

# **COMMUNICATIONS USING NETWORK IBox INSTRUCTIONS**

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**NOTE:** *DirectSOFT (version 5.2 or later) is required to program using the IBox instructions. The DL05 CPU requires firmware version v5.10 or later, and the DL06 CPU requires firmware version v2.10 or later to support use of the IBox instructions. See our web site for firmware information and downloads: [www.automationdirect.com](http://www.automationdirect.com)*

## Network Configuration Instruction (NETCFG)

### NETCFG IB-700

Network Config defines all the common information necessary for performing network reading and writing using the NETRX and NETWX IBox instructions via the D0–DCM module.

You must have the Network Config instruction at the top of your ladder/stage program with any other configuration IBoxes.

If you use more than one local serial port, DCM or ECOM in your PLC for Networking, you must have a different Network Config instruction for each network in your system that utilizes any NETRX/NETWX IBox instructions.

The Workspace parameter is an internal, private register used by the Network Config IBox and must be unique in this one instruction and must not be used anywhere else in your program.

The “CPU Port or Slot” parameter is the PLC option slot the DCM is occupying.

#### NETCFG Parameters:

- **Network#:** specifies a unique # for each DCM network to use.
- **CPU Port or Slot:** specifies the option slot number of used by the DCM.
- **Workspace:** specifies a V-memory location that will be used by the instruction.

The screenshot shows a window titled "Network Config" with a sub-label "IB-700". It contains three input fields: "Network #" with the value "K0", "CPU Port or Slot (ex. KF2 or K3)" with the value "K0", and "Workspace" with the value "V400". Each field has a small green dot to its right, indicating it is a valid input.

Parameter		DL05/DL06 Range
Network #	K	K0–255
CPU Port or Slot	K	K0–FF
Workspace	V	See PLC V-memory map – Data Words

## Network Read Instruction (NETRX)

### NETRX IB-701

Network RX Read performs the RX instruction with built-in interlocking with all other Network RX (NETRX) and Network WX (NETWX) IBoxes in your program to simplify communications networking. It will perform the RX on the specified Network #, which corresponds to a specific unique Network Configuration (NETCFG) at the top of your program.

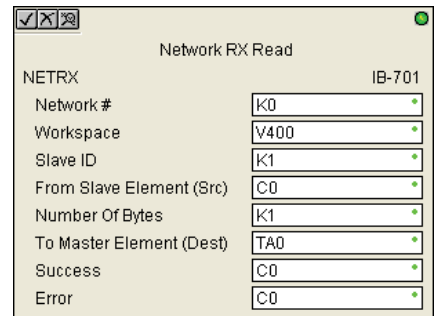
The Workspace parameter is an internal, private register used by this IBox and must be unique in this one instruction and must not be used anywhere else in your program.

Whenever this IBox has power, it will read element data from the specified slave into the given destination V-memory buffer, giving other Network RX and Network WX IBoxes on that Network# a chance to execute.

For example, if you wish to read and write data continuously from 5 different slaves, you can have all of these NETRX and NETWX instructions in one rung driven by SP1 (Always On). They will execute round-robin style, automatically.

#### NETRX Parameters:

- **Network#:** specifies the (CPU port's, DCM's, ECOM's) Network# defined by the NETCFG instruction.
- **Workspace:** specifies a V-memory location that will be used by the instruction Slave ID: specifies the slave PLC that will be targeted by the NETRX instruction From Slave Element (Src): specifies the slave address of the data to be read Number of Bytes: specifies the number of bytes to read from the slave device.
- **To Master Element (Dest):** specifies the location where the slave data will be placed in the master PLC.
- **Success:** specifies a bit that will turn on once the request is completed successfully.
- **Error:** specifies a bit that will turn on if the instruction is not successfully completed.



Parameter		DL05/DL06 Range
Network #	K	K0-255
Workspace	V	See PLC V-memory map – Data Words
Slave ID	K	K0-90
SRC X,Y,C,S,T,CT,GX,GY,V		See PLC V-memory map
# of Bytes	K	K1-128
Dest	V	See PLC V-memory map – Data Words
Success	X,Y,C,GX,GY,B	See PLC V-memory map
Error	X,Y,C,GX,GY,B	See PLC V-memory map

# Network Write Instruction (NETWX)

## NETWX IB-702

Network WX Write performs the WX instruction with built-in interlocking with all other Network RX (NETRX) and Network WX (NETWX) IBoxes in your program to simplify communications networking. It will perform the WX on the specified Network #, which corresponds to a specific unique Network Configuration (NETCFG) at the top of your program.

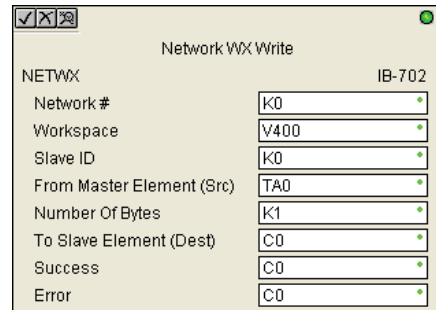
The Workspace parameter is an internal, private register used by this IBox and must be unique in this one instruction and must not be used anywhere else in your program.

Whenever this IBox has power, it will write data from the master's V-memory buffer to the specified slave starting with the given slave element, giving other Network RX and Network WX IBoxes on that Network # a chance to execute.

For example, if you wish to read and write data continuously from 5 different slaves, you can have all of these NETRX and NETWX instructions in one rung driven by SP1 (Always On). They will execute round-robin style, automatically.

### NETWX Parameters:

- **Network#:** specifies the (CPU port's, DCM's, ECOM's) Network# defined by the NETCFG instruction.
- **Workspace:** specifies a V-memory location that will be used by the instruction.
- **Slave ID:** specifies the slave PLC that will be targeted by the NETWX instruction.
- **From Slave Element (Src):** specifies the location in the master PLC where the data will be sourced from.
- **Number of Bytes:** specifies the number of bytes to write to the slave device.
- **To Master Element (Dest):** specifies the slave address the data will be written to.
- **Success:** specifies a bit that will turn on once the request is completed successfully.
- **Error:** specifies a bit that will turn on if the instruction is not successfully completed.



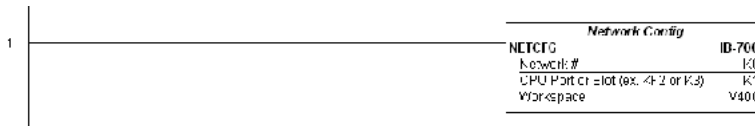
Parameter		DL05/DL06 Range
Network #	K	K0-255
Workspace	V	See PLC V-memory map – Data Words
Slave ID	K	K0-90
SRC X,Y,C,S,T,CT,GX,GY,V		See PLC V-memory map – Data Words
# of Bytes	K	K1-128
Dest X,Y,C,S,T,CT,GX,GY,V		See PLC V-memory map
Success X,Y,C,GX,GY,B		See PLC V-memory map
Error X,Y,C,GX,GY,B		See PLC V-memory map

## Example Using NETCFG, NETRX and NETWX

Rung 1: The Network Configuration IBox coordinates all of the interaction with other Network IBoxes (NETRX/NETWX). You must have a Network Configuration IBox for each CPU serial port, DCM or ECOM network in your system. Configuration IBoxes must be at the top of your program and must execute every scan.

This IBox defines Network# K0 to be for a DCM in slot 1.

The Workspace register is used to maintain state information about the port or module, along with proper sharing and interlocking with the other NETRX and NETWX IBoxes in the program. This V memory register must not be used anywhere else in the entire program.



Rung 2: Using Network# K0, read X0–X7 from Slave K7 and write them to slave K5 as fast as possible. Store them in this local PLC in C200–C207, and write them to C300–C307 in slave K5.

Both the NETRX and NETWX work with the Network Config IBox to simplify all networking by handling all of the interlocks and proper resource sharing. They also provide very simplified error reporting. You no longer need to worry about any SP "busy bits" or "error bits", or what port number or slot number a module is in, or have any counters or shift registers or any other interlocks for resource management.

In this example, SP1 (always ON) is driving both the NETRX and NETWX IBoxes in the same rung. On the scan that the Network Read completes, the Network Write will start that same scan. As soon as the Network Write completes, any pending operations below it in the program would get a turn. If there are no pending NETRX or NETWX IBoxes below this IBox, then the very next scan the NETRX would start its request again.

