



ICM Setup Guide



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Introduction

Congratulations on your purchase of an In2 Networks control system. The Internet Control Module (ICM) is the heart of a state of the art control system that uses Internet Protocol (IP) and standard Ethernet hardware to integrate home system control with computer networking.

This User's Guide explains the setup and installation process for an ICM. This guide assumes that the installer is familiar with IP networking concepts. See the In2 Networks Networking Primer for a review of IP networking concepts and terminology.

There are four basic steps that you will need to take to set up your system:

- Set up the network.
- Set up the network controller hardware.
- Connect the nodes to the devices and the system.
- Set up the nodes on the system.

Network Setup and Configuration

Setting up the Network Hardware

Before you begin connecting nodes to the network, you need at least the following:

- PC or other web browser enabled device capable of browsing the setup pages.
- Router, or wireless router (when using a wireless PDA or tablet)
- Network Controller hardware.
- Ethernet hub or switch.
- Installing a Router or Wireless Access Point

A router is the easiest and least expensive way to setup a home network. If the home has a wired or wireless network, it probably already has a router. If the home has a broadband Internet connection, it may already have a router.



Note: If a router is already installed in the home and you are connecting the ICM to the home network, skip this step and continue on to connecting a computer.

Note: Before installing a new router, make sure there is no other router in the network, since more than one router can interfere with network access from some devices in the network.

The router must be installed according to the installation instructions supplied by the router manufacturer. Follow the instructions included with the router to install and configure the router.

Installing an Ethernet Hub or Switch

Connect an Ethernet hub or switch when there are more network devices than ports on the router. Connect the uplink port on the hub or switch to one of the Ethernet ports on the router. The following general restrictions exist for all Ethernet hubs and switches:

- Each Ethernet device must be home-run from the device to the hub.
- Ethernet cables must be at least Category 5 cable (CAT5). CAT5e is preferred since a single CAT5e can support gigabit Ethernet.
- Ethernet does not support daisy chaining, however it is possible to add another hub or switch in a remote location. No more than 4 hubs can be between any two Ethernet devices.

Connecting a Computer

Verify the network installation by connecting a computer to the network. Plug the computer to one of the Ethernet ports on the router, or a hub or switch that is connected to the router. Verify that the computer can retrieve an IP address and access the router.

Refer to the networking instructions provided by the computer manufacturer to connect the computer to the network. Each operating system will have a different sequence of steps to configure the network. The following general tasks must be performed regardless of the computer or operating system vendor:

1. Connect the Ethernet cable to the Ethernet jack on the computer. If the computer does not have an Ethernet jack, you will need to install a Network Interface Card (NIC). The link LED will light when the computer is linked to a hub with a good Ethernet cable.
2. The default networking settings for most operating systems is to obtain an IP address from a DHCP server. If the computer uses other IP settings, change the configuration to use DHCP.
3. Most modern computers will obtain a lease automatically when you connect the Ethernet cable. If you are using an older computer, reboot the computer to cause it to request a new IP address. You can also run the operating system utility to obtain a lease. Older

Microsoft Windows based operating systems use the command "ipconfig /?" to get a list of options for the ipconfig command.

4. Ping the router or DHCP server, or connect using a web browser to verify that you have established a working network connection. Microsoft Windows operating systems can ping a device from the MS-DOS prompt (or command prompt) with the ping command. Type "ping /?" to get proper usage information on the ping command.

Setting up the Network Controller Software

Connecting a Network Controller

To connect an ICM:

1. Place the ICM in a suitable clean, dry, ventilated indoor location, near the equipment to be controlled.
 - a. The RS-232 standard for serial communication limits serial cables to 50 feet in length; Keep the ICM within 50 feet of the device it will control.
 - b. The ICM is not designed to be installed in an attic, crawl space, or an outdoor location.
2. Connect the controlled device to the ICM using the RS-232 cable recommended by the manufacturer. The ICM uses exactly the same cable you would use to connect the device to a PC (DB-9 connector).
3. Connect the Ethernet port on the ICM to the network hub or switch using a standard CAT5 cable.
4. Plug the included 12 Volt 300mA power supply into a suitable power outlet.

Connecting to the ICM Setup Pages

Once the network hardware is in place, you can initiate communication with ICM hardware. Make sure the computer has received an address and is able to communicate with the devices on the network. This can be verified by pinging the router, or the DHCP server.

To ping the router from a Windows PC, open a command prompt and enter the command: ping followed by the IP address of the router. Enter the command "ping /?" to see a list of options for the ping command.

You can obtain the router IP address on a Windows PC by entering the command: ipconfig at the command prompt. Enter "ipconfig /?" to see usage information for the ipconfig command.

Open the web browser on the computer, and in the Address bar enter: myhome. This will bring up the ICM setup start page. Configure the nodes according to the instructions in the next section.

Configuring the Nodes

Node configuration is divided into 4 procedures:

1. Select Devices
2. Configure Devices
3. Enter Contact Information
4. Create Groups (Optional)

These procedures are accessed through the ICM setup pages. The Navigation bar on the left of the page allows direct access to any step in the process. Keep in mind that changing the device setup will affect other settings and may require you to make changes to programming or groups.

The wizard steps through all 4 procedures in order. Start the wizard by pressing the Start Wizard button on the setup start page.



Caution: Select Devices before you perform any other setup task. When you select a new device, it will be necessary to reconfigure some devices and setup groups again.

Select Devices

The Device Setup page allows you to configure what specific equipment is controlled by each node in the network. Select the device controlled by each ICM before configuring anything else in the system. The device selection process is performed using the following steps:

1. Click on Devices to bring up the Device Setup page. This page contains a list of all the devices in the system. The checkbox on the left side of the page will contain a green checkmark for each device that has already been set up. Click on the name of the first device in the list that has not been configured.
2. For each port in the list, perform the following three steps:
 - a. In the column headed "Device File" select the device file from the drop-down list that matches the make and model of the device attached to that port. Built-in devices will auto-detect

the connected device if it is powered on and connected. If the device has already been detected, the information in the list will already reflect the correct device.

- b. In the column headed "Device Name", enter the name you will use to identify the device. If you leave the name blank, the default name defined in the device file will be used. It is best to use a descriptive name that includes the room or group if you plan to have more than one device of the same type. The room name will simplify the group setup.
- c. Click the Next button to submit the changes and return to the device selection page. This will reset any prior configuration information for this node, and may require the device to be configured again.

When all the devices in the list have been assigned, click the Next button to proceed to device configuration.

Configure Devices

The Configuration page allows you to access custom configuration options specific to the device or system controlled by the node. Follow the configuration help screens for each device to change the configuration. Once configuration is complete, the changes must be saved to prevent data loss.

Click the Next button to complete the configuration process and move on to the next setup task.

Enter Contact Information

The Contact Information page allows you to leave information with the client about who to contact for support, upgrades or new products. The contact information fields are free-form, so just enter the information you would like the client to see. The contact information is available from the control pages from the Help button.

Click the Next button to submit the updated information to the node and continue on.

Create Groups

Groups are used in large networks to allow independent control of audio zones, or to limit the number of devices on a single touch-panel. Devices are usually grouped by room, but can be grouped according to any other criteria.

1. Type the name of the new group in the first text box.

2. Click the Add button to add the group to the list.
 3. When all the groups have been entered, click on the Group Name to select the devices in the group, and repeat for each group in the list.
- For each group you created, select the audio/video zone (if any) for the group from the list of A/V zones.
 - Click the checkmark next to each device that should be controlled as part of the group.
 - When this group is configured, click the Next button to commit the changes and proceed to the next task.
 - The new groups will become active after you save the node settings to flash.

Save Settings

Once the setup is complete, you must save the changes to make sure everything works as configured after the nodes are restarted. All the setup changes are stored in RAM, which is erased when power is removed from the node. The save process compresses the new configuration and copies it to flash memory on the node where it will be saved permanently, and reloaded when the node powers up.

Click the Save button to save your changes. This will cause all nodes on the network to save changes, and will cause the system to be unresponsive for about 20 seconds.



Caution: If you do not save the setup, the changes you made will be lost when the nodes lose power.

Advanced Network Setup

Advanced Setup

Advanced Setup contains 6 utilities, including:

Diagnostics – The diagnostic page contains detailed information about the node, including version and configuration details.

File System – The file system page is for uploading and downloading files to the node.

Network – The network page allows you to configure advanced networking options. These options include static IP addresses, IP address server, and network time functions.

Upgrade – The upgrade page allows you to access the one-button AutoUpdate process. This upgrades the node firmware over the Internet.

Backup Restore – The backup and restore utility allows you to save the new node configuration to a file that can be copied to your PC.

What's New –What's New links to the Internet to obtain the latest information about new software, new products, and online help and services.

These utilities are accessed through the Advanced setup pages. The Navigation bar on the left of the page allows direct access to any utility.



Caution: The advanced setup pages contain information and utilities that affect system operation. Use care in changing system settings from the advanced setup menu.

Diagnostics

The Diagnostics page shows the complete list of all devices that have been discovered on the network, including devices that are currently offline. The main diagnostic page lists a table of information about all the nodes on the network.

The fields on the diagnostic page include:

Node # - The node number is assigned to the node at installation, and is based on the order the nodes were installed on the network.

Node Name – The name of each node, based on the first device attached to the node.

Type – This indicates the node type and manufacturer.

IP – The IP address assigned to the node (either static or assigned by DHCP)

MAC – The Media Access Control address assigned to the node by the

manufacturer.

Home– This indicates if the node is responding to “myhome” or “in2” from a local web browser.

Status – This shows whether the device is online or offline.

Note: Clicking on the Node Name will open the diagnostic detail page for that node (as long as the node is online).

The details page includes the following information:

Time Online – This shows how long the node has been running without interruption.

Version/Date – This shows the build version of the core firmware image installed on this node, as well as the date it was built.

Style Version – This shows the version of the style files on the node, which is normally the same as the firmware image version.

Devices Version – The version of the device files.

Device Settings – Reflects the node type and manufacturer.

The buttons on the diagnostic page perform the following functions:

Restart – This button will restart the node, and will reload the last saved configuration.

Reset – Reset to Factory Defaults will erase all configuration information and restart the node. If the node is configured to use a static IP address, it will be preserved. If the node is connected to a serial controlled device, and that device is powered on, the node will attempt to auto-detect the connected device type.

Password – This controls the setup password. Add a setup password only if you want to prevent the homeowner from accessing setup.

Startup – This page allows you to change the default page behavior and parameters.

Node Info – This displays the error log in the node, along with other information that is useful for diagnostic purposes, including version information and network settings. This information can also be accessed directly by entering the node name or IP address followed by /log.

Port List – This lists all the ports on the node, and the device selected for each port.

Unit List – This lists all the units on the node, from all ports on the node. A device may have several units if it performs several functions. For example a combination TV/VCR has three units, a TV tuner, a VCR, and a monitor unit.

Each unit can have variables and commands. The Variables link shows all the variables for that unit, and the commands link lists all the commands for that unit. If the command exists, clicking on the command name will execute the command. The commands on the diagnostic page may not operate exactly the same as the buttons on the control pages, since some commands depend on variables or other information in the device.

Diagnostics – Startup Page

The startup page alters the default startup web page and parameters for the node when it is accessed from a browser by typing the node name or the IP address alone.

Default Web Page - The default web page determines the page that displays when you enter the Node Name in the web browser.

Feedback TCP Port – is the port number used for communication with the Java applet. This can be changed if you have trouble viewing feedback from a corporate network with extreme port filtering rules (try a port like FTP port 21).

Group – If you have setup groups, you can select a group here to limit control to those devices by default. You can assign different groups to different node names to make it easy to access any group from any browser.

File System

The file system page allows you to access the files on any node. The first page shows a list of the nodes on the network. Click the Node Name to access the file system.

The top section of the file system page allows you to load a file to the node from any directory on your PC. You can load any file to the node including graphic images, device files and web pages.

1. Click the Browse button to locate a file on your PC to upload, or type the full pathname in the box marked "File".
2. Click the upload button to load the file onto the node. The file will show in the file list.
3. Upload any other desired files to the node by repeating steps 1 and 2.
4. Click Save to save the files to flash memory.

The bottom section of the page shows the files that are already present on the node. Any files that you upload to the node will be available on the node web server. For example, to view the log on the node shown above, type <http://myhome/web/log> into the web browser.

Network

The Network page lets you modify the network settings of the node, and configure the node to get time from a network time server. From the initial Network page, select a node or select *Configure System Time*.

You can override the default NTP server by entering a new server name. Select the time zone and check the daylight savings time to adjust the time to your locale. NTP can be disabled by checking the box marked Disable NTP.

Network Settings

Node specific network settings are accessed from the network node list by clicking on a node name. Use the Network Settings page to set the node to use a static IP address. When using a static IP address, check for the following setup related problems:

1. Make sure the address is not used by another device on the network.
2. Ensure the address does not overlap the DHCP server address range.
3. The gateway address must match the address of the router used to connect this node to the Internet.
4. The DNS address must point to a valid Internet DNS server (or the node will not be able to update).

The proxy server is an advanced feature for installers who are very familiar with networking concepts, and is not recommended for casual

users. The proxy setting is used to allow access to the setup pages from an external IP address. To use proxy, you must expose the port to the outside network by forwarding the port in the router setup, then turn on proxy in the remote web browser, using the home's external IP address and forwarded proxy port.

Backup Restore

Backup and Restore is used to allow you to backup a working network, and restore the same configuration to the original nodes, or save them to a PC for safekeeping. The backup files can also be used to replicate a network configuration to new nodes. Click on a node from the main menu to start.

To make a backup of the node configuration, just change the name and press the backup button. This will create a file in the file system that includes a complete backup of the node configuration data. The backup process will stop at the file system page to make it easy to copy the backup file.

To restore the backup, select one of the available backup files and click restore.

To restore a configuration from another node, first load the file into the node from the file system page. Next, go to the backup restore page and restore the new file you loaded. It is wise to save settings after the restore is complete.

Upgrade

The Upgrade page will allow you to select any node on the network, and upgrade the firmware. Firmware upgrades will be available periodically to enable new features, add functionality, or correct problems with the original firmware.

To upgrade a specific node, select the node you want to upgrade from the list. Click the Auto Update button to retrieve the latest version of firmware from the server on the Internet. This requires the node to be attached to the Internet. The update process can take several minutes depending on the network connection speed. The firmware image is typically larger than 1 megabyte.

You can use the Latest Version Info link to view information about the latest firmware version on the Internet.

Troubleshooting

Troubleshooting an Ethernet home control network can be easy if you can divide and conquer. See the following table to cut the problem in half.

Problem	Resolution
Cannot access ICM web page	This is a network problem – see the Network Problems section to resolve
Can access ICM pages	This is a device problem – see the Device Problems section to resolve

Network Problems

If you cannot access the web page on the ICM, there may be a network problem. If you are having difficulty pinpointing the problem, just check the problems one by one in order from top to bottom in the table below. Use the following chart to break the problem down:

Problem	Resolution
No Link Light on PC	The link light is typically right next to the Ethernet (RJ-45) jack on the PC, tablet and the ICM. The link light should turn on when the PC is powered on and properly connected to an Ethernet hub, switch or router. If the link light is off, check the Ethernet cable.
No Link Light on Hub	The link light on the hub (or router/switch) turns on when a PC or ICM is connected and powered on. If the link light is off, check the Ethernet cable and power on the hub.
PC cannot get an IP address	Most PCs get an IP address from the router using DHCP. On Windows PCs, open a command prompt and type "ipconfig" to view the IP address, or "ipconfig/renew" to get a new IP address.
PC cannot contact DHCP server	The network router contains the DHCP server. Make sure the router or wireless router is installed properly. Check the router documentation to turn on the DHCP server in the router setup software.
Invalid IP address	An invalid IP address message normally only happens if a device is set up to use a static IP. Make sure no devices have static IP address, and then reboot the offending device.
Tablet does not respond to touch	Tablet computer may need to be

	reset. Press and hold in the large 5-way button for 8 seconds to power off the tablet. Wait 5 seconds, then press the button in and release to start the rightmost function button and the left arrow on the navigation circle at the same time.
Computer cannot access ICM at http://myhome	Try to access the ICM from a tablet or another computer. The PC may have firewall software installed. Download the findnode utility from http://in2nets.com/findnode.exe . Open a command prompt (on Windows PC) and run findnode to list the IP addresses of the nodes on the network. Access the node using any one of the IP addresses reported by findnode. (i.e. http://192.168.0.5)

Device Problems

If you can access the web pages on the ICM but you are still having trouble, it may be a device problem. If you are having difficulty pinpointing the problem, just check the problems one by one in order from top to bottom in the table below. Use the following chart to break the problem down:

Problem	Resolution
Control page errors	If the control page does not load correctly, refresh the page (F5 on Microsoft Windows). In some cases, after an upgrade you may need to clear the browser cache to reset the web pages to normal (Windows – Tools, Internet options).
Change button text	If the button text on the control pages is incorrect, go to http://myhome/setup , then configuration to change the configuration buttons.
No feedback on control page	The basic web pages use a Java applet to display real-time feedback at the top of the control page. If this box is empty and does not change, the Java plug-in may not be installed on the PC. Go to http://www.java.com and download the Java virtual machine (this is a free plug-in).
Interaction with the device	If the device works from the control page, but does not interact with the attached hardware as desired, go to http://myhome/setup , then configuration to change the configuration of the device.

No device control	If the buttons on the control page do not affect the device, check the cable between the ICM and the device. If the correct cable is attached, check the setup/configuration page to make sure the correct address and communication information is entered.
No device feedback	If you can control the device but get no feedback, check the diagnostics page. Click on the port variable information at the bottom of the diagnostics page, and then look at the variable called "display" to see if it's updating properly. NOTE: You must refresh the variables by clicking on variable again. If the display variable updates, see the problem "No feedback on control page." If not, replace the cable.
No email	If the device does not send email alerts as desired, check the errors in the log to see if the node reported a problem. Go to http://myhome/setup , then Advanced, Diagnostics and click the View Log button.