

INNCOM B574 Datasheet

Overview

The INNCOM B574 Network Controller is an INNCOM Integrated Room Automation System (IRAS) product that provides the PAN Coordinator functionality in INNCOM's Layer-2 802.15.4 Zigbee Mesh network. The B574 serves as the gateway between the wireless routers sending guestroom network data back to the wired network server, where it can be managed by INNCOM's building management system (INNControl).

Features

- Supports PoE (Power over Ethernet) *[Note: This feature is not currently implemented]*
- 128 bit AES encryption
- Indoor range up to 100ft
- 2.4Ghz IEEE 802.15.4 compliant RF transceiver (CC2430 radio core)
- Compact physical dimension
- DIN Rail mounting option
- In general, 50 B574s can be supported in one network segment*



Figure 1: B574

Specification

Parameter	B574
RF Data Rate	250kbps
Indoor/Urban range	100ft
Transmit Power	approximately 10mW
Receive Sensitivity	-94.6dBm
Frequency Band	2.4Ghz
Encryption	AES-128
Protocol	802.15.4
Frequency Channels	11-26
Network Topology	Mesh
Maximum per network segment	Up to 50*
Supply Voltage	12VDC
Current Consumption	200mA
Operating Ambient Temperature	0-40 ° C
Dimensions	86mm x 78mm x 40mm
Agency Approvals	FCC Part 15, CE Mark ETSI, RoHS

*Actual network support may be higher or lower, depending on traffic patterns, selected antenna types, and environmental considerations.

B574 Networking Topology

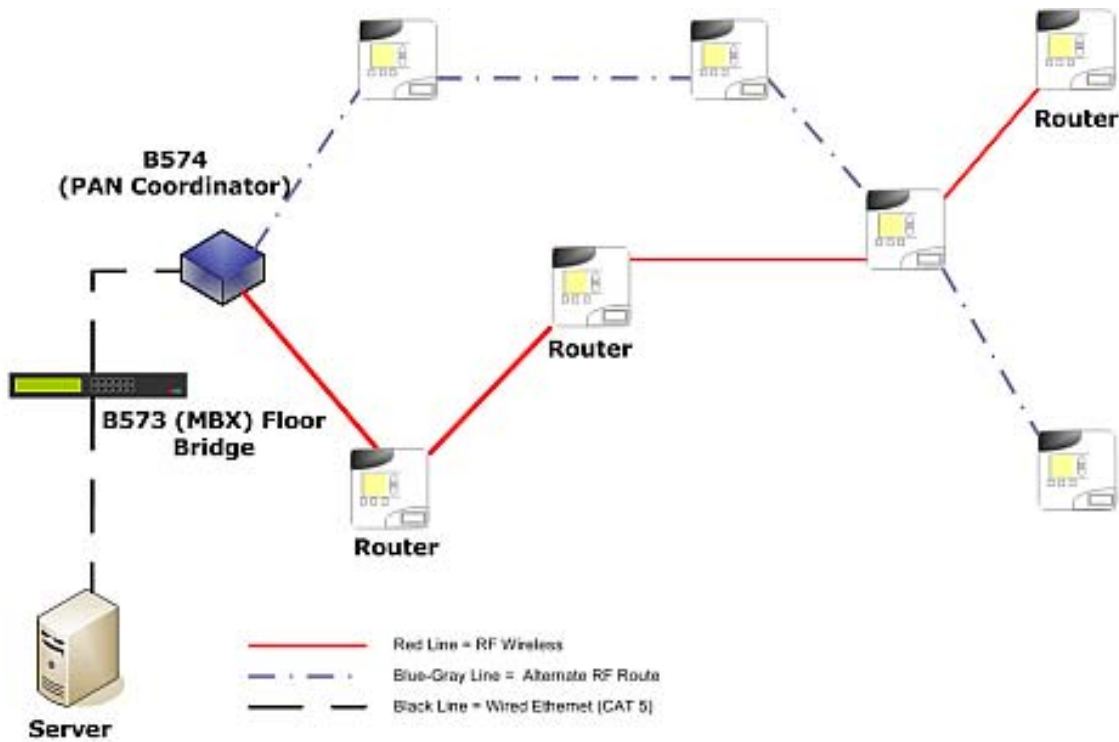


Figure 2: B574 Layer-2 Network Topology

The B574 uses ZigBee 802.15.4 technology to create RF Mesh networks. This software-based feature set allows the many network members to link-up in a dynamic way, forming a redundant mesh of routers. A typical router in an INNCOM IRAS is a Layer-2 thermostat or a Layer-2 PC-502. The mesh network is managed by the B574 functioning as the PAN Coordinator. Each B574 can accommodate up to 50 ZigBee routers; each B573 MBX bridge can handle 50 B574 Coordinators. MBX bridges can be added as necessary to accommodate the number of B574s and their routers (50 routers per B574 × 50 B574s per B573 = 2500 routers per B573). (See also the B574 Engineering Manual, v1.0, and the B573 Media Connector Users Guide, v1.0.)

The server configures the B574 Coordinator to a selected RF channel and PAN ID on start up. Once it has started a PAN, the coordinator can allow routers in the network to join the PAN. The coordinator transmits and receives RF data transmissions and assists in routing data through the mesh network.

In Figure 2 above, data travels along the red route from and to the router on the upper right corner. Should one of the links (hops) break due to a localized disturbance or the failure of a router, then the network would dynamically form another route for the packet; the communication could therefore be maintained even if the network partially fails.

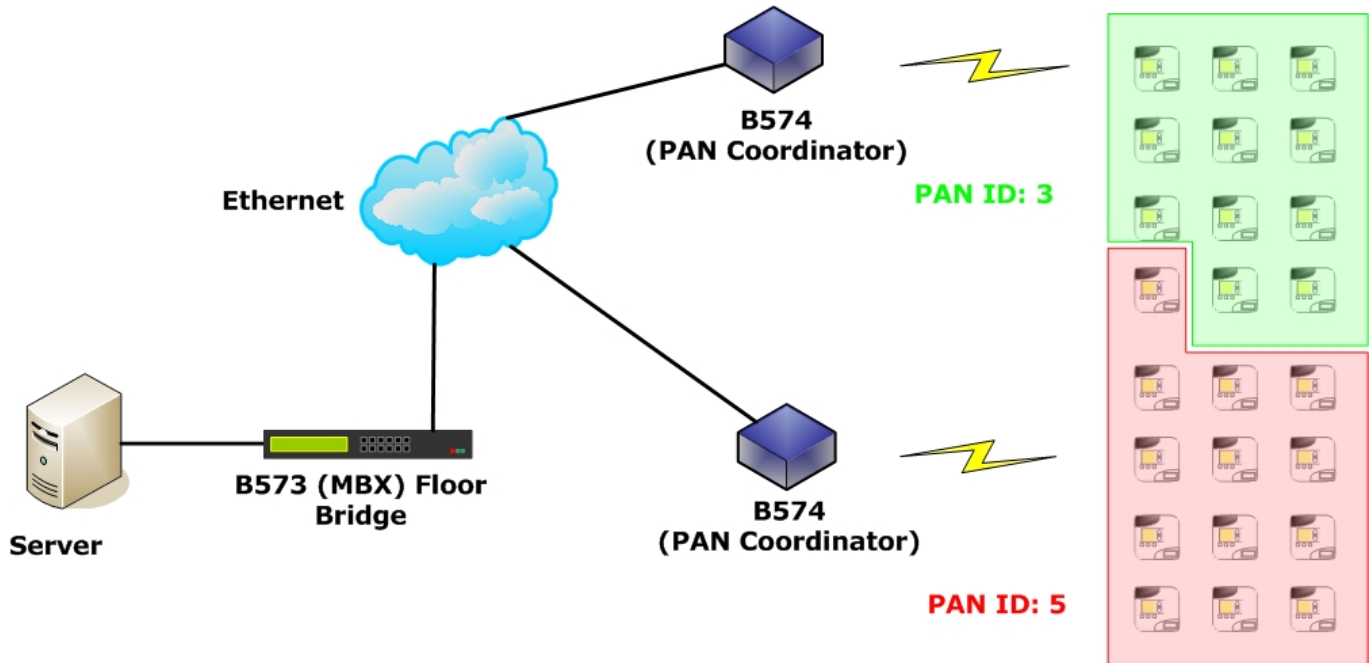


Figure 3 B574 IP Network Topology

An IP network based on Ethernet technology serves as the backbone network linking the B574 with the server. The B574 uses a wired Ethernet connection to the B573 (MBX) bridge that communicates with the server using a UDP protocol. In the drawing above, the Layer-2 networks are segregated by PAN ID. Note that the routers in each PAN do not necessarily need to be physically located in geographically segregated locations. If a router can make a solid RF connection into a network, then the router could be geographically located in a neighboring PAN location.

Mechanical Drawings

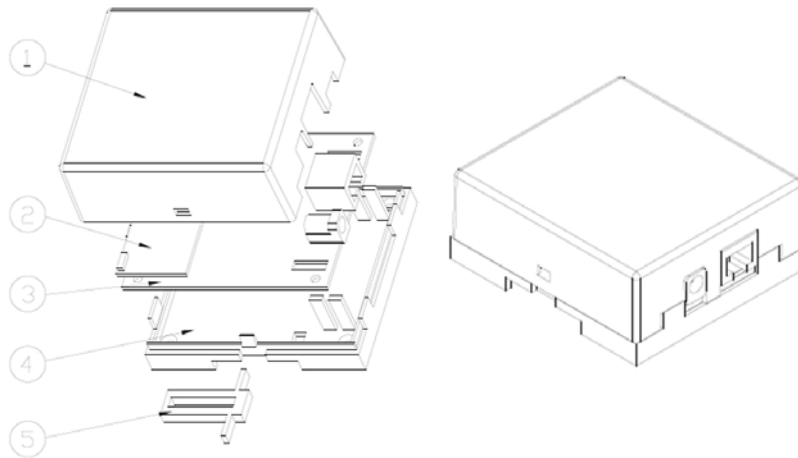


Figure 4: Mechanical Drawings

Item	Description	Part Number
1	Top Housing	53-8084
2	Radio Module	02-9994
3	Main PCBA	02-9845
4	Bottom Housing	53-9918
5	Din Rail Tab	53-9919

Mounting Considerations

The B574 Network Controllers are designed for mounting in a variety of applications. The bottom housing is equipped with a channel and tab for DIN rail mounting and therefore does not require any additional screws or hardware for installation. For screw-mounted applications, there are 4 countersunk holes located in the bottom housing that can be accessed by removing the top cover and Printed Circuit Board Assembly (PCBA).

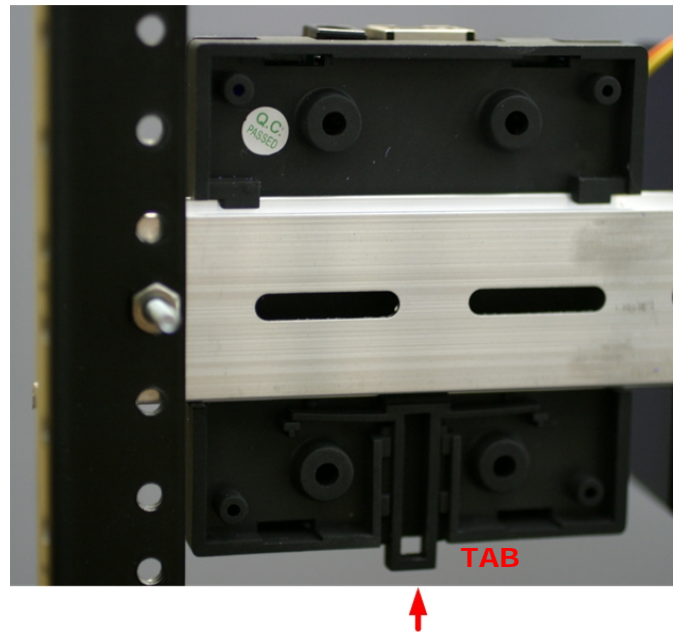


Figure 5: B574 DIN Rail Installation



Figure 6: B574 Series DIN Rail Mounted

The B574 can be attached to an X-type DIN rail. To attach the B574 to a DIN rail, pull the tab (Figure 5) down and attach the bottom of the housing to the DIN rail (always mount the DIN rail with the tab at the bottom). Once the unit is sitting flush on the rail, release the tab. To remove the B574 from the DIN rail, pull the tab down and lift the bottom edge of the unit off the DIN rail first. This ensures that

the cable, cable channels and connections are always aligned in the correct orientation in a daisy-chained application.



Figure 7 B574 Top Housing Removal

To gain access to headers and connectors located on the PCBA, remove the B574 from the DIN rail or NEMA box enclosure. Using a flat screw driver, lift the top housing away from the snap tangs on the bottom housing.

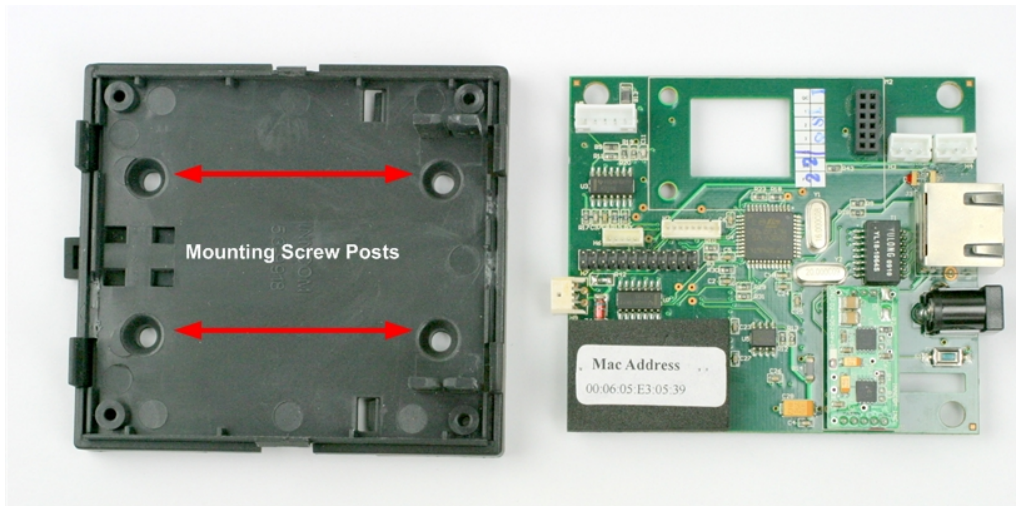


Figure 8 B574 Mounting Screw Locations

To screw mount the B574, open the B574 as described above and remove the PCBA. The PCBA is held in place by 4 tangs located at the perimeter of the PCBA. Once the PCBA is removed, locate the 4 countersink posts. Using a self-tapping screw, mount the bottom housing to the intended fixture. Mount the PCBA back on to the bottom housing, make the necessary wire connections (see Headers and Connectors below), connect power to DC jack, plug in Ethernet connection, and then snap the top housing back onto the unit.

Headers and Connections

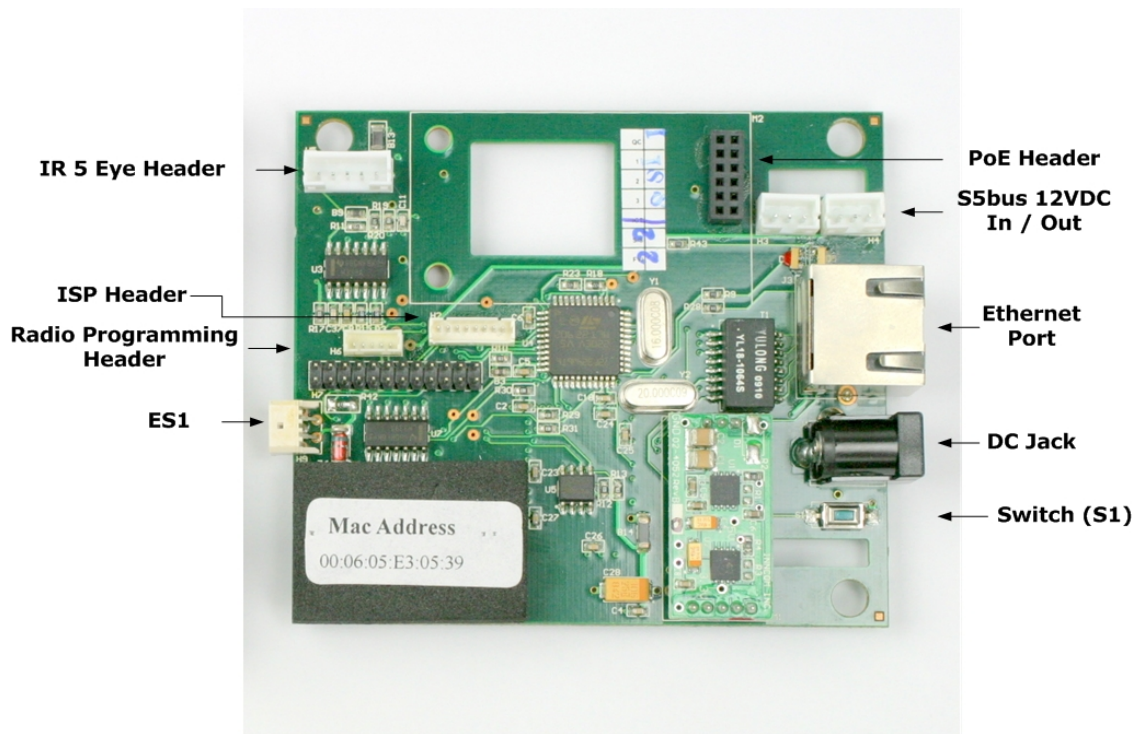


Figure 9 B574 Connections
H2 (In System Programming)

Pin	Function	Type	Min	Max
1-8	Various signals for programming	-	-	-

H3 / H4 (S5-bus In/Out)

Pin	Function	Type	Min	Max
1-GND	Common	-	-	-
2-12VDC	Input voltage	In	11.75	12.25
3-S5-bus	Multi-drop	In/Out	-	-

H5 (IR-Eye)

Pin	Function	Type	Min	Max
1-GND	Common	-	-	-
2-AGC	Gain control	-	-	-
3-12VDC	Input voltage	In/Out	11.75	12.25
4 -IRTx	Transmit	Out	-	-
5- IRRx	Receive	In	-	-

H6 (Radio Programming)

Pin	Function	Type	Min	Max
1-5	Various signals for programming	-	-	-

H9 (ES1)

Pin	Function	Type	Min	Max
1-3	Reserved for future use	-	-	-

J1 (DC Jack)

Pin	Function	Type	Min	Max
1-3	12VDC Input	11.75	12.25	11.75

J3 (Ethernet)

Pin	Function	Type	Min	Max
1-8	Ethernet Connectivity	-	-	-

M2 (PoE)

Pin	Function	Type	Min	Max
1-12	Signal and power for Power over Ethernet Module	-	-	-

Output Function

The following table describes the function of the indicator LEDs on the B574 PCBA.

LED	Function
RED	<ul style="list-style-type: none"> Flash on power-up to indicate proper hardware initialization. Steady on to indicate no connectivity to B573 floor bridge (see Figure 7). Flashes fast to indicate a valid CIS connection. Flashes slow to indicate 75 seconds have passed with no packets from the CIS network.
Blue	<ul style="list-style-type: none"> Toggles when RF Rx tunnel packet is received

Ordering Information

The B574 and PC-803 are available in several operating ranges but are based on the same fundamental hardware platform (see Ordering Notes below). The ordering part numbers (OPN) are formed by a combination of the elements, as shown in Figure 7 below.

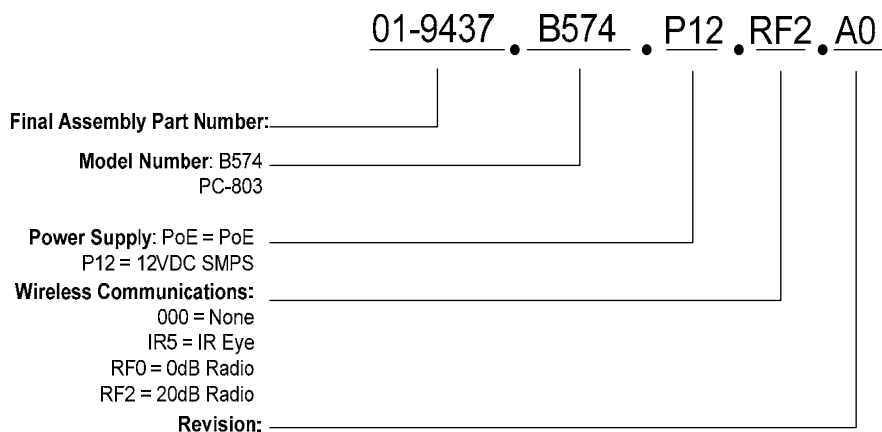


Figure 10: Ordering Part Number

Ordering Notes

B574

B574 is the Layer-2 mesh network controller. This configuration is used in Layer-2 applications only. This configuration will never require the IR5 option but is typically ordered with a 20dB TXR radio as the wireless communications option. This product can be powered from the PoE or 12VDC SMPS. Ensure that the B574 shelf software is specified when ordering in this configuration.

PC-803 [Note: Currently, there is no software application available for this configuration]

The PC-803 (protocol converter) is the room gateway configuration of the product. In this configuration, the product converts in-room IR, RF (Layer-1), or S5bus traffic to Ethernet towards the server. The PC-803 mirrors the TCT in functionality with the addition of Layer-1 capability. Order this product with a 0dB TXR radio unless otherwise specified. The radio and IR5 module are mutually exclusive; they cannot be used simultaneously in the same unit (but the PC-803 can accommodate an external IR5 Eye). Ensure that the PC-803 shelf software is specified when ordering in this configuration.

Examples:

01-9437.B574.P12.RF2.AO: A B574 supplied with an external power supply (04-4040), populated with a 20dB Radio (02-9894), and no IR5 eye. This is a typical configuration for the B574.

01-9437.PC-803.POE.RF0.AO: A PC-803 supplied with the PoE module for power (02-9949), 0db Radio (02-9994).

Sub-assemblies:

Part Name	Description	Part Number
B574/PC-803 logic board	Logic board	02-9845
PoE	Power over Ethernet Module	02-9949
12VDC SMPS	External 12VDC Power Supply	04-4040
0 dB Radio	0db RF TXR radio module	02-9994
20 dB Radio	20dB RF TXR radio module	02-9894
IR5 Eye	IR5 Eye	02-9467
PSH1-L12	Power supply module (logic board)	02-4052

References

Title	Location
B574 Engineering Manual	T:\Library\INNCOM Products\Devices\B574-(TCT.RF)\B574 Engineering Manual, v1.0 EM.pdf
B573 Users Guide	T:\Library\INNCOM Products\System\IWAN_Reference\Docu\B573_MC Users Guide.pdf

Document Revision History

Revision	Date Issued	Reason
0.1	12-Jun-2009	FCC for B574
0.2	24-Jun-2009	Edited for sense and format
0.3	29-Jun-2009	Incorporated review comments
0.4	08-Jul-2009	Clarified network bridge language and capacity
0.5	22-Jul-2009	Incorporated final R&D review comments
1.0	03-Aug-2009	Incorporated Approvers' comments and released.

FCC NOTE:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.