LDG-ILINQ

Daikin *iLINQ*

LonWorks® Design Guide

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⚠ WARNING

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Outline
About this document

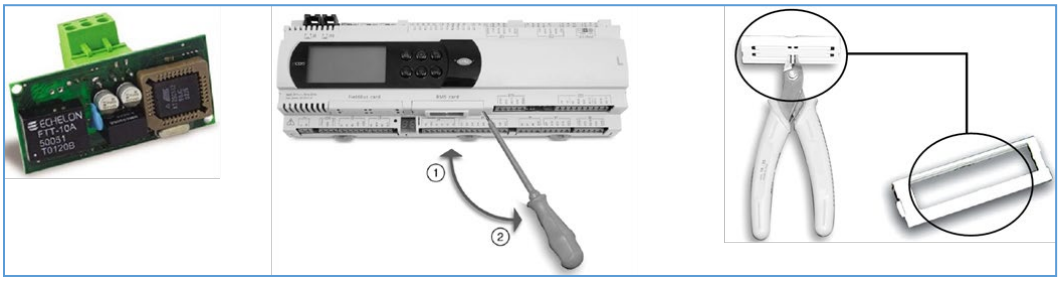
This guide describes the LonWorks® communication functionality supported by the Daikin *iLINQ* controller and provides a description of the communication card installation procedures. It is not intended to provide a complete overview of the standard *LonWorks* protocol, network, and wiring guidelines which must be followed to ensure the successful implementation of a *LonWorks* network. Network limitations are dependent on network topology, wire terminations, and other factors.

LonWorks® Integration Guide
Communication Card Installation

The *LonWorks* Communication Card (Part Number 0130M00584) is purchased separately and must be installed in the BMS Card slot following the installation instructions provided with the *LonWorks* Communication Card. There are no configuration settings that need to be modified in the controller to enable communication. After installation, the *LonWorks* Communication Card is ready for use.

Remove power to the Daikin *iLINQ* DDC Controller prior to installation of the *LonWorks* Communication Card.

1. Using a screwdriver, remove the BMS Card hatch from the Daikin *iLINQ* DDC Controller.
2. Using cutting nippers, remove the pre-cut plastic part of the hatch, making the hole for the 3-position connector.

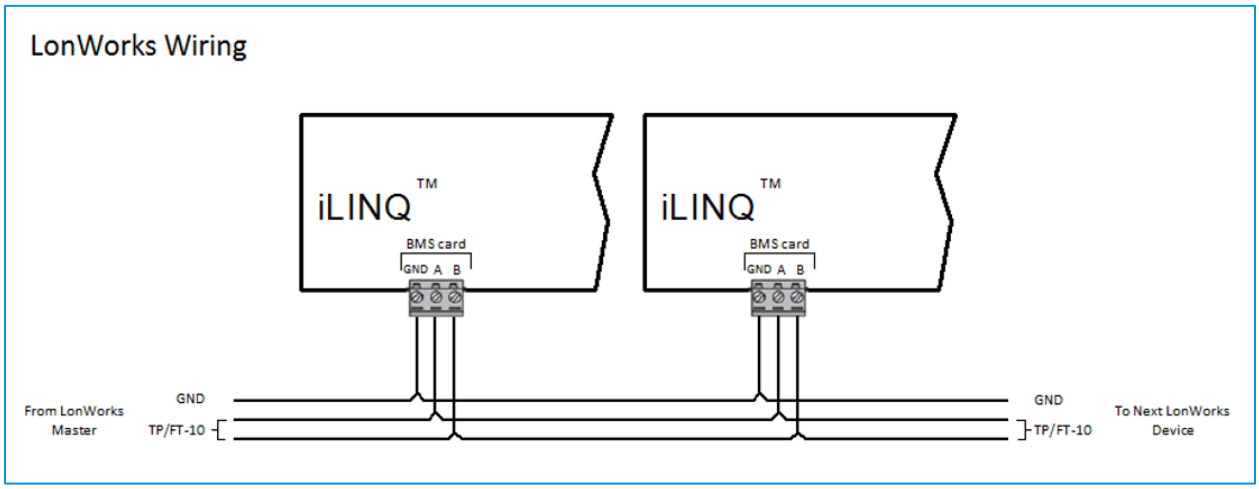


3. Insert the board into the corresponding plug-in connector, making sure that the board is properly fitted and rests against the two plastic supports on the Daikin *iLINQ* DDC Controller. The insertion of the card may be difficult due to the space available and the presence of the two plastic supports. The board should be inserted obliquely, and then rotated until the connectors are fitted.

4. Close the hatch, lining up the connector on the serial board with the hatch opening.
5. Connect the communication cable, winding it around the ferrite core included.

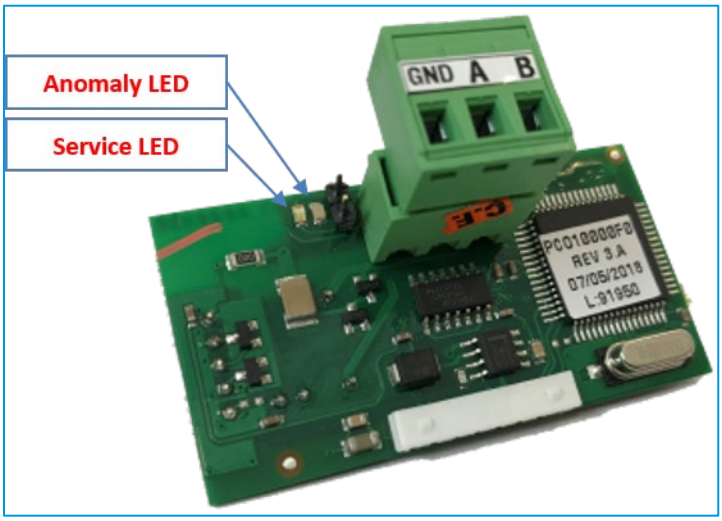
Connecting To The LonWorks® Network

The connection to the *LonWorks* network is performed using the removable terminal connector present on the board. The shield drain wire in the communication cable should be terminated on the GND terminal, the positive wire to the A terminal and the negative wire to the B terminal.

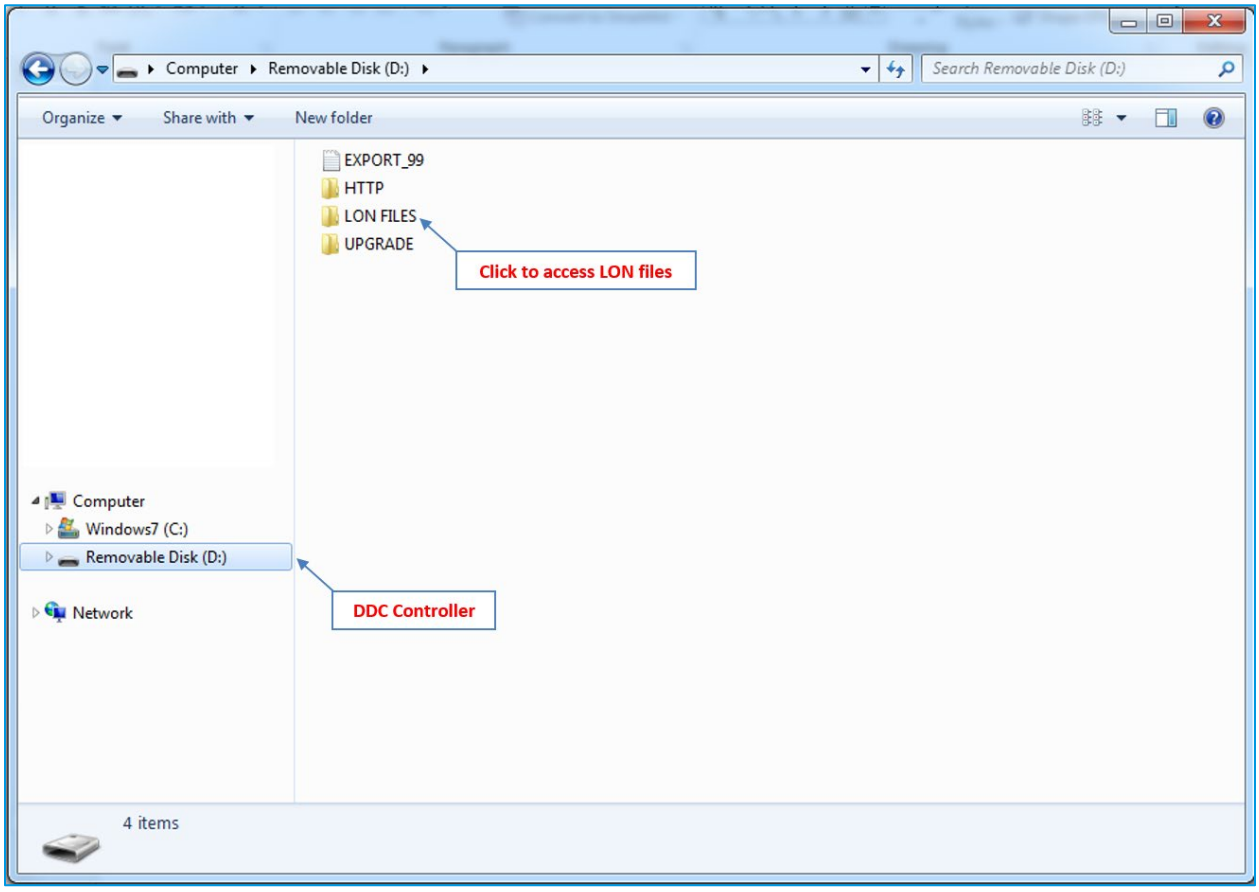


Service LED (Green): The service LED provides the status of the node, as per the *LonWorks* protocol. The LED remains on during the activation of the service pin and remains on for one second when receiving a WINK command from the network.

Anomaly LED (Red): The Anomaly LED signals the impossibility of connection on the Daikin *iLINQ* DDC Controller side. If the red anomaly LED is lighted, the application is not properly configured to accept the installation of the *LonWorks* Communication Card. The communication card may not be properly installed, or the application in the controller does not support *LonWorks* communication.

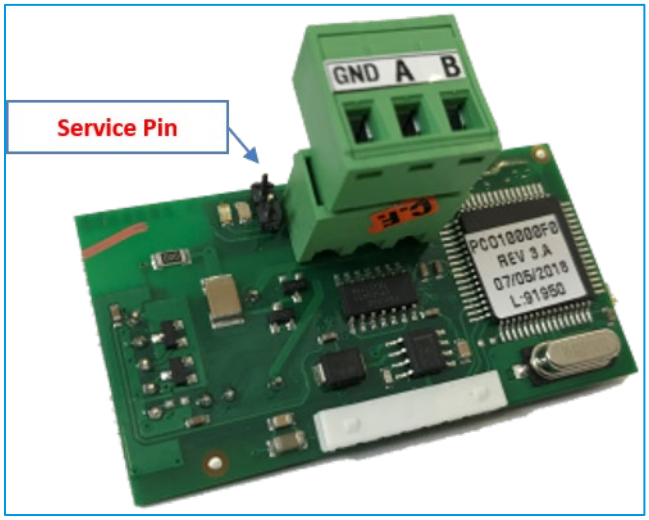


LON Files: The XIF, NXE, NEI, and APB files can be copied from the controller's internal flash memory to a PC via a USB connection for use during the device commissioning process. Connect the controller to the PC via a USB-A to USB-B cable and open windows explorer. The controller will appear as a removable disk. Open the controller and copy the LON files to the PC.



Device Commissioning: The *LonWorks* Communication Card is shipped with a standard device template from the manufacturer. A custom device template that is specific to the unit application has been created and the associated files are stored on the controller. Prior to commissioning the device, a Device Template must be created in the *LonWorks* Manager Tool using the provided XIF file. While commissioning the device, the option to use the Device Template created must be selected. If a template is automatically created by uploading from the device during commissioning, the expected variables will not be available for monitoring or control.

Service Pin: To activate the service pin for device commissioning, momentarily short-circuit the two pins located to the left of the removable terminal using the tip of a screwdriver. The activation is confirmed by the lighting of the service LED.



Once the device has been successfully commissioned using the appropriate device template, the objects listed in this guide are available.

LonWorks® Objects List

TYPE	INDEX	VARIABLE NAME	VARIABLE DESCRIPTION	VARIABLE TYPE	UNITS	MIN.	MAX	R/W
Analog	1	nvoSpaceTemp	Space Temperature	SNVT_temp_p	°F	---	---	R
Analog	2	nvoSupplyAirTemp	Supply Air Temperature	SNVT_temp_p	°F	---	---	R
Analog	3	nvoOutdoorAirTmp	Outdoor Air Temperature	SNVT_temp_p	°F	---	---	R
Analog	4	nvoActiveCoolSP	Active Space Temperature Cooling Setpoint	SNVT_temp_p	°F	---	---	R
Analog	5	nvoActiveHeatSP	Active Space Temperature Heating Setpoint	SNVT_temp_p	°F	---	---	R
Analog	6	nvoActiveSATSP	Active Supply Air Temperature setpoint	SNVT_temp_p	°F	---	---	R
Analog	7	nviOccCoolSP	Occupied Space Temperature Cooling Setpoint	SNVT_temp_p	°F	40.0	90.0	W
Analog	8	nviOccHeatSP	Occupied Space Temperature Heating Setpoint	SNVT_temp_p	°F	40.0	90.0	W
Analog	9	nviSpaceTempNet	Space Temperature Network - From BAS	SNVT_temp_p	°F	---	---	W
Analog	10	nviOutdoorTmpNet	Outdoor Air Temperature Network - From BAS	SNVT_temp_p	°F	---	---	W
Boolean	1	nvoEmergShutdown	Emergency Shutdown Input Status	SNVT_switch	---	---	---	R
Boolean	2	nvoBlowerProving	Blower Proving Switch Status	SNVT_switch	---	---	---	R
Boolean	3	nvoCompPresSw1	Compressor 1 Pressure Switch Status	SNVT_switch	---	---	---	R
Boolean	4	nvoCompPresSw2	Compressor 2 Pressure Switch Status	SNVT_switch	---	---	---	R
Boolean	5	nvoCompPresSw3	Compressor 3 Pressure Switch Status	SNVT_switch	---	---	---	R
Boolean	6	nvoCompPresSw4	Compressor 4 Pressure Switch Status	SNVT_switch	---	---	---	R
Boolean	7	nvoRemoteStrtStp	Remote Occupancy Input Status	SNVT_switch	---	---	---	R
Boolean	8	nvoLoadShed	Load Shedding Input Status	SNVT_switch	---	---	---	R
Boolean	9	nvoDirtyFilterSw	Dirty Filter Switch Status	SNVT_switch	---	---	---	R
Boolean	10	nvoCoolLockout	Cooling Lockout	SNVT_switch	---	---	---	R
Boolean	11	nvoHeatLockout	Heating Lockout	SNVT_switch	---	---	---	R
Boolean	12	nvoHPHeatLockout	Heat Pump Heating Lockout	SNVT_switch	---	---	---	R
Boolean	13	nvoEconEnable	Economizer Enable Status	SNVT_switch	---	---	---	R
Boolean	14	nvoDefrostEnable	Defrost Enabled	SNVT_switch	---	---	---	R
Boolean	15	nvoDehumLockout	Dehumidification Lockout	SNVT_switch	---	---	---	R
Boolean	16	nvoBlowerStage1	Blower Stage 1 Relay Status	SNVT_switch	---	---	---	R
Boolean	17	nvoBlowerStage2	Blower Stage 2 Relay Status	SNVT_switch	---	---	---	R
Boolean	18	nvoHeatStage1	Heat Stage 1 Relay Status	SNVT_switch	---	---	---	R
Boolean	19	nvoHeatStage2	Heat Stage 2 Relay Status	SNVT_switch	---	---	---	R

TYPE	INDEX	VARIABLE NAME	VARIABLE DESCRIPTION	VARIABLE TYPE	UNITS	MIN.	MAX	R/W
Boolean	20	nvoRevValve1	Reversing Valve 1 Relay Status	SNVT_switch	---	---	---	R
Boolean	21	nvoRevValve2	Reversing Valve 2 Relay Status	SNVT_switch	---	---	---	R
Boolean	22	nvoExhaustFanEna	Exhaust Fan Relay Status	SNVT_switch	---	---	---	R
Boolean	23	nvoCompressor1	Compressor 1 Relay Status	SNVT_switch	---	---	---	R
Boolean	24	nvoCompressor2	Compressor 2 Relay Status	SNVT_switch	---	---	---	R
Boolean	25	nvoCompressor3	Compressor 3 Relay Status	SNVT_switch	---	---	---	R
Boolean	26	nvoCompressor4	Compressor 4 Relay Status	SNVT_switch	---	---	---	R
Boolean	27	nvoCondFan1	Condenser Fan 1 Relay Status	SNVT_switch	---	---	---	R
Boolean	28	nvoCondFan2	Condenser Fan 2 Relay Status	SNVT_switch	---	---	---	R
Boolean	29	nvoAlarmDO	Alarm Digital Output	SNVT_switch	---	---	---	R
Integer	1	nvoScheduleMode	**Schedule Mode Status** 0 – Unoccupied 1 – Occupied 2 - Push Button Override 3 - Holiday Unoccupied 4 - Holiday Occupied 5 - Force Unoccupied 6 – Force Occupied 7 – TSTAT 8 - Optimized Start 9 - Optimized Stop	SNVT_count	---	0	9	R
Integer	2	nvoHVACMode	**HVAC Mode Status** 0 – Off 1 – Vent 2 – Cooling 3 - Economizer Cooling 4 – Heating 5 – Dehumidification 6 - Force	SNVT_count	---	0	6	R
Integer	3	nviScheduleSrc	**Schedule Source Setting** 1 – Onboard 2 - Remote Start Stop Only 3 - Force Occupied 4 - Force Unoccupied	SNVT_count	---	1	4	W
Integer	4	nvoSpaceHumidity	Space Humidity	SNVT_lev_percent	%RH	0.0	100.0	R
Integer	5	nvoOutdoorAirHum	Outdoor Air Humidity	SNVT_lev_percent	%RH	0.0	100.0	R
Integer	6	nvoCO2	Space CO2	SNVT_ppm	ppm	0.0	2000	R
Integer	7	nvoEconFeedback	Economizer Damper Position Feedback	SNVT_lev_percent	%	0.0	100.0	R
Integer	8	nvoEconPosition	Economizer Damper Position Command	SNVT_lev_percent	%	0.0	100.0	R
Integer	9	nvoOutdoorEnth	Outdoor Enthalpy	SNVT_enthalpy	Btu/lb	---	---	R
Integer	10	nvoSpaceEnthalpy	Space Enthalpy	SNVT_enthalpy	Btu/lb	---	---	R

TYPE	INDEX	VARIABLE NAME	VARIABLE DESCRIPTION	VARIABLE TYPE	UNITS	MIN.	MAX	R/W
Integer	11	nvoReheatVlvPos	Reheat Valve position Feedback From EVD	SNVT_lev_ percent	%	0.0	100.0	R
Integer	12	nvoBlowerSpeed	Blower Speed Command	SNVT_lev_ percent	%	0.0	100.0	R
Integer	13	nvoSCRHeat	SCR Heat Command	SNVT_lev_ percent	%	0.0	100.0	R
Integer	14	nvoActiveHumSP	Active Space Humidity Setpoint	SNVT_lev_ percent	%RH	0.0	100.0	R
Integer	15	nviSpaceHumSP	Occupied Space Humidity Setpoint	SNVT_lev_ percent	%RH	0.0	100.0	W
Integer	16	nviSpaceHumNet	Space Humidity Network - From BAS	SNVT_lev_ percent	%RH	0.0	100.0	W
Integer	17	nviOutdoorHumNet	Outdoor Air Humidity Network - From BAS	SNVT_lev_ percent	%RH	0.0	100.0	W
Integer	18	nviCO2Net	CO2 Network - From BAS	SNVT_ppm	ppm	0.0	2000	W
Integer	19	nvoEffCoolLoad	Effective Cooling Load	SNVT_lev_ percent	%	0.0	100.0	R
Integer	20	nvoEffHeatLoad	Effective Heating Load	SNVT_lev_ percent	%	0.0	100.0	R

Application Examples

Most of the *LonWorks* objects listed are intended to be monitored by a building automation system (BAS) for display on custom graphics and to alert building personnel of potential service needs. Some of the objects can be controlled by a BAS and are identified in the table as W. The following are examples of control using the available *LonWorks* objects.

Command unit occupancy from the building automation system: In many cases, it is preferable to use a central building time schedule that is managed through the BAS rather than setting onboard time schedules in each unit. To implement this, the BAS should write a value of 3 (Force Occupied) to the nviScheduleSrc object when the building is occupied and write a value of 4 (Force Unoccupied) when the building is unoccupied. The onboard time schedule is ignored and the Optimized Start and Optimized Stop features are not functional. If the Push Button Override Duration is set to a value greater than 0, the local space sensor override button or the Remote Start Stop input can still be used for temporary occupancy overrides. The Occupied Start Delay parameter can be set to a different value in each unit if staggered equipment startup is required.

Set space temperature cooling and heating setpoints: To set the space temperature cooling and heating setpoints, use the Occupied Space Temperature Cooling Setpoint (nviOccCoolSP) and Occupied Space Temperature Heating Setpoint (nviOccHeatSP) objects. The Active Space Temperature Cooling Setpoint (nvoActiveCoolSP) and Active Space Temperature Heating Setpoint (nvoActiveHeatSP) are read-only objects which include local user adjustment, load shedding, and unoccupied offsets.

Monitor unit alarm status: The Alarm Digital Output (nvoAlarmDO) object is set to TRUE when any alarm is active. To view specific details about which alarm(s) are active, the operator can view the alarm list through the web interface or onboard display.

Provide remote sensor values instead of hard-wiring to the controller: Some of the sensors that would normally be installed in the space served by the unit and wired to the unit controller can alternatively have their values provided through *LonWorks* communication. The Space Temperature, Space Humidity, Outdoor Air Temperature, Outdoor Air Humidity, and Space CO2 can all be configured to use values received over network communication instead of the onboard inputs. The configuration settings must be set using the onboard LCD display or the web interface.

NAME	LCD DISPLAY	DESCRIPTION	DEFAULT	RANGE
Space Temperature Source	Space Temp Src	Select from Onboard, and Network to set the source of the space temperature control value.	Onboard	N/A
Space Humidity Source	Space Hum Src	Select from Onboard, and Network to set the source of the space humidity control value.	Onboard	N/A
Outdoor Temperature Source	Outdr Temp Src	Select from Onboard, and Network to set the source of the outdoor air temperature control value.	Onboard	N/A
Outdoor Humidity Source	Outdr Hum Src	Select from Onboard, and Network to set the source of the outdoor air humidity control value.	Onboard	N/A
CO2 Source	Space CO2 Src	Select from Onboard, and Network to set the source of the space CO2 control value.	Onboard	N/A

Once the sensor source settings are configured as Network, the values written to nviSpaceTempNet, nviSpaceHumNet, nviOutdoorHumNet, nviOutdoorTmpNet, and nviCO2Net will be used by the controller logic instead of the value read at the onboard physical input.

WARNING

- Only qualified personnel must complete the installation.
- Consult your Daikin dealer/contractor regarding relocation and reinstallation of the remote controller. Improper installation may result in electric shock or fire.
- Electrical work must be performed in accordance with relevant local and national regulations,
  and with the instructions in this installation manual. Improper installation may cause electric shock or fire.
- Only use specified accessories and parts for installation. Failure to use specified parts may result in electric shock, fire, or controller damage.
- Do not disassemble, reconstruct, or repair. Electric shock or fire may occur.
- Only use specified wiring and verify all wiring is secured. Assure no external forces act on the terminal connections or wires. Improper connections or installation may result in electric shock or fire.
- Confirm power to the unit is OFF before touching electrical components.