

LINKnet TechBox



LINKnet is compatible with the software DSE version 3.00 or greater.

**Product
Manual**
HA473865U001
Issue 1

Safety Information



Please read this information BEFORE installing the equipment.

Intended Users

This manual is to be made available to all persons who are required to install, configure or service equipment described herein, or any other associated operation.

The information given is intended to highlight safety issues, and to enable the user to obtain maximum benefit from the equipment.

Application Area

The equipment described is intended for industrial motor speed control using DC or AC motor controllers, with DC motors AC induction or AC synchronous machines.

Personnel

Installation, operation and maintenance of the equipment should be carried out by qualified personnel. A qualified person is someone who is technically competent and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

**REFER TO YOUR MAIN PRODUCT MANUAL FOR SPECIFIC SAFETY
INFORMATION ABOUT THE DEVICE YOU ARE CONTROLLING**

IMPORTANT

It is required that the user be familiar with navigating through the drive MMI menus, be able to select functions and set values and options. For further reading on this topic, refer to the appropriate drive instruction manual. If using DSE890 or DSELite it is required the user must be familiar with the software packages.

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Chapter 1 - An Overview

The *LINKnet* TechBox/TechCard option allows standard drives to be a part of the *LINKnet* Ethernet network. A computer may be used to provide supervision and monitoring for each drive and other modules in the system.

6053-LNET-00 TechBox

This techbox is to be used with the AC690+ frame B. The 6053-LNET-00 fits into the same location normally occupied by the keypad. If the keypad is needed for the application, it may still be used with a remote mounting kit. An auxiliary 24VDC power supply input allows the techbox to be powered separately from the drive. If the drive shuts down, the network remains intact.



Figure 1 – 6053 LINKnet Techbox

6055-LNET-00 TechBox

This techbox is to be used with the DC590+ all frames and AC690+ frames C and higher. The 6055-LNET-00 plugs into the right side technology box slot beneath the front cover of the drive. The left side location is reserved for feedback technology options. The keypad is unaffected by the presence of a techbox. An auxiliary 24VDC power supply input is provided allowing the techbox to be powered separately from the drive. In the event of a drive shut down, the network integrity remains intact.



Figure 2 – 6055 LINKnet Techbox

Further Reading

AC690+ Drive Instruction Manuals
DC590+ Drive Instruction Manual

Product Features

- Available for AC690+ and DC590+ products
- Compact 5H x 3W x 1D inches
- Easy snap on installation
- Eliminates hard wired signal connections
- Standalone processing with built in macros
- Auxiliary power supply input for network backup
- Indicator LED's for Drive and power On status
- Direct tag access for all drive parameters

Part Number and Identification

The Option can be supplied with the drive or independently.

- DC590+ Drive

Supplied with the DC590+ drive: **590P/xxxx/xxx/xxxx/xx/LNET/xxx/xxxx**
 Enclosed in a "Technology Box" for use with the 590+ all Frames: **6055-LNET-00**

- AC690+ Drive

Supplied with the AC690+ drive: **690PB/xxxx/xxx/x/x/xxxx/xxxx/xxxx/LNET/xxx/xxxx**

690P/xxxx/xxx/xxxx/xx/xxx/ LNET /xxx/xxx /xxx/xxxx
 Enclosed in a "Technology Box" for use with the 690+ Size B: **6053-LNET-00**
 Enclosed in a "Technology Box" for use with the 690+ Sizes C+: **6055-LNET-00**

Ethernet Protocols supported:

LINKnet supports the following Ethernet protocols:

1. Modbus UDP/IP Master for Wago support.
2. Modbus TCP/IP Slave – Supports TS8000 and PLCs

Software Requirements:

1. The software DSE (Drive System Explorer) & DSELite version 3.00 or greater supports LINKnet.

Hardware supported:

1. The 690+ drive with firmware version 5.x
2. The 590+ drive with firmware version 8.10 or greater only. If the firmware version is 8.9 or less, the drive can be flashed to the latest firmware version using DSELite.
3. The 590+ drives with firmware version 5.x and 7.x drives.

Chapter 2 - Installation

Installing the Option

WARNING

Before installing, ensure that the drive power is switched off and cannot be switched on accidentally by other personnel.

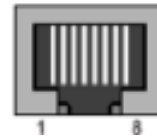
Wait 5 minutes after disconnecting power before working on any part of the system or removing the covers from the drive.

Wiring Requirements:

Use only Cat 6 Shielded Ethernet, patch or crossover cable.

Cable Connections

PIN	Signal
1	TD+
2	TD-
3	RD+
4	Termination
5	Termination
6	RD-
7	Termination
8	Termination



Cable Specifications – patch or crossover

Cable Type	Maximum Node-to-Node Distance (m)
CAT6 Shielded	100

LINKnet operates at the nominal rate of 100 Mbit/s.

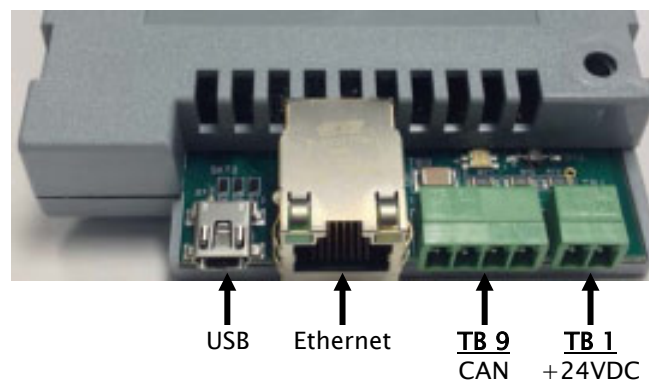


Figure 3 - LINKnet Techbox Connections

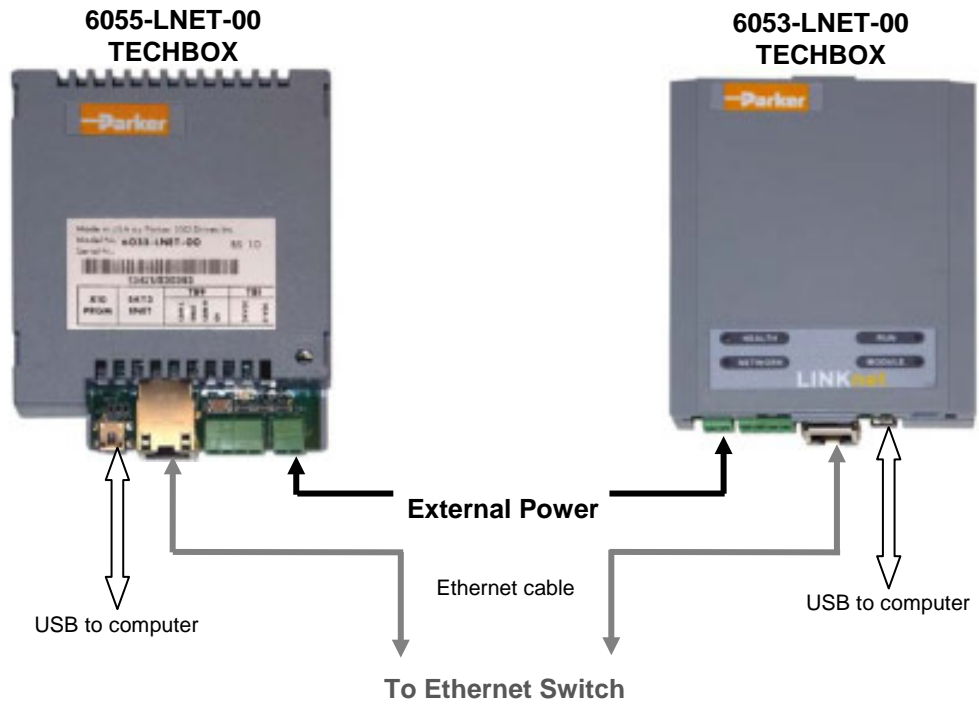


Figure 4 -Sample LINKnet Network

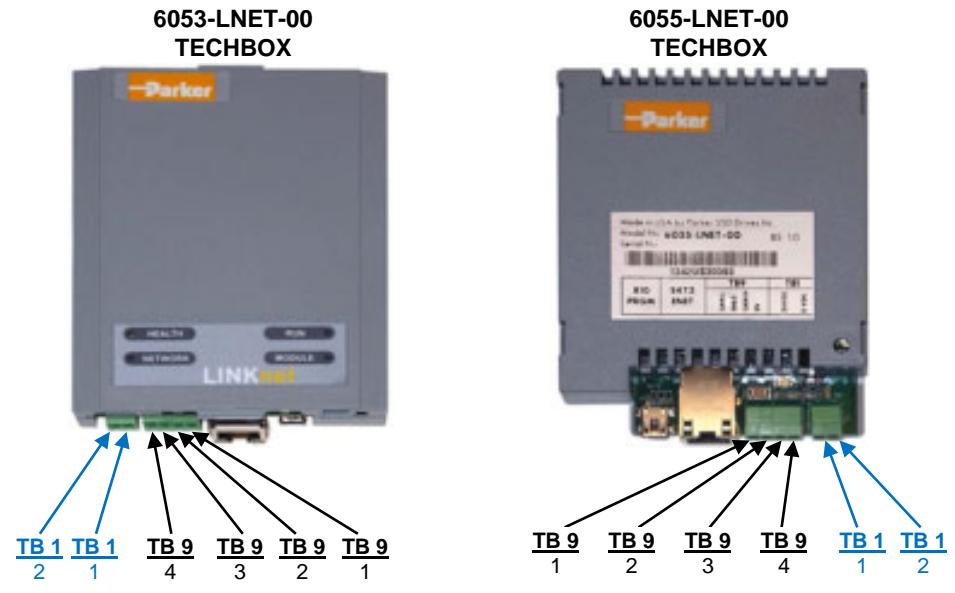


Figure 5 - LINKnet Terminations

24VDC External Power Terminal block

Techbox TB 1	PIN 1	PIN 2
6053-LNET-00	+24VDC	0V
6055-LNET-00	+24VDC	0V

(The +24V terminal is always on the inboard terminal)

Ethernet Connection – (RJ45)

The Ethernet port is primarily intended for peer to peer communications with other modules in the system. Other functions include direct support between the LINKnet module and a PC, ModBus TCP/UDP access to remote I/O, HMI's and PLCs. A computer connected to the Ethernet connector on the LINKnet module or via an Ethernet switch, can be used to install LINKnet configurations or monitor (Go On line) with any element within the LINKnet network. SSD Drives graphic configuration software package Drive System Explorer 890 (DSE890) version 3.0 and all subsequent versions support LINKnet. If you have an older version, updates may be obtained simply by contacting Parker SSD Drives Product Support.

Firmware cannot be installed into a LINKnet module, over Ethernet. The USB port must be used.

USB Computer Connection – USB mini B connector.

A computer connected to the USB socket on a LINKnet module can be used to install configurations, install firmware or monitor (Go On line) with a LINKnet Techbox. The USB cable can also supply power to the individual LINKnet module. The connector is a USB mini B socket. A USB cable is supplied with the DSE890 software package. The connected LINKnet Techbox can also forward (act as a gateway for) commands to other LINKnet Techbox connected via Ethernet. When using DSE the entire LINKnet network can be viewed using this connection. Since the USB cable can supply power to the LINKnet Techbox, a Powered USB Hub may be required, as some PC's may not have enough power on the USB port, to properly power the Techbox. If the USB cable is connected to the LnTB and it does not have the required amount of power to power the Techbox, the *Module Status LED* will flash in the *Power Fail* mode and communications will not be established.

If using this method to communicate to the LINKnet Techbox, the USB cable **MUST** be connected to the Techbox first, then launch DSE. If DSE is launched first and then you connect the USB cable to the Techbox, communications will not be established. (The USB driver does not get loaded into Windows until the USB cable is connected to the Techbox. Once this driver is loaded into Windows, DSE can detect it. DSE can only detect drivers, if it is closed.)

DSE must always be closed before connecting the USB cable to the Techbox.

External Power Connection (Optional) Terminal Block (TB 1)

The LINKnet Techbox incorporates a switch mode power supply. When the LINKnet Techbox is fitted to the 590+ or 690+ drive, the power will be supplied from the drive. If power is supplied externally from the Terminal Block TB1 connector, the Techbox will be powered from this external supply and not the drive.

Note: Power requirements: 200ma @24Vdc with a 15 to 30Vdc range. 320 mA @ 15 Vdc and 160 mA @ 30 Vdc.

24VDC External Power Terminal block – 2 pin connector (TB 1)

The plug-in connectors for TB1 are physically different for the 6055-LNET-00 TechBox, and the 6053-LNET-00 TechBox.

Techbox TB 1	PIN 1	PIN 2
6053-LNET-00	+24VDC	0V
6055-LNET-00	+24VDC	0V

(The +24V terminal is always on the inboard terminal)

CAN peer-to-peer Terminal block – 4 pin connector (TB 9)

This option is not implemented yet

The CanOpen port will support peer to peer communication of run time data between LINKnet TBs and other LINKnet nodes on a system. The plug-in connectors for TB1 are physically different for the 6055-LNET-00 TechBox, and the 6053-LNET-00 TechBox.

Techbox TB 9	PIN 1	PIN 2	PIN 3	PIN 4
6053-LNET-00	CAN L	SHLD	CAN H	0V
6055-LNET-00	CAN L	SHLD	CAN H	0V

(The CAN L (pin 1) terminal is always on the inboard terminal)

Fitting the TechBox to the frame B AC690+ Drives

WARNING!

Ensure that all power is off prior to working on the drive

The option is supplied as a “6053-LNET-00 Technology Box” which fits into the front of the AC690+ drive in place of the keypad or blank cover.

- Remove the terminal cover and screws.
- Plug the ribbon cable into the back of the TechBox and into the socket on the AC690+B drive
- Snap the TechBox into place in the recess on the front of the AC690+B
- Make all user-wiring connections. Connect all shields to the ground post on the chassis. Make a connection from the TechBox TB1 ground terminal to the ground post on the chassis.
- Re-install the terminal cover securely with the screws.

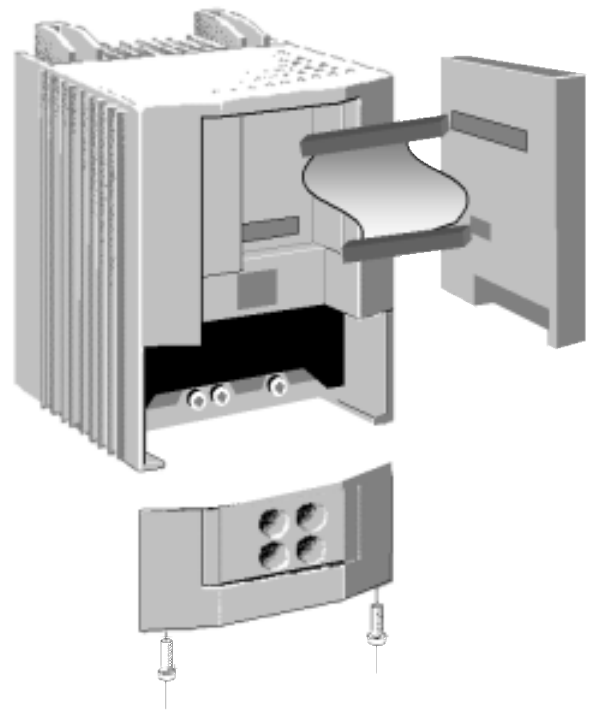


Figure 6 – 6053 LINKnet Installation

Note: *If permanently using the keypad with the Technology Box fitted, mount the keypad remotely using the Panel Mounting Kit with part number (6052). The connecting lead enters the AC690+ drive through the gland plate.*

Fitting the TechBox to a DC590+ and AC690+ frames C and above

The option is supplied as a “6055-LNET-00 TechBox” which fits into the lower right front of the AC690+C - K drive.

Note: The 6055-LNET-00 TechBox does not affect the operation of the 6051/6901 keypad.

WARNING!
Ensure that all power is off prior to working on the drive.

- Remove the terminal cover.
- Plug the techbox into the socket located in the lower right side of the AC690+ C-K drive.
- Tighten the screw to secure the techbox to the drive. This also serves as a ground connection for the TechBox.
- Make all user-wiring connections. Connect all shields to the ground post on the chassis.
- Re-install the terminal cover securely with the screws.

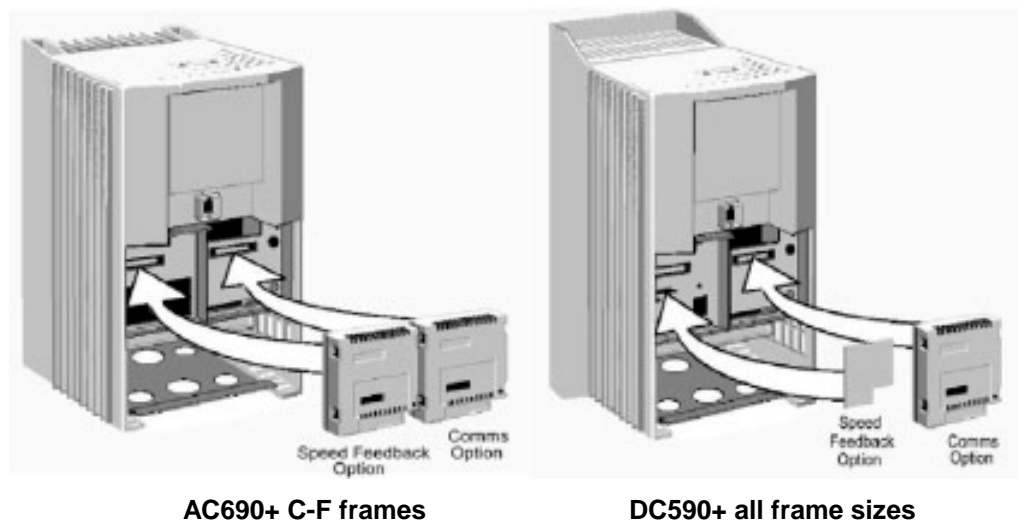


Figure 7 – 6055 *LINKnet* Installation

Chapter 3 - Initial Set-up

There are 2 ways to communicate to the LINKnet Techbox: USB & Ethernet

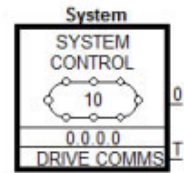
The USB port is primarily intended to use for initial set up of the Techbox and setting up of the IP address. But it can be used to install configurations, install firmware and monitor the entire LINKnet System. All of the nodes in the system will appear in the DSE Module List when using the USB. Also if there are Ethernet issues or IP address conflicts, the USB port can be used to directly connect to each Techbox for analysis. When using the USB for the first time, the USB driver must be installed. Refer to *Installing the USB driver for DSE and the LINKnet Techbox* at the end of this section.

An Ethernet connection can also be used to connect to the LINKnet Techbox. It will have a faster connection than the USB method. A pc can be connected directly to the Ethernet port or it can be connected to the Ethernet switch where all of the modules in the system will appear in the DSE Module List. When communicating to the LINKnet modules via Ethernet, the computer must be on the same subnet and the LINKnet modules. For set up instructions on using Ethernet communications, see page 15 to or if in DSE go to *HELP / LINKnet Support / Setting the computer IP Address for LINKnet access*.

IP addressing information

Each LINKnet Techbox must have a unique IP address. Each LINKnet Techbox has a unique default IP shipping address of 192.168.1.xxx. The last 3 digits will be random for each Techbox in the range of 1-127. When the LINKnet TB is powered up in a system and it has the default shipping configuration, it will *self assign* a unique address on each Techbox. At this point DSE can be launched and all of the LINKnet Techboxes will appear in the Module List. (If there are duplicate IP Addresses, communications will not establish between the Techboxes and DSE will not obtain a Module List.) Now the custom configurations can be installed to each individual TB.

In a LINKnet configuration there is a System Control block which contains a place to set the IP address. If no IP address is entered, the default shipping address of 192.168.1.xxx will be used and the TB will be *self assigned* an IP address in the range of 1 - 127.



If an IP Address is entered in the System Control block, it will override the *self assigned* IP address. It is recommended that an IP Address be assigned to each LINKnet TB. It is recommended that the LINKnet configuration address be used as the last 3 digits of the IP address. Thus if the configuration address is 10 the IP address would be 192.168.1.10

Configuring the LINKnet Techbox IP addressing

There are two ways to set the IP Address. One way is to set the IP Address in the SYSTEM CONTROL function block, which is located in the LINKnet configuration, as shown below. If you enter an IP Address you **MUST** also enter the Subnet Mask address. If the IP Address in the SYSTEM CONTROL block is left at 0.0.0.0, the IP Address which is currently in the Techbox will be used. If an IP Address is set in the SYSTEM CONTROL block, it will override the present IP Address which is in the Techbox.

The remaining way is to use the USB cable and connect it directly to the individual TechBox via the USB port on the Techbox. The USB cable will supply power to the Techbox so it does not have to be fitted to a drive. To use this method, connect the USB cable to the LINKnet Techbox, then launch DSE and go to *COMMAND / REFRESH FULL*. The module will appear in the *MODULE LIST*. Then do a *COMMAND / SET IP ADDRESS*. Enter the desired IP ADDRESS. Then do a *COMMAND / GET INO* and verify this data in the *SCRATCHPAD*. Because of the way the USB driver loads and unloads from Windows, there is a specific procedure which must be followed. Connect the USB cable to the Techbox first then launch DSE. DSE can't be open when connecting the USB cable to the Techbox. The USB driver will not load, thus the

module will not appear in the MODULE LIST. Thus if you are setting the IP ADDRESS on multiple Techboxes, after removing the USB cable from the Techbox, DSE must be closed. Then connect the USB cable to the next Techbox, then launch DSE and repeat the procedure.

The IP address of the Techbox will be set as long as there is no IP address entered in the *System Control* block. It must have an address of 0.0.0.0

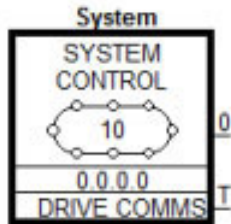
If there is an IP address entered in the *System Control* block it will get over ridden with the set entered address.

Setting the Node Address

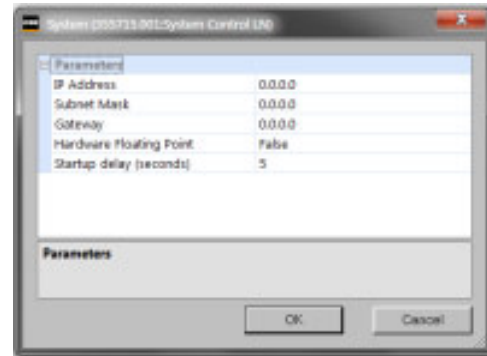
Up to 127 LINKnet nodes can be addressed in the LINKnet configuration. Thus the NODE ADDRESS range is 1 – 127.

To set the *Node Address* go to *EDIT / Net Address* and set the Node Address. The NodeAddress in the example shown below is address 10.

There is no limitation on the IP address, but they all MUST be on the same subnet.

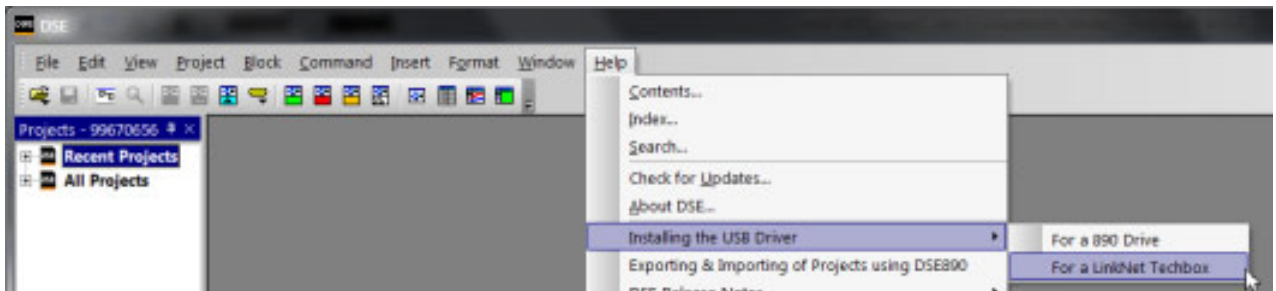


The SYSTEM CONTROL block is located in the LINKnet configuration.



Installing the USB driver for DSE and the LINKnet Techbox

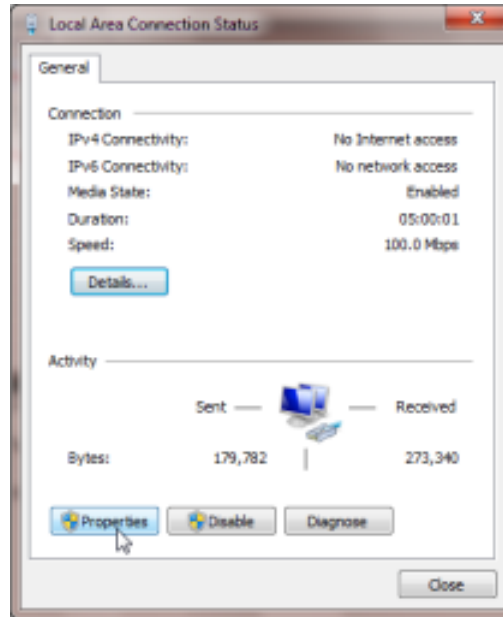
When using the LINKnet Techbox for the first time, the USB **STMicroelectronics Virtual COM driver** must be installed, so DSE can communicate to the LINKnet Techbox. To do this launch DSE, go to the menu on the top, called **Help / Installing the USB Driver / For a LINKnet Techbox**. View this document and follow the instructions.



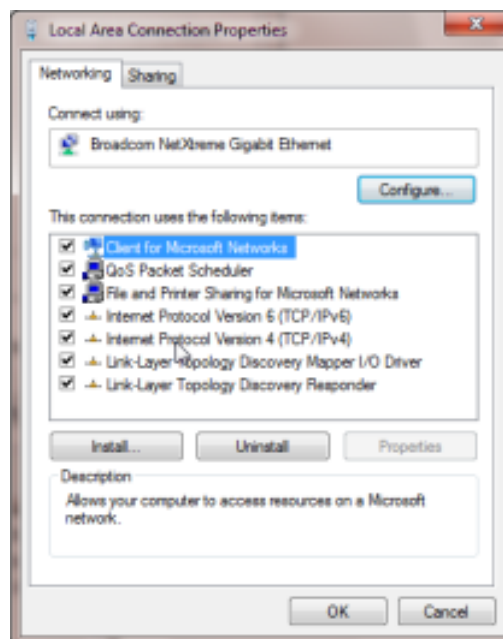
Setting the computer IP Address for LINKnet access via Ethernet

When communicating to the LINKnet via Ethernet, the computer must be on the same subnet. To change the pc settings:

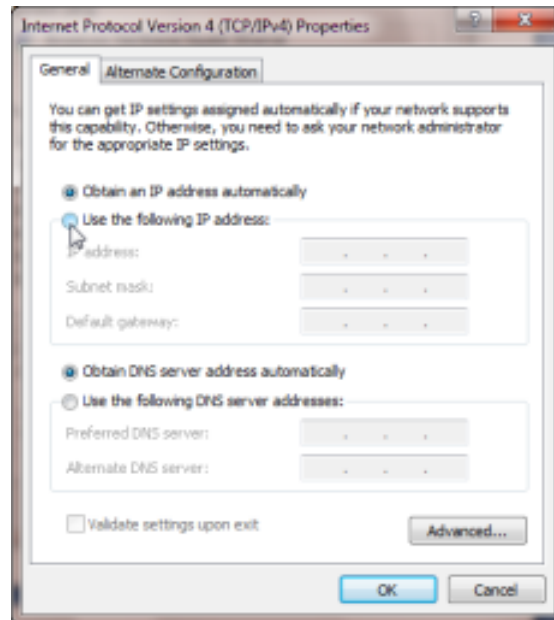
1. From the START menu, open the Control Panel and select “Network and Sharing Center” or “Network Connections” depending on the version of Windows you’re running.
2. In the window that comes up, click on “Local Area Connection”. That should bring up a dialog that looks something like the following:



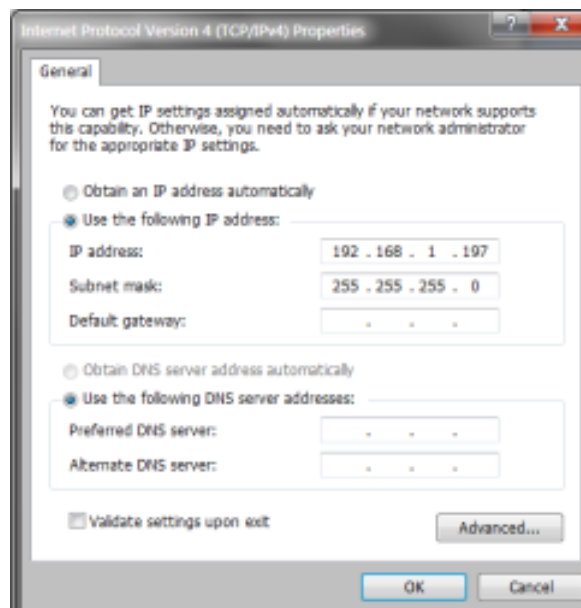
3. Click on the Properties button to bring up the Local Area Connection Properties dialog. On Windows 7 it should look something like this (it will be slightly different for XP):



4. Double click on “Internet Protocol Version 4 (TCP/IPv4)” (“Internet Protocol TCP/IP” in XP) and that should bring up the Internet Protocol Dialog that should look something like:



5. Click on the selection “Use the following IP address” and enter 192.168.1.197 for the IP address and 255.255.255.0 for the Subnet mask. Make sure “Use the following DNS server addresses” is also selected, but you don’t have to enter anything for that. It should look something like:



Configuring the Drive

MMI Menu Map

- 1 SETUP PARAMETERS
- 2 FUNCTION BLOCKS
- 3 SERIAL LINKS
- 4 TEC OPTION
 - TEC OPTION TYPE
 - TEC OPTION IN 1
 - TEC OPTION IN 2
 - TEC OPTION IN 3
 - TEC OPTION IN 4
 - TEC OPTION IN 5
 - TEC OPTION FAULT
 - TEC OPTION VER
 - TEC OPTION OUT 1
 - TEC OPTION OUT 2

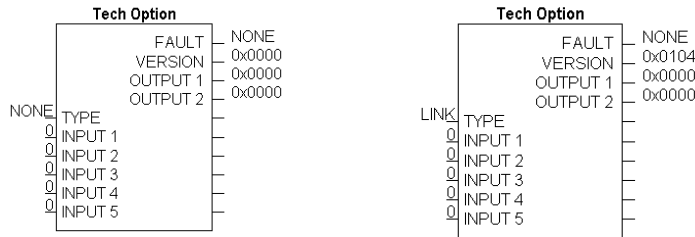
The first step in using the technology option is configuring the drive to accept the TechBox. The keypad (MMI), DSE890 (SSD Drives' device level configuration software), must be used to configure the TEC OPTION function block parameters inside the drive before commissioning the *LINKnet* technology option.

The parameter names/functions in this function block are inter-dependent and will change with different parameter values and various technology options.

The Function Block diagram below shows the DSE890 parameter names, which are also displayed on the MMI if no Option is fitted or an incorrect TYPE is selected for the fitted Option.

IMPORTANT

The user must be familiar with navigating through the drive MMI menus, be able to select functions and set values and options. For further reading on this topic, refer to the appropriate drive instruction manual. If using DSE890, the user must be familiar with the software package



Under TYPE, select LINK

Parameter Descriptions

TYPE

Selects the type of TechBox.

Range: Enumerated - see below

Enumerated Value : Technology Option

- 0 : NONE
- 1 : RS485
- 2 : PROFIBUS DP
- 3 : LINK
- 4 : DEVICENET
- 5 : CANOPEN
- 6 : LONWORKS
- 7 : TYPE 7

FAULT*Range: Enumerated - see below*

The fault state of the Technology Option card.

Enumerated Value : Fault State

- 0 : NONE: Normal operating mode.
- 1 : PARAMETER: Confirm that tag exists in the *LINK* Configuration.
- 2 : TYPE MISMATCH: Confirm that type of tag is valid.
- 3 : SELF TEST: The self test has failed. Replace TechCard/TechBox.
- 4 : HARDWARE: Hardware error. Replace TechCard/TechBox.
- 5 : MISSING: TechCard/TechBox not installed/

VERSION*Range: 0000 to FFFF*

The version of the Technology Option. If no option is fitted then the version is set to zero.

INPUTS (1–5)*Range: 0000 to FFFF*

Not used with the *LINK* Technology Option

OUTPUTS (1–2)*Range: 0 to 9999*

Not used with the *LINK* Technology Option

Other Function blocks

While configuring the “TEC OPTION”, you may also insert other Link function blocks into the TechBox template. This can be done by using DSE890.

DSE890

When configuring the “TEC OPTION” function block using DSE890 the TechBox and drive can be programmed completely using the DSE890. Drive System Explorer (DSE890) provides the TechBox templates for the DC590+ and AC690+ drives.

Chapter 4 - Using DSE Macros and Templates

Node Addressing the LINKnet Modules

Each LINKnet module must have a unique Node Address assigned to it. The range allowed in DSE is 1 to 127.

AC690+ and DC590+ Macros/Templates

The DSE program has pre-configured macros for the AC690+ and the DC590+. These macros contain a template for the specific drive. The internal drive parameters are programmed via the template and are stored in the TechBox/TechCard. The macros are loaded every time the drive is energized; thus all drive parameters are loaded into the volatile memory. DSE version 3.0 or a subsequent revision is required.

Additional *LINK* function blocks may be inserted into the Techbox/Techcard configuration.

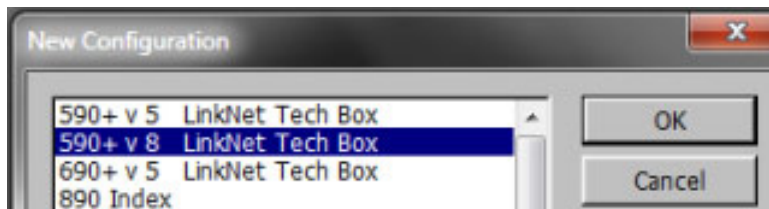
AC690+ Macro Template

The 690+ macro is selected from the **File/New** drop down menu as shown below. This **690+_v5** supports a 690+ drive with firmware version 5.x. If the drive is an earlier firmware version, it can be field upgradeable to the latest firmware, by using DSELite.

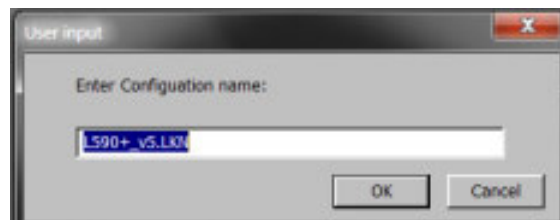


DC590+ Macro Template

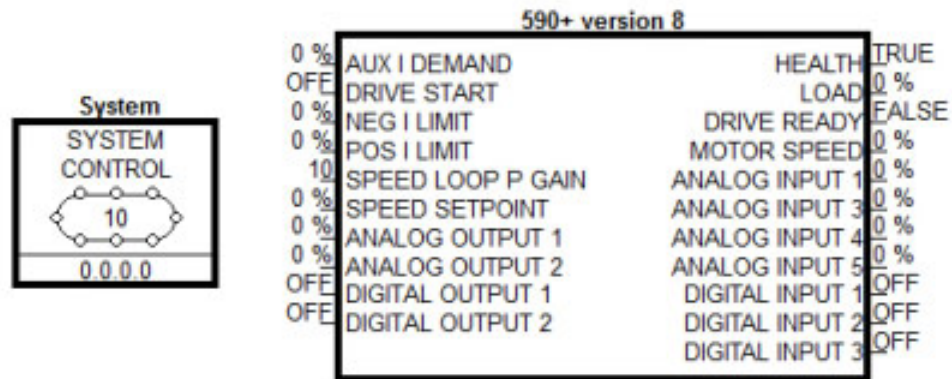
The 590+ macro is selected from the **File/New** drop down menu in DSE. There are two choices: the **590+_v5 LINKnet Techbox** for a 590+ drive with firmware version 5.x and a **590+_v8 LINKnet Techbox** for a 590+ drive with firmware version 8.x drive. In DSELite the choices are the **590v5_f1.LKN** and the **590v8_f1.LKN**. A **590+_v5** template will install into a firmware version 5, 7 or 8 drive. A **590v8f1.LKN** template will install into a firmware version 8 drive only. **Note:** When using a v8 drive, make sure the firmware version is at least version 8.10 or later.



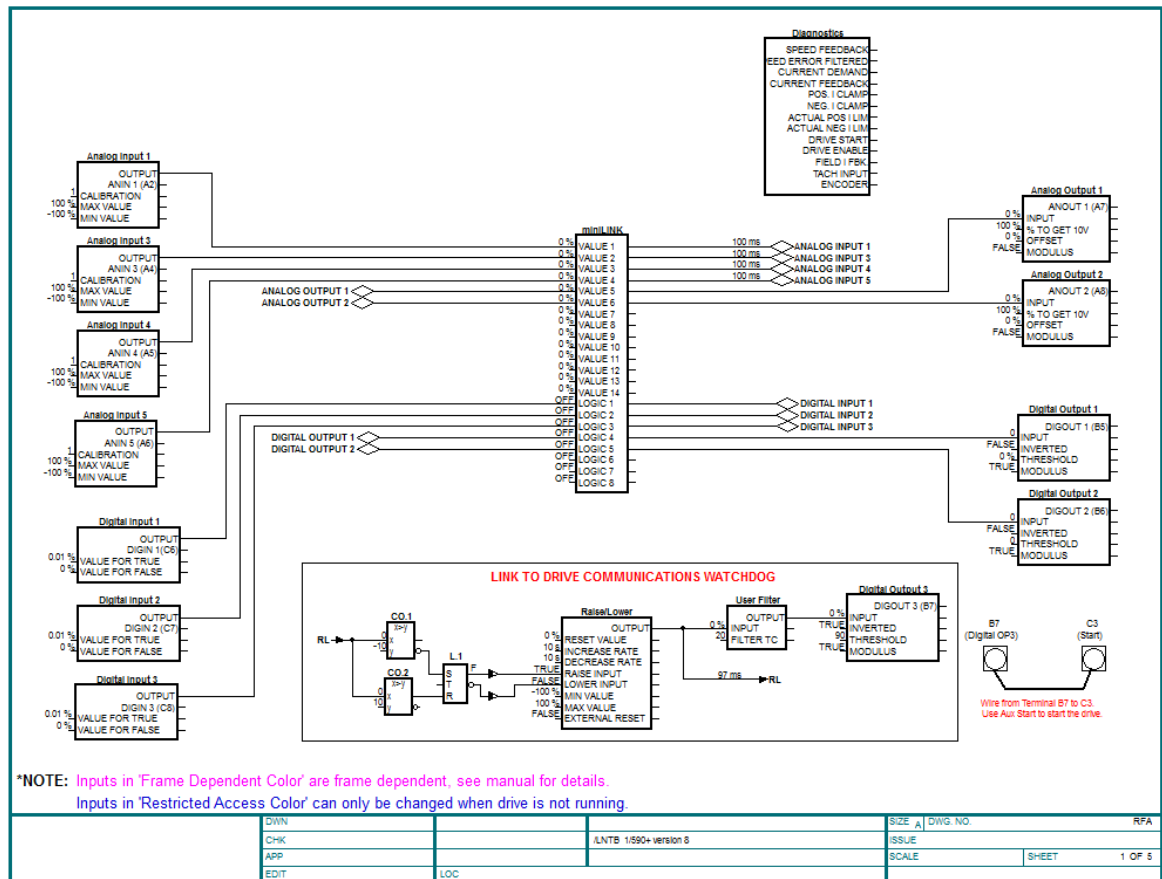
Select the applicable configuration for your drive. The program will prompt you for the module name.



LINKnet L590+ Version 8 Template



The 590+ macro has some preconfigured inputs and outputs as default. If another tag or parameter is needed, it can be added inside the macro. It is possible to use both the drives' internal function blocks and the Link function blocks. Simply double-click on the macro to access the 590+ internal function blocks.



Modifying inside the macro

All the drive functions are available through the TechBox. When using some of the DC590+ drives with firmware version 5.x function blocks, it may be necessary to use the Mini-Link block or a 'Native drive' block as the connection point to the TechBox. If a parameter is Orange in color, it must be connected to a Native drive block. The purpose for doing this is to ensure proper triggering of non-system function blocks.

Note: The DC590+ drive with firmware version 8.x and the AC690+ drives do not require the use of the Mini-Link block or 'Native drive' block to ensure proper triggering. Drive blocks can be connected to other blocks without a triggering problem.

Deleting and/or moving an internal connection

The connections inside the macro can be deleted or moved in the same fashion that is used in DSE.— If the connection is only being moved from one block to another block it is not necessary to delete the external macro connection.

Inserting a new internal connection

Input connection points to the 590+ macro do not need to be connected to the Mini-Link block. When you are adding an output connection point to the 590+ macro it may be necessary to connect to the Mini-Link or system block. If the output connection point is originating from a Native drive block it is not necessary to link the connection to the Mini-Link block.

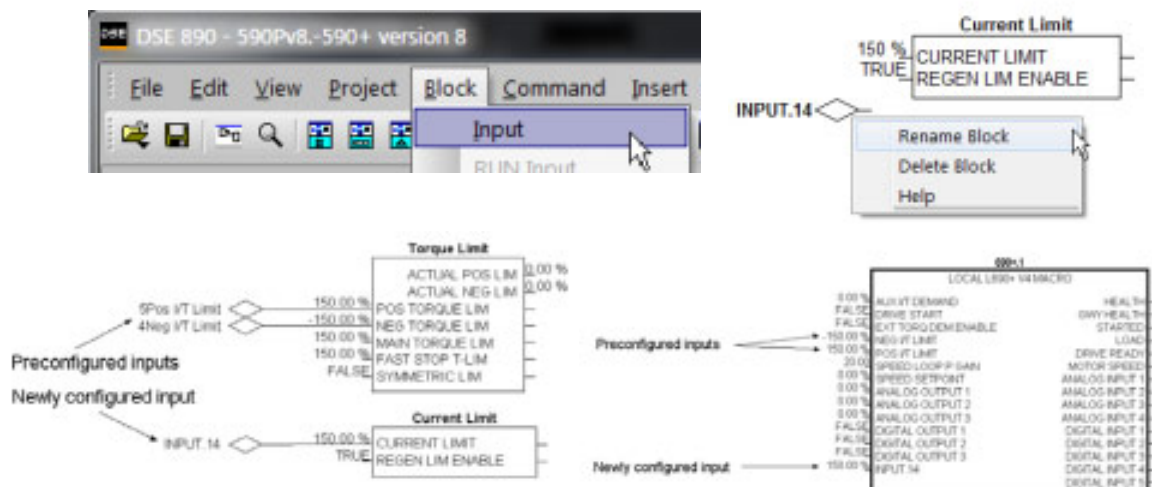
Inserting function blocks

Link function blocks may be programmed into the TechBox. *LINK* function blocks can be inserted outside or outside the macro. The function blocks are accessed in the same manner as other *Link2* modules.

Inserting and deleting macro Inputs/Outputs

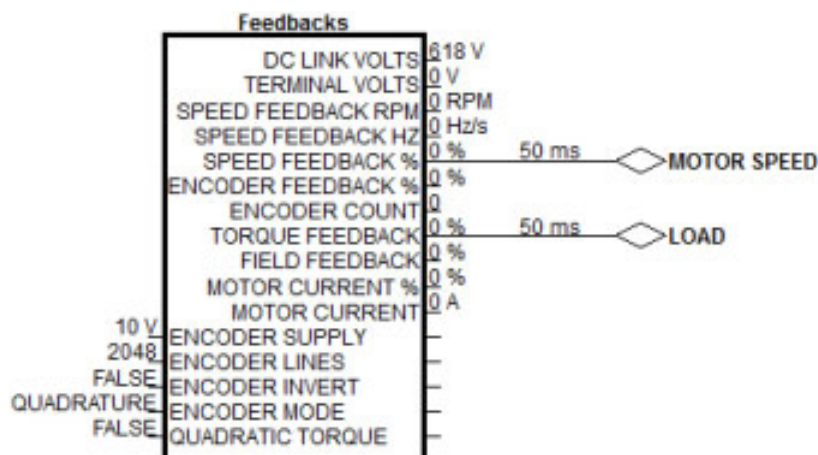
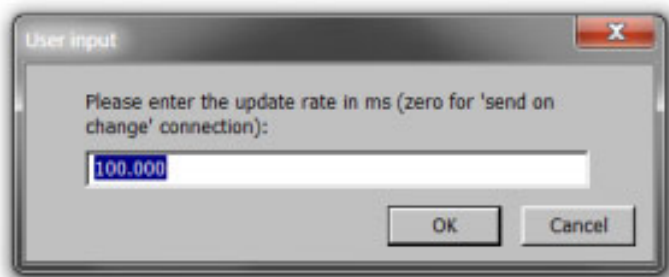
Connections in and out of the macros are made by the following methods.

1. Selecting the inputs and outputs from the BLOCK menu will allow the I/O diamonds to be inserted into the macro. The diamond shaped Input and Output tags can be dropped anywhere inside the drive macro. Drawing a link from the Input/Output diamond to the desired connection point will make the connection to outside the macro.
2. Highlighting the tag and pressing the "DELETE" key will delete inputs or outputs. Prior to deleting the tag, be sure to disconnect all external connections to the macro.

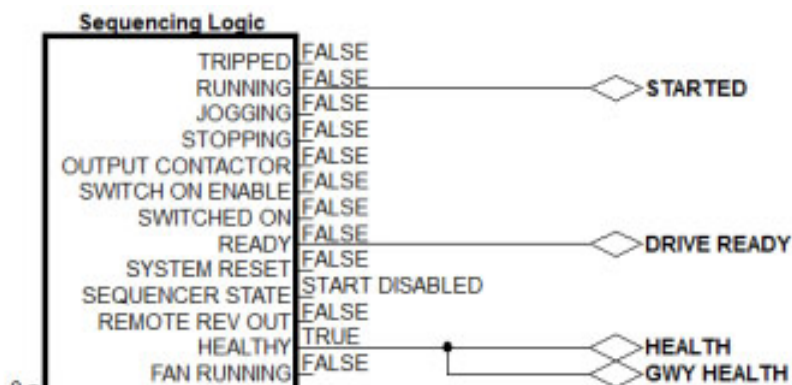


Note: Internal tags do not get a module address or slot address. The tag appears as a connection point on the outside of the macro. Right mouse clicking on the diamond will allow you to change the name of the tag. This name will appear inside and outside the macro. The number preceding the tag name controls the order of appearance on the macro outside connection points. The number may be changed in the same manner as changing the name of the tag. Input connection points to the 590+ macro do not need to be connected to the Mini-Link block. When adding an output connection point to the 590+ macro it may be necessary to connect to the Mini-Link or system blocks.

- Certain output tags will require an entry for the connection speed. The faster connection speeds require more of the CPU heap usage. If too many fast connections are made, it may be possible to run out of CPU heap and cause an “L-Error” fault. Keep fast connections to a minimum.

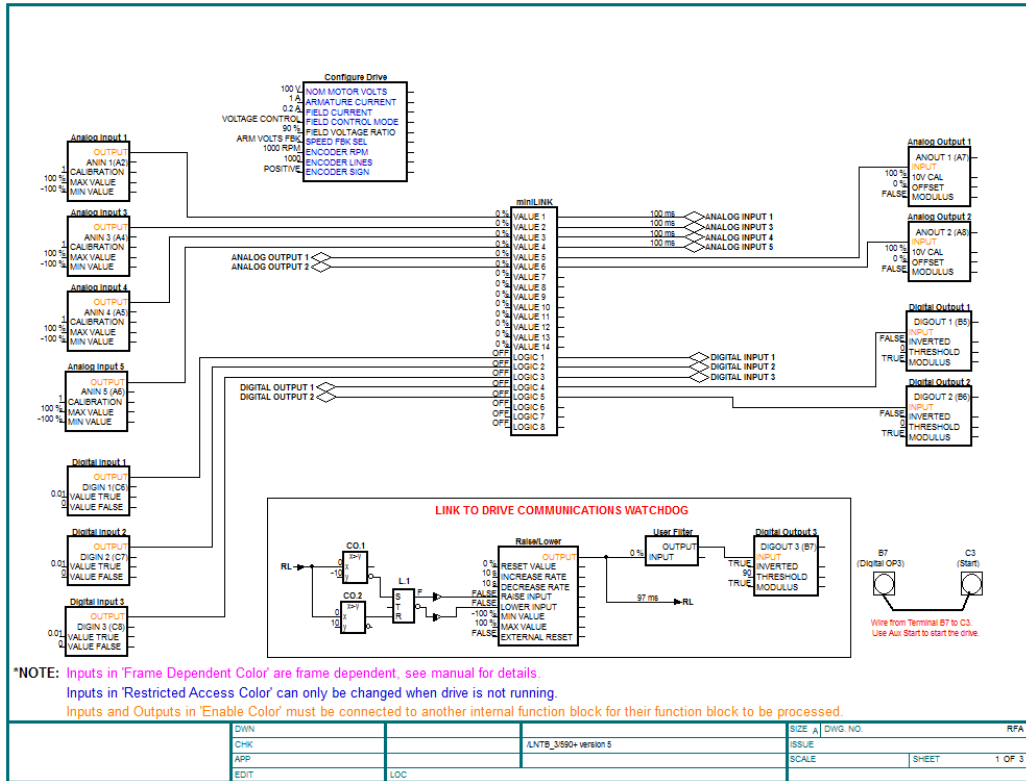


- A Digital Input or Output will not require a connection speed as they are updated on a change of state only. Meaning that if the state is always True, an Output will not be sent until the state changes to a False. The Digital Outputs are scanned at a default rate of 100 ms. This update rate can be changed by right mouse clicking on the connection line and selecting Update Rate.

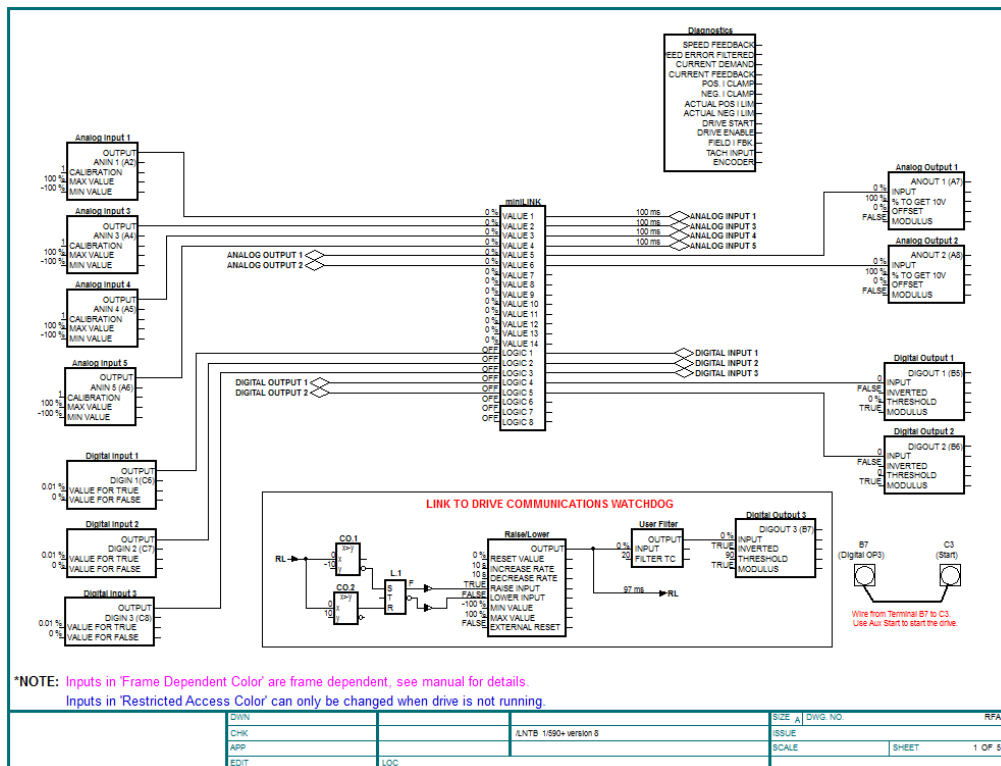


Using Drive I/O

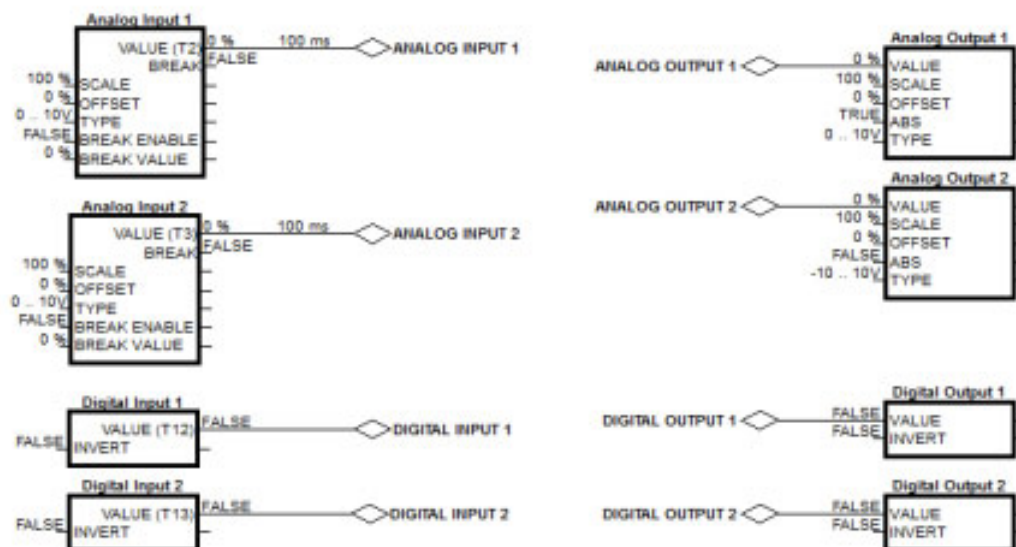
Drive analog and digital inputs are available for use as I/O for the *Link* system. The DC590+ drive firmware version 5.x requires the use of the MiniLink or system function blocks. The DC590+ drive with firmware v 8.x and the AC690+ drive don't require the use of the MiniLink or system blocks.



DC590+ Version 5.x Analog and Digital I/O



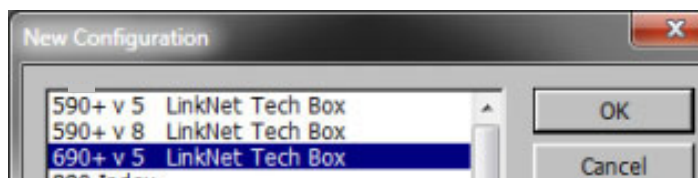
DC590+ Version 8.x Analog and Digital I/O



AC690+ Analog and Digital

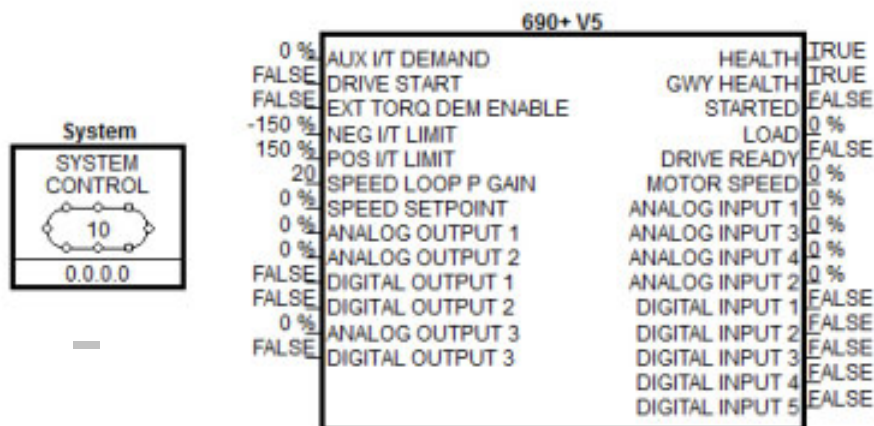
690+ Macro Sample Configuration

Select the 690+ template from the “FILE / NEW” menu.



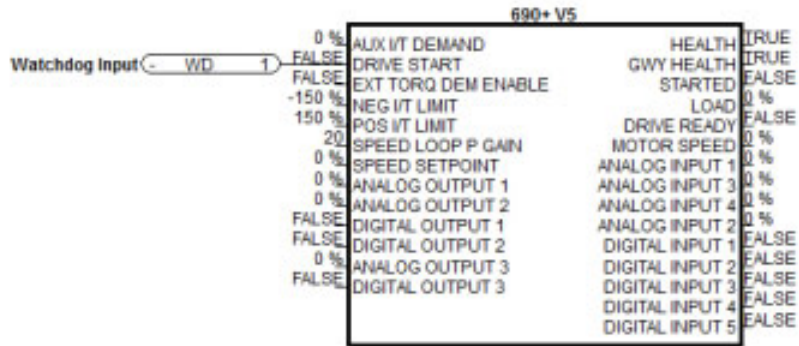
After completing the above steps you should see the 690+ macro without any Link connections as shown below.

LINKnet L690+ version 5 Template



Watchdog Circuit

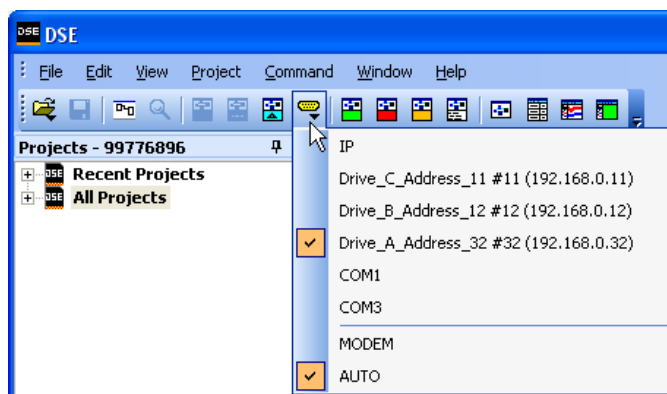
It is recommended that a Watchdog Circuit be implemented in each LINKnet configuration to stop the drive if there is a loss of Ethernet communications. Presently if there is a loss of Ethernet communications on the LINKnet drive, it will continue to run and not fault. Within DSE there is a WATCHDOG INPUT function block located in the BLOCK MENU. It can be connected to the DRIVE START Input in place of an INPUT Slot. It must be updated with a logic True signal. If 5 seconds has passed and it is not updated with a logic True, the Output of the block will go False and the drive will stop and not fault. This WATCHDOG can also be connected to a Digital Output which can be monitored by the user to take further action. For more information on this function block, see the Help Data sheet within DSE.



Chapter 5 – Connecting to the LINKnet Techbox

There are two ways to connect to LINKnet Techbox network. One way is using the USB port and the other way is via Ethernet. The recommended way is the Ethernet, as it is faster. The USB port can be used if there is a problem connecting via Ethernet.

To use the Ethernet connection the pc must be set up to be on the same subnet address as LINKnet. This setup procedure is listed on page 8 of this manual. Once this setup is complete connect the pc's Ethernet cable to a device which is on the LINKnet communications network such as a switch. Then launch DSE. Go to the yellow Serial port Icon and select it. All of the modules which are on the LINKnet will be shown along with the IP Address of each module. Also shown will be which module the Ethernet is connected to. In the example shown below the Ethernet is connected to 'Drive_A_Address_32'. There are 3 modules on this Ethernet.



In the above example the 'checked box' shows which module DSE is connected via the Ethernet.

The *Module List* will look like the picture shown below. The * indicates which module, the Ethernet is connected to.

Module list			
Adrs	Name v	Library	Status
*0032	Drive_A_Address_32	LNTB v1.1	OK
0012	Drive_B_Address_12	LNTB v1.1	OK
0011	Drive_C_Address_11	LNTB v1.1	OK

Command / Get Info

A *Command / Get Info* displays the modules *IP Address* as shown below.

It also shows the firmware *build* (shown 1.1) and the firmware *boot loader* (shown 1.1) information.

```
Scratch Pad - 99304132:INTE-5/LA0355050-LN
-----Module Information----- Tue Jul 01 12:18:38 2014
Serial number: 1342-US-9-0404, MAC: 0:13:70:169:97:147, IP: 192.168.1.40
Hardware: LINKnet TB (ROM 12.4, rev. 1 hardware)
Library: LINKnet Techbox (version 1.1 firmware) - RD470905.001, build 1.1, loader 1.1
Project: 99304132:LINKnet Example
Configuration: LN590P-40
Modification: 43
Permanent address: 40
Working address: 40
Persistents used: 19.0% (456 of 2400)
Storage used: 25.8% (264 of 1024 pages)
CPU used: Recent: 0.8%, Peak: 0.8%
Heap used: Static: 69.4%, Peak: 69.4% (5796/5955 of 8579 nodes)
Messages/s: 0
Status: OK, drive not started
```

Installing and updating a configuration for the first time

1. Using DSE obtain a *Module List*. This *Module List* will show all of the modules in the network.
2. Open the LINKnet configuration which you want to install. Make sure the correct motor data is entered in the *Motor Data* block for the 690+ or in the *Configure Drive* block for the 590+ drive.
3. In the *Module List* highlight the module where you to install this configuration.
4. Do a *Command / Install at Selected*. This will install the Application configuration and all of the drive setting except the *Frame dependent* parameters.
5. Perform and *Autotune* on the drive.
6. Do a *Parameter Save* either from the Drive MMI keypad or from DSE by doing a *Command / Parameters Save*.
7. Now to get the Frame dependent and Autotune parameters back into the DSE configuration, do a *Project / Update*.
8. Open the configuration and make sure these Autotune parameters did get updated into the configuration.

Chapter 6 – Troubleshooting

**6055-LNET-00
TECHBOX**



**6053-LNET-00
TECHBOX**



Health and Run LED's

Health and Run are drive functions and are not associated with the operation of the technology feature.

On the AC690+ frame B the Techbox is mounted in place of the keypad or blank cover. The Run and Health LED's from the keypad are replicated on the face of the techbox. The bottom two LED indicators are for the Module and Power On status.

On the AC690+ frames C and above and DC590+ the Run and Health LED's are on the drive itself. Located on the TechBox are 2 LEDs that indicate the Status of the Module and the Power on.

Power On LED

This indicates that the LINKnet Technology Box Option has power applied to it.

LED STATE	FAULT	DESCRIPTION
OFF	No Power	Apply power to drive or supply external power via terminal connector TB1.
ON (Red)	None	Module has power applied to it.

Module LED Status

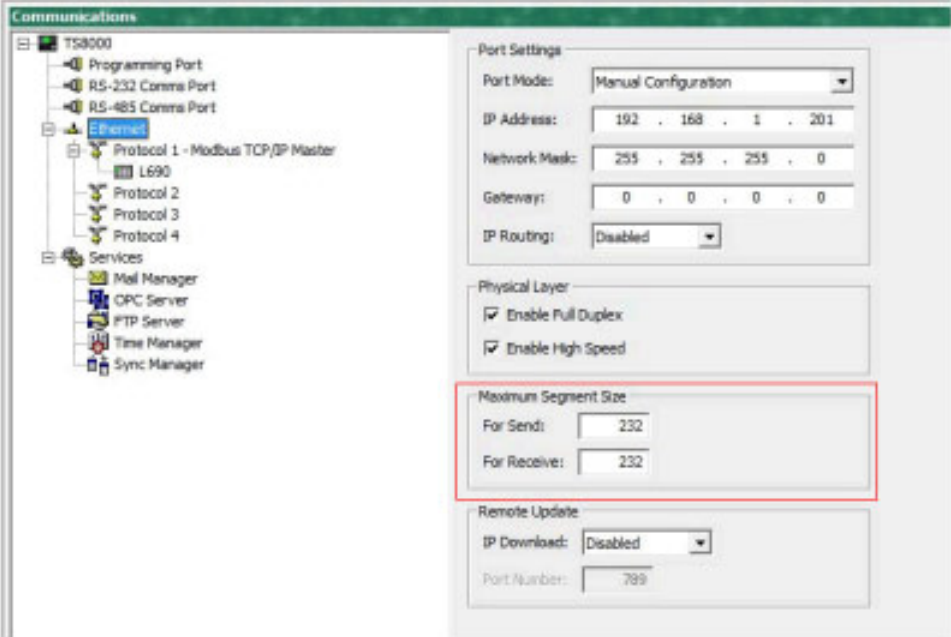
NCP State	Techbox State	LED Indication – 1 second period ^E	Blink Code (1second ^E)
0 Initializing	Initializing	Green 10 % : Off 90 %	
1 Halt	Config	Red 95% : Green 5%	
2 No Config	Fault	Red 50% : Off 50%	
3 L-Error	Fault	Green 50% : Red 50%	
4 H-Error	Fault	Orange 50% : Red 50%	
5 Self Test Fail	Fault	Green 50% : Orange 50%	
6 Shutdown **	Stopping	Green 30% : Orange 30% : Red 30% : Off 10% (over a 8 second period)	
7 OK	Running	Green 95% : Off 5%	
8 Power Fail disabled **	Running	Orange 25%:Green 50%:Off 25% (a very slow blink over a 2 second period)	
9 Network Failure	Running	Green 50% : Off 50%	
A Checking Network	Starting	Green 25% : Off 75%	
B Peer Halted	Starting	Red 50% : Green 35% : Off 15%	
C Duplicate Address	Fault	Green 75% : Red 25%	
- Debugging	Fault	Red 25% : Off 75%	
- Identify USB power *	Running	Orange 25% : Off 75%	
- Identify drive power *	Running	Orange 50% : Off 50%	
- Identify External power *	Running	Orange 75% : Off 25%	
- Hardware Initialization	Fault	Orange 25:Red 25:Orange 25:Green 25	
*When using DSE and a COMMAND / IDENTIFY is performed, the LED will flash at this Blink Code indicating where the Techbox power is coming from, either the USB port, drive power or External power.			
** To clear this fault all power must be removed from the Techbox and the USB cable must not be disconnected from the Techbox.			
^E LED blink duration is 1 second, except as noted			

Chapter 7 – Programming TS8000

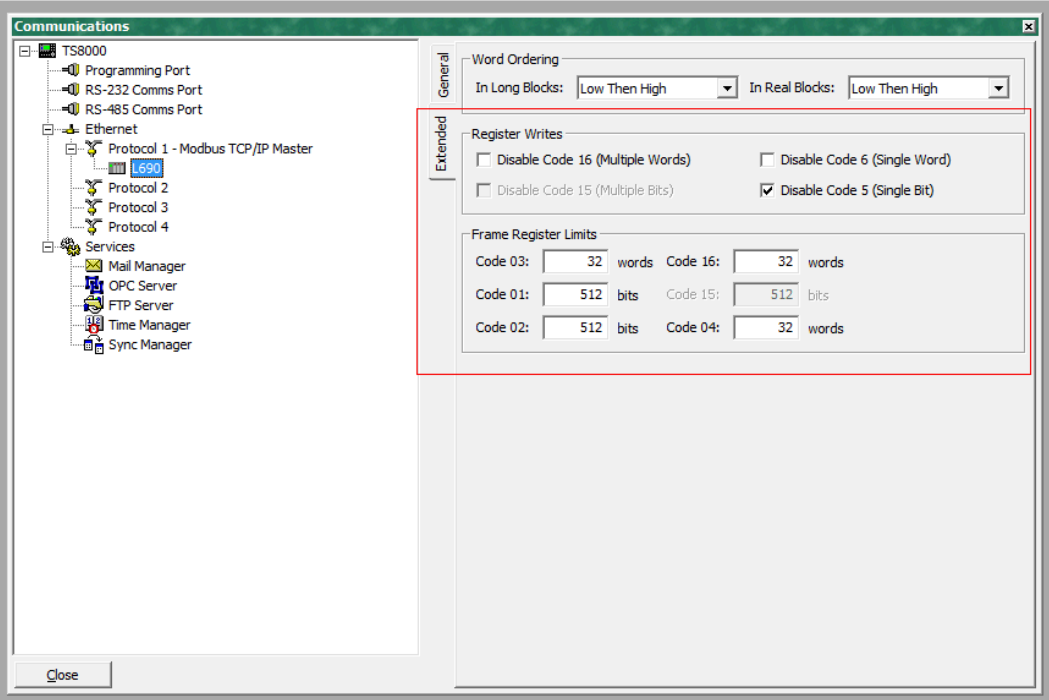
Modbus Settings

There are some settings/limits that are needed for the TS8000 communications.

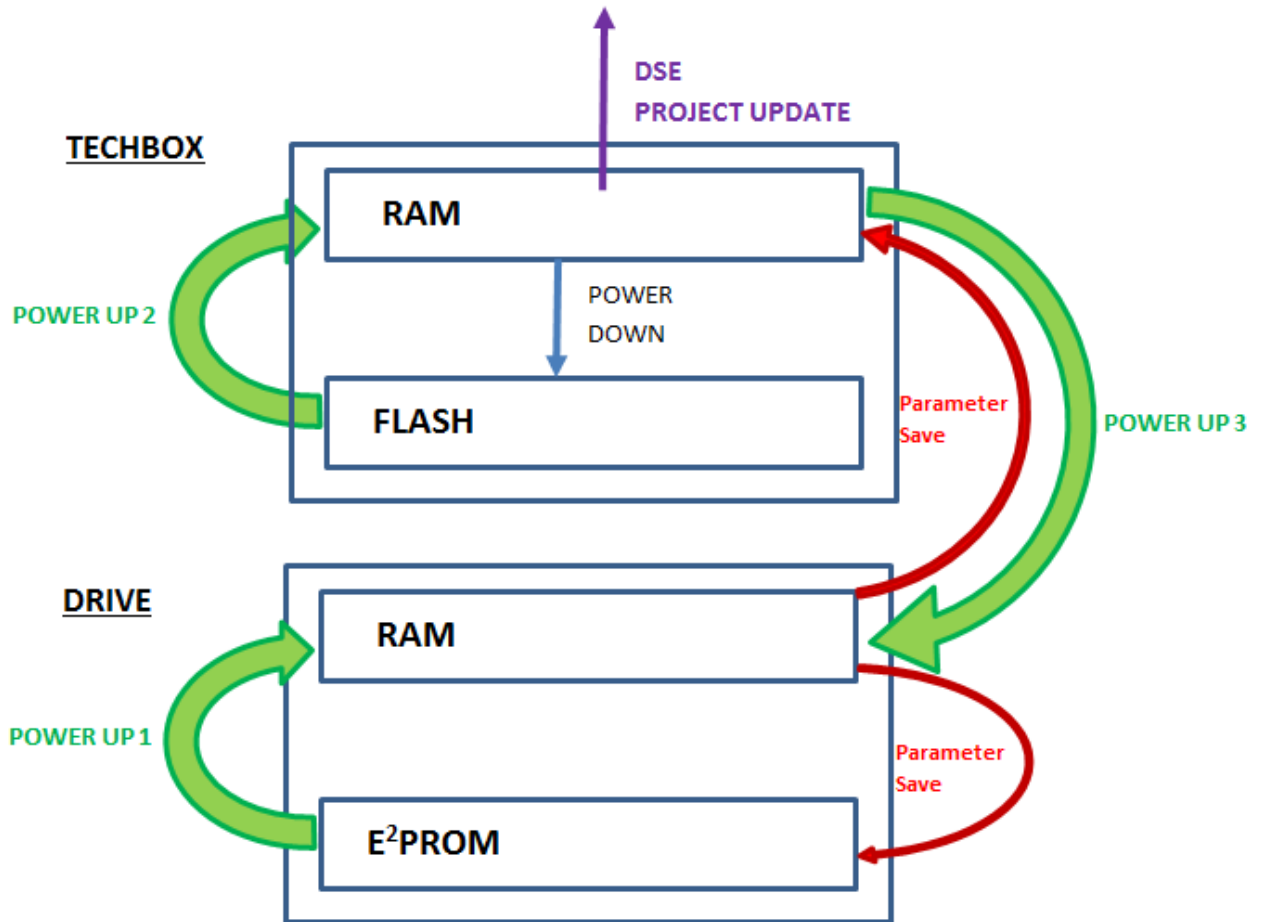
The Maximum Segment (Ethernet packet) size is 232:



In the Extended Settings, the Register Writes and the Frame Register Limits need to be set as shown below:



Appendix A - Sequencing States



On Power Up the sequence is as follows:

1. When the drive is powered up, data is transferred from the *Drives E Squared PROM* to the *Drives RAM*.
2. Then data is transferred from the *Techbox's Flash* to the *Techbox's RAM*.
3. The last step is: data is transferred from the *Techbox's RAM* to the *Drives RAM*.

On a "Drive Parameter Save" the sequence is as follows:

1. Data is transferred from the *Drives RAM* to the *Drives E Squared PROM*.
2. Data is transferred from the *Drives RAM* to the *Techbox's RAM*.

On a "DSE / Project / Update" the sequence is as follows:

1. When using DSE and a *Project / Update* is performed, data taken from the *Techbox's RAM* and the *LINK Configurations* are updated. This is why a *Parameter Save* MUST be done prior to doing a *Project / Update*. If a *Parameter Save* is not performed, the *LINK Configurations* will not be updated with the drives latest parameters.

On a Power down:

1. Data is transferred from the *Techbox's RAM* to the *Techbox's FLASH*.

Parker Worldwide

AE – UAE, Dubai

Tel: +971 4 8127100
parker.me@parker.com

AR – Argentina, Buenos Aires

Tel: +54 3327 44 4129

AT – Austria, Wiener Neustadt

Tel: +43 (0)2622 23501-0
parker.austria@parker.com

AT – Eastern Europe, Wiener Neustadt

Tel: +43 (0)2622 23501 900
parker.easteurope@parker.com

AU – Australia, Castle Hill

Tel: +61 (0)2-9634 7777

AZ – Azerbaijan, Baku

Tel: +994 50 2233 458
parker.azerbaijan@parker.com

BE/LU – Belgium, Nivelles

Tel: +32 (0)67 280 900
parker.belgium@parker.com

BR – Brazil, Cachoeirinha RS

Tel: +55 51 3470 9144

BY – Belarus, Minsk

Tel: +375 17 209 9399
parker.belarus@parker.com

CA – Canada, Milton, Ontario

Tel: +1 905 693 3000

CH – Switzerland, Etoy

Tel: +41 (0)21 821 87 00
parker.switzerland@parker.com

CL – Chile, Santiago

Tel: +56 2 623 1216

CN – China, Shanghai

Tel: +86 21 2899 5000

CZ – Czech Republic, Klecany

Tel: +420 284 083 111
parker.czechrepublic@parker.com

DE – Germany, Kaarst

Tel: +49 (0)2131 4016 0
parker.germany@parker.com

DK – Denmark, Ballerup

Tel: +45 43 56 04 00
parker.denmark@parker.com

ES – Spain, Madrid

Tel: +34 902 330 001
parker.spain@parker.com

FI – Finland, Vantaa

Tel: +358 (0)20 753 2500
parker.finland@parker.com

FR – France, Contamine s/Arve

Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

GR – Greece, Athens

Tel: +30 210 933 6450
parker.greece@parker.com

HK – Hong Kong

Tel: +852 2428 8008

HU – Hungary, Budapest

Tel: +36 1 220 4155
parker.hungary@parker.com

IE – Ireland, Dublin

Tel: +353 (0)1 466 6370
parker.ireland@parker.com

IN – India, Mumbai

Tel: +91 22 6513 7081-85

IT – Italy, Corsico (MI)

Tel: +39 02 45 19 21
parker.italy@parker.com

JP – Japan, Tokyo

Tel: +81 (0)3 6408 3901

KR – South Korea, Seoul

Tel: +82 2 559 0400

KZ – Kazakhstan, Almaty

Tel: +7 7272 505 800
parker.easteurope@parker.com

LV – Latvia, Riga

Tel: +371 6 745 2601
parker.latvia@parker.com

MX – Mexico, Apodaca

Tel: +52 81 8156 6000

MY – Malaysia, Shah Alam

Tel: +60 3 7849 0800

NL – The Netherlands, Oldenzaal

Tel: +31 (0)541 585 000
parker.nl@parker.com

NO – Norway, Ski

Tel: +47 64 91 10 00
parker.norway@parker.com

NZ – New Zealand, Mt Wellington

Tel: +64 9 574 1744

PL – Poland, Warsaw

Tel: +48 (0)22 573 24 00
parker.poland@parker.com

PT – Portugal, Leca da Palmeira

Tel: +351 22 999 7360
parker.portugal@parker.com

RO – Romania, Bucharest

Tel: +40 21 252 1382
parker.romania@parker.com

RU – Russia, Moscow

Tel: +7 495 645-2156
parker.russia@parker.com

SE – Sweden, Spånga

Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

SG – Singapore

Tel: +65 6887 6300

SK – Slovakia, Banská Bystrica

Tel: +421 484 162 252
parker.slovakia@parker.com

SL – Slovenia, Novo Mesto

Tel: +386 7 337 6650
parker.slovenia@parker.com

TH – Thailand, Bangkok

Tel: +662 717 8140

TR – Turkey, Istanbul

Tel: +90 216 4997081
parker.turkey@parker.com

TW – Taiwan, Taipei

Tel: +886 2 2298 8987

UA – Ukraine, Kiev

Tel: +380 44 494 2731
parker.ukraine@parker.com

UK – United Kingdom, Warwick

Tel: +44 (0)1926 317 878
parker.uk@parker.com

US – USA, Cleveland

Tel: +1 216 896 3000

VE – Venezuela, Caracas

Tel: +58 212 238 5422

ZA – South Africa, Kempton Park

Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

