XBee3, Digi XBee S2 and S2C modules, plus several Digi XBee Wall Routers. Everything works well together, and displays correctly in the XCTU map.

XCTU can also map Digi XBee 802.15.4 networks, as well as DigiMesh protocol networks, while displaying appropriate diagnostic information for each protocol. These can be tremendously helpful in designing and debugging, and everything works in a similar manner to the Zigbee network we explore below.

SET UP YOUR DIGI XBEE NETWORK

Every Zigbee network must have one Coordinator node. You can use XCTU to set up the node using the instructions from the blog post, [Manage Digi XBee Networks Wirelessly with XCTU](#). Set CE to 1 to enable the coordinator and AP 2 for API mode with escapes. (For modules prior to the Digi XBee3, load the Zigbee coordinator API firmware.) To make testing easier, enable unlimited join time by setting NJ to FF.

You will also want to configure some nodes as Zigbee routers. All Digi XBee Zigbee modules ship as routers from the factory. For a more stable prototyping network, use these settings on your routers:

- Set NJ to FF for unlimited join time.
- Set NW to 14 (20 minutes) to trigger a rejoin if the network is lost.
- Set JV to 1 so that if you switch coordinators, your routers will search for the new one on startup.

These settings entirely optional. They are helpful for lab networks you'll be running for a while, but for these examples, the factory-default configuration will work just fine too.

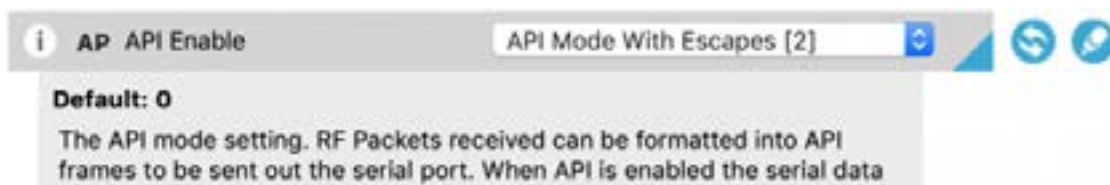


Once all your modules are configured, one XBee device must be directly connected to your computer with an evaluation board and USB cable. The remaining modules do not need any computer connection. Power them with a plug-in adapter, battery or USB power supply.

Map Your Digi XBee IoT Network with Digi XCTU (continued)

SET UP YOUR DIGI XBEE NETWORK (continued)

In our last example, we kept the coordinator radio attached to the computer but there's no requirement to do it that way. In most real-world networks the coordinator radio will just be another node on the network, so for added realism you can connect one of your Zigbee router modules to your computer and join the network that way. Just be sure to switch the locally-connected XBee into API mode (AP=2). In our examples, we will demonstrate using a local non-coordinator radio connected to XCTU, as that's more common.



CONFIGURE END DEVICES - Digi XBee3 End Device Configuration

If you'd like to create some sleeping end devices to explore Zigbee's power saving modes including parent-child network topographies, you can configure cyclic sleep mode on a Digi XBee3 by setting SM to 4. The other settings can remain at factory default as illustrated below.

▼ Sleep Modes

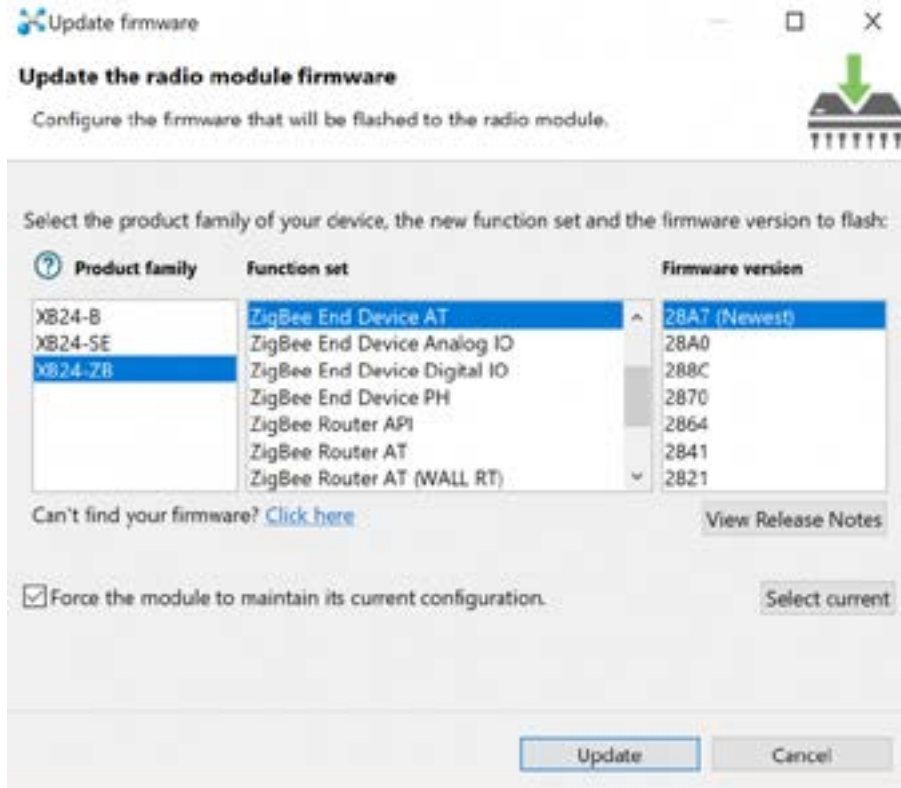
Configure low power options to support end device children

SM Sleep Mode	Cyclic Sleep [4]		
SP Cyclic Sleep Period	20	x 10 ms	
ST Time before Sleep	1388	x 1 ms	
SN Number of Cyclic Sleep Periods	1		
SO Sleep Options	0	Bitfield	
WH Wake Host	0	x 1 ms	
PO Poll Rate	0	x 100 ms	

Map Your Digi XBee IoT Network with Digi XCTU (continued)

LEGACY DIGI XBEE END DEVICE - FIRMWARE CHANGE

For Digi XBee models prior to the Digi XBee3, you can create end devices by loading the Zigbee End Device AT firmware and resetting the module. This will automatically enable cyclic sleep mode.



Remember that end devices will only talk to their “parent” radio module, a relationship negotiated when the module starts up. They are not directly part of the mesh so you will only see one connection to the current parent on the map.

NOTE: You can change firmware over the air in most cases. However in certain situations the same model hardware must be connected to XCTU as your remote target. If your firmware Update icon is grayed out and disabled, as shown below, make sure your local and remote Digi XBees match.



Map Your Digi XBee IoT Network with Digi XCTU (continued)

LEGACY DIGI XBEE END DEVICE - FIRMWARE CHANGE (continued)

You are ready to go once you have the following set up:

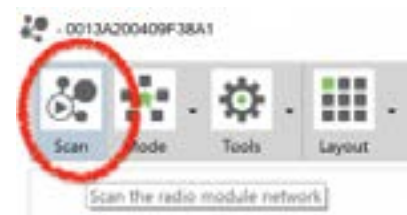
- One Digi XBee configured as a Zigbee coordinator.
- One Digi XBee (Zigbee coordinator or router mode) connected to your computer and configured for API mode.
- All your remaining Digi XBees configured as either Zigbee routers or end devices, and powered on.

XCTU NETWORK MODE

With a Digi XBee in API mode connected to your computer over USB, launch the Digi XCTU program. Add this Digi XBee to your Radio Module list using the plus icon in the upper left. Once that radio is in your list, click the Network mode icon in the upper right to display the mapping screen.



It's simple to get started. Click on the Scan button to begin a continuous scan of the Zigbee network. It will start by discovering the locally connected module. After that, it will scan the network for the remaining modules, then query each, one at a time, to determine their neighbors and connection strengths. Whenever additional modules are discovered in this process, they are added to the map and the scan will be extended to include them.



Digi XCTU Live Network Mapping Tool

This video demonstrates the process of discovering all Digi XBee Zigbee devices on the network.

WATCH VIDEO

CHECKING YOUR NETWORK ADDRESSES AND CONNECTIONS

For Zigbee networks, you'll see a link quality indicator (0-255) that describes the connection strength in each direction between the radio modules. This can help in finding weak connections that might benefit from repositioning, antenna adjustment or additional mesh routers. Drag the module icons around to better understand the connections and relationships that make up your network.

Each Digi XBee module icon shows a role badge and two address numbers. For Zigbee networks, the role badge at the top will be C for coordinator, R for router and E for non-routing end device.

The long hexadecimal number in the white box is the 64-bit MAC or serial number for that node, which is selected at the factory and unique in the world. The second short hex number is the

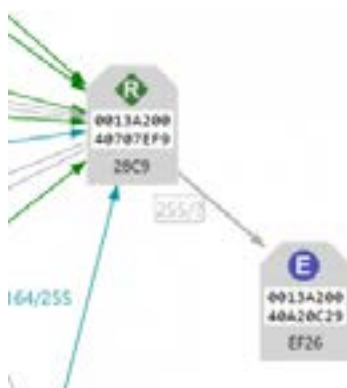
Map Your Digi XBee IoT Network with Digi XCTU (continued)

CHECKING YOUR NETWORK ADDRESSES AND CONNECTIONS (continued)

16-bit network address. This is what the radios store in their network routing tables. It's assigned at runtime and unique only for the current network. You can double-click any module's icon to directly launch configuration mode for that radio over the air.

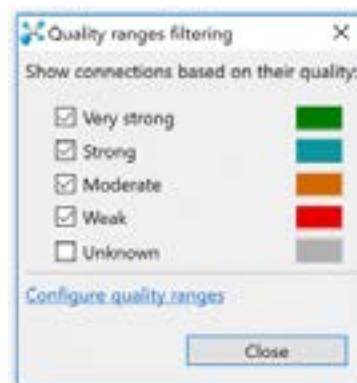


Zigbee router and coordinator nodes will have many mesh network connections to each other, usually with varied link qualities. But you'll notice that end devices are different. They only connect to a single "parent" router node that handles all communications for the device when it is sleeping.



FILTERS

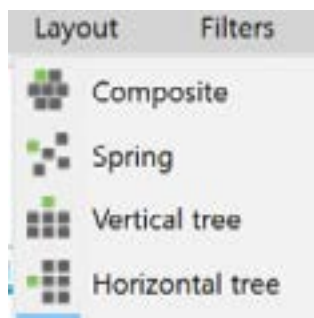
Zigbee networks can have a bewildering number of connections. This is what makes mesh networking so reliable and resilient. However, it can be confusing to look at all at once. XCTU allows you to filter the connections displayed based upon their quality. By selecting filters you can easily determine the best connections in the mesh or the worst ones, depending upon your task.



Map Your Digi XBee IoT Network with Digi XCTU (continued)

LAYOUTS

Various graphical layouts are available. Try starting with the simple Grid layout to show everything neatly organized on the screen. Then begin experimenting with the other layouts to see which visual organization depicts your network topography the best.



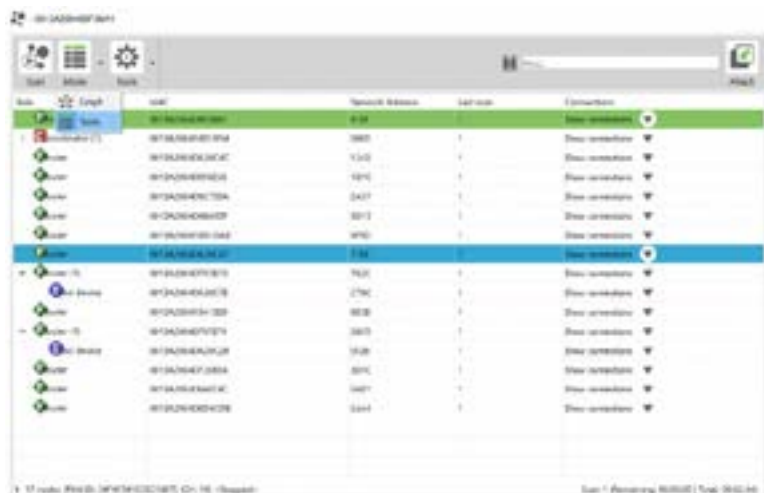
SEARCH

The find and zoom features provide additional assistance in managing and navigating the map.



TABLES

The graph view of the network provides excellent information on the layout and relationships between the network nodes. However, it can become overwhelming as networks get larger, or when the task at hand is better suited to a sorted list. Table view on the Mode menu will display the network in a spreadsheet view—much better for networks with hundreds of nodes to sort through.



Node	MAC	Speed	Status	Comments
Root	0013020000000000	0.00	✓	Root node
Node 1	0013020000000001	1.00	✓	Node 1
Node 2	0013020000000002	1.00	✓	Node 2
Node 3	0013020000000003	1.00	✓	Node 3
Node 4	0013020000000004	1.00	✓	Node 4
Node 5	0013020000000005	1.00	✓	Node 5
Node 6	0013020000000006	1.00	✓	Node 6
Node 7	0013020000000007	1.00	✓	Node 7
Node 8	0013020000000008	1.00	✓	Node 8
Node 9	0013020000000009	1.00	✓	Node 9
Node 10	001302000000000A	1.00	✓	Node 10
Node 11	001302000000000B	1.00	✓	Node 11
Node 12	001302000000000C	1.00	✓	Node 12
Node 13	001302000000000D	1.00	✓	Node 13
Node 14	001302000000000E	1.00	✓	Node 14
Node 15	001302000000000F	1.00	✓	Node 15
Node 16	0013020000000010	1.00	✓	Node 16
Node 17	0013020000000011	1.00	✓	Node 17
Node 18	0013020000000012	1.00	✓	Node 18
Node 19	0013020000000013	1.00	✓	Node 19
Node 20	0013020000000014	1.00	✓	Node 20
Node 21	0013020000000015	1.00	✓	Node 21
Node 22	0013020000000016	1.00	✓	Node 22
Node 23	0013020000000017	1.00	✓	Node 23
Node 24	0013020000000018	1.00	✓	Node 24
Node 25	0013020000000019	1.00	✓	Node 25
Node 26	001302000000001A	1.00	✓	Node 26
Node 27	001302000000001B	1.00	✓	Node 27
Node 28	001302000000001C	1.00	✓	Node 28
Node 29	001302000000001D	1.00	✓	Node 29
Node 30	001302000000001E	1.00	✓	Node 30
Node 31	001302000000001F	1.00	✓	Node 31
Node 32	0013020000000020	1.00	✓	Node 32
Node 33	0013020000000021	1.00	✓	Node 33
Node 34	0013020000000022	1.00	✓	Node 34
Node 35	0013020000000023	1.00	✓	Node 35
Node 36	0013020000000024	1.00	✓	Node 36
Node 37	0013020000000025	1.00	✓	Node 37
Node 38	0013020000000026	1.00	✓	Node 38
Node 39	0013020000000027	1.00	✓	Node 39
Node 40	0013020000000028	1.00	✓	Node 40
Node 41	0013020000000029	1.00	✓	Node 41
Node 42	001302000000002A	1.00	✓	Node 42
Node 43	001302000000002B	1.00	✓	Node 43
Node 44	001302000000002C	1.00	✓	Node 44
Node 45	001302000000002D	1.00	✓	Node 45
Node 46	001302000000002E	1.00	✓	Node 46
Node 47	001302000000002F	1.00	✓	Node 47
Node 48	0013020000000030	1.00	✓	Node 48
Node 49	0013020000000031	1.00	✓	Node 49
Node 50	0013020000000032	1.00	✓	Node 50
Node 51	0013020000000033	1.00	✓	Node 51
Node 52	0013020000000034	1.00	✓	Node 52
Node 53	0013020000000035	1.00	✓	Node 53
Node 54	0013020000000036	1.00	✓	Node 54
Node 55	0013020000000037	1.00	✓	Node 55
Node 56	0013020000000038	1.00	✓	Node 56
Node 57	0013020000000039	1.00	✓	Node 57
Node 58	001302000000003A	1.00	✓	Node 58
Node 59	001302000000003B	1.00	✓	Node 59
Node 60	001302000000003C	1.00	✓	Node 60
Node 61	001302000000003D	1.00	✓	Node 61
Node 62	001302000000003E	1.00	✓	Node 62
Node 63	001302000000003F	1.00	✓	Node 63
Node 64	0013020000000040	1.00	✓	Node 64
Node 65	0013020000000041	1.00	✓	Node 65
Node 66	0013020000000042	1.00	✓	Node 66
Node 67	0013020000000043	1.00	✓	Node 67
Node 68	0013020000000044	1.00	✓	Node 68
Node 69	0013020000000045	1.00	✓	Node 69
Node 70	0013020000000046	1.00	✓	Node 70
Node 71	0013020000000047	1.00	✓	Node 71
Node 72	0013020000000048	1.00	✓	Node 72
Node 73	0013020000000049	1.00	✓	Node 73
Node 74	001302000000004A	1.00	✓	Node 74
Node 75	001302000000004B	1.00	✓	Node 75
Node 76	001302000000004C	1.00	✓	Node 76
Node 77	001302000000004D	1.00	✓	Node 77
Node 78	001302000000004E	1.00	✓	Node 78
Node 79	001302000000004F	1.00	✓	Node 79
Node 80	0013020000000050	1.00	✓	Node 80
Node 81	0013020000000051	1.00	✓	Node 81
Node 82	0013020000000052	1.00	✓	Node 82
Node 83	0013020000000053	1.00	✓	Node 83
Node 84	0013020000000054	1.00	✓	Node 84
Node 85	0013020000000055	1.00	✓	Node 85
Node 86	0013020000000056	1.00	✓	Node 86
Node 87	0013020000000057	1.00	✓	Node 87
Node 88	0013020000000058	1.00	✓	Node 88
Node 89	0013020000000059	1.00	✓	Node 89
Node 90	001302000000005A	1.00	✓	Node 90
Node 91	001302000000005B	1.00	✓	Node 91
Node 92	001302000000005C	1.00	✓	Node 92
Node 93	001302000000005D	1.00	✓	Node 93
Node 94	001302000000005E	1.00	✓	Node 94
Node 95	001302000000005F	1.00	✓	Node 95
Node 96	0013020000000060	1.00	✓	Node 96
Node 97	0013020000000061	1.00	✓	Node 97
Node 98	0013020000000062	1.00	✓	Node 98
Node 99	0013020000000063	1.00	✓	Node 99

Map Your Digi XBee IoT Network with Digi XCTU (continued)

SUPPORTING FEATURES - Settings

There are several ways to scan Digi XBee networks, and these depend on the protocol being used. Small Zigbee networks can be quickly discovered in “flood” mode. Larger ones and DigiMesh networks are better explored with “cascade” mode to avoid saturating the network with requests. Cascade mode is slower. Other timings can also be adjusted, though the defaults should work well in most cases.

Network

Always clear the Network view before starting

Remove nodes if they were not discovered in the last performed scan

Read remote nodes basic information after the network scan

? Stop after scan:

? Time between scans: seconds.

802.15.4 network

? Neighbor discovery timeout: seconds.

DigiMesh/SX network

? Discovery mode:

? Neighbor discovery timeout: seconds.

? Time between requests: seconds.

ZigBee network

? Discovery mode:

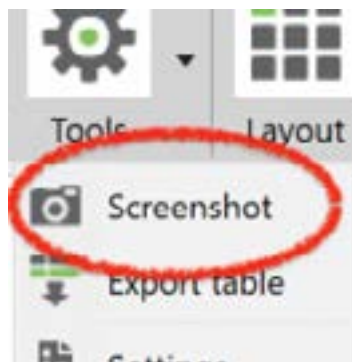
? Neighbor discovery timeout: seconds.

? Time between requests: seconds.

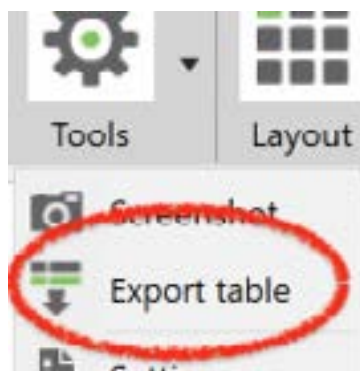
Map Your Digi XBee IoT Network with Digi XCTU (continued)

SUPPORTING FEATURES - Exports

XCTU's maps can be saved and exported in a couple different ways. You can capture a screenshot by selecting the Screenshot function on the Tools menu. You can save network map images as PNG files, or as JPEG or BMP files if desired. This is a great way to capture information for explanatory presentations, or to clearly communicate with customers about networking situations that might otherwise be difficult to understand.



Data can also be exported in tabular format, as a CSV file. This is perfect for creating spreadsheets or for capturing detailed debugging and network tuning data into a log repository or database.



Great visualizations are key to understanding and communicating how a wireless network is structured. Maps turn abstract descriptions of invisible communications into a concrete picture of relationships that would otherwise go unseen. Digi XCTU's graphical layout tools are terrific for finding trouble-spots, enhancing reliability, removing redundancy, monitoring live changes, and fully documenting your findings. With XCTU's impressive array of mapping tools at your command, you'll become a master of radio network exploration.



Need help with an IoT project? Digi has [wireless design](#) and [professional services](#) to help. Contact us.

OUR CERTIFICATE

DiGi provide top-quality products and perfect service for customer worldwide through standardization, technological innovation and continuous improvement. DiGi through third-party certification, we stricly control the quality of products and services. Welcome your RFQ to

Email: Info@DiGi-Electronics.com



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.