Addendum

L5211-HP VME Gateway

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WARNING!

Only qualified personnel who thoroughly understand the operation of this equipment and any associated machinery should install, start-up, or attempt maintenance of this equipment. Non-compliance with this warning may result in serious personal injury and/or equipment damage.

WARNING!

Never work on any control equipment or motors without first removing all power supplies from the equipment.

Caution

This equipment contains ESD (Electrostatic Discharge) sensitive parts. Observe static control precautions when handling, installing, and servicing this device.

Caution

This equipment was tested before it left our factory. However, before installation and start up, inspect all equipment for transit damage, loose parts, packing materials, etc.

Caution

Ruptured semiconductor devices may release toxic materials. Contact Eurotherm Drives or the semiconductor manufacturer for proper disposal procedures for semiconductors or other material.

NOTE. The installation of this equipment must comply with the National Electric Code and any applicable local codes.

CONTENTS

Chapter 1 INTRODUCTION

The original release of the software library for the L5211 VME Gateway had limitations which made the product less than attractive for Link users, especially on larger systems. The L5211's limitations included: a restriction on the number of parameters per L5211 (about 40 inputs and 40 outputs), a cumbersome programming burden on the VME user, and relatively poor throughput between the VME backplane and the Link system. To address these limitations, a rewrite of the existing software library was undertaken resulting in the new high performance VME library.

Improvements of the L5211 HP library include:

- a total of 1535 inputs and 1536 Link Outputs per L5211 card
- the user no longer has to control flag bits to transmit data, the user simply writes to memory locations (base address + offset)
- the user may use a control byte to enable/disable inputs, outputs, and sender functionality
- direct support of byte-swapping through the control byte making the product both Intel® and Motorola® friendly

Upgrading the L5211 requires only an update of the LINK database. No hardware modifications are required (i.e., all existing Gateways may be upgraded with only the programming changes required in the VME controller).

Chapter 2 THEORY OF OPERATION

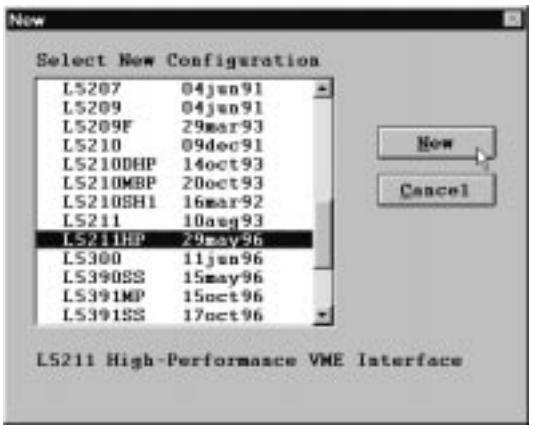
The L5211 has dual ported memory which can be accessed by both the VME processor and the Link processor. All manipulation of the L5211's functionality is from the VME (PLC) side. The user reads the data coming in from Link, writes the data going out to Link, and specifies the Link routing information by accessing memory locations on the VME backplane. The only information which is specified by ConfigEd is the Link topology and node address of the L5211.

On the Link side, all the programming of the drives is performed as with a normal Link system. Data being sent from Link to VME has to have the gateway's node number and the appropriate slot number defined in the sending module's configuration while any data which needs to be sent from VME to Link needs to have the receiving slot's number defined in the destination node's Link configuration.

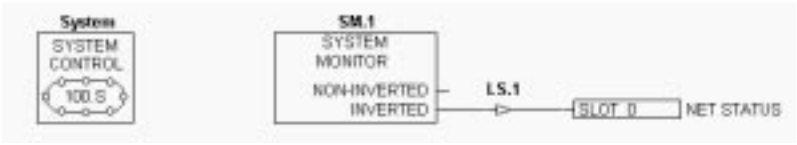
On the PLC side, the user writes to memory to both route all the information and to transmit the actual data. The L5211 product uses standard VME Read Byte and VME Write Byte operations available in the VME's master processor programming software, so for the PLC programming side, all the user has to do is read and write from memory mapped to the VME backplane.

Chapter 3 LINK CONFIGURATION

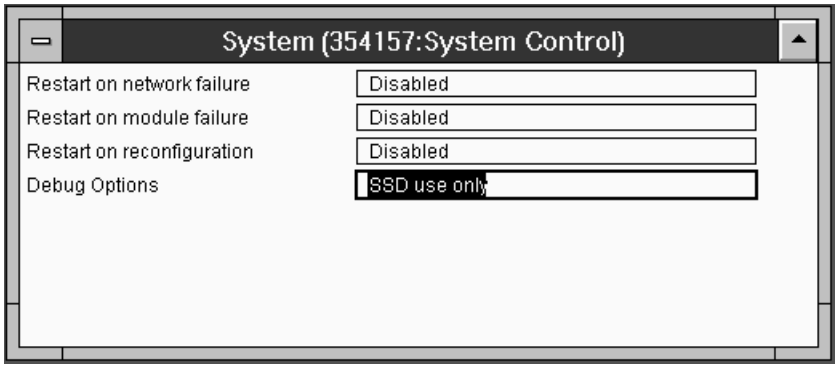
To select the L5211 High Performance library, after selecting the File/New menu item in ConfigEd choose the L5211 HP.



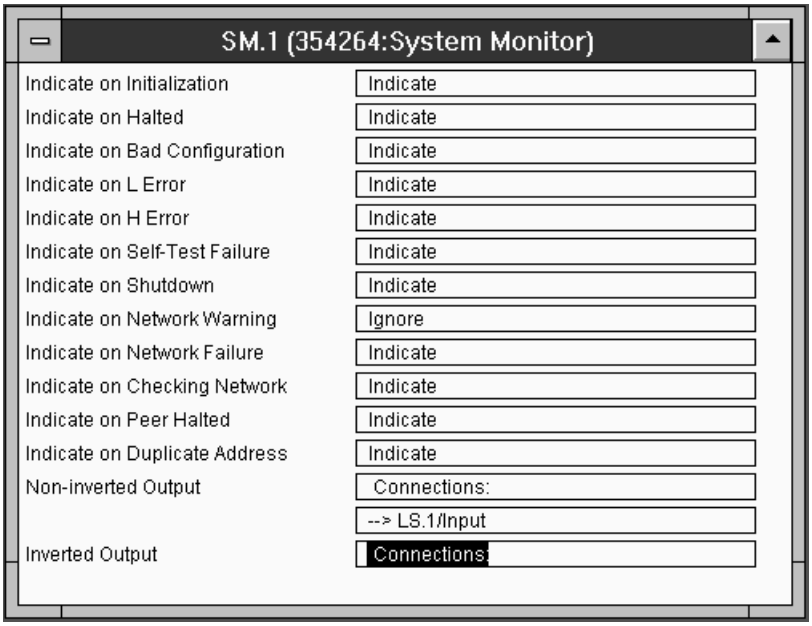
Although the L5211 configuration can contain an assortment of LINK function blocks, any blocks placed in the Gateway's configuration will hinder performance. Each block will require CPU time which would otherwise be used in the Gateway's task of passing data between the VME backplane and the LINK system. For this reason, the default configuration for the L5211 with the High Performance VME library contains only the blocks shown below:



The System Control block is configured the same as in all other LINK modules. The user need change only the network topology and address to the appropriate values prior to loading the configuration. Typically, all of the restart actions are disabled as shown below:

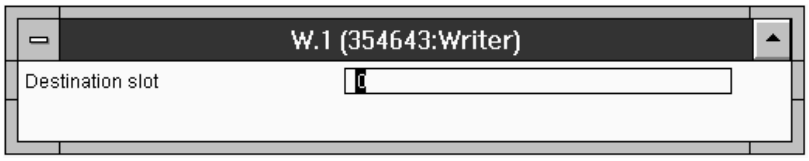


The System Monitor block is used to monitor the status of the LINK network and may be configured to indicate on numerous network states. In the default configuration, the non-inverted output of the System Monitor is connected to Slot 0 (offset of $0000 - $0001 in the memory space). The default setup of the System Monitor is configured to indicate on all changes of state with the exception of the Network Warning state. The indication states may be modified by editing the default configuration appropriately. The internals of the System Monitor block are shown below:



The Logic Sender block LS.1 is a block which will update the Writer block W.1 on-change as well as every two seconds.

The Writer block may be used to connect function blocks in the L5211 VME configuration to incoming slots in the shared memory. Valid ranges for the destination slot are 0 through 1535 which map to the corresponding offset address as specified in the Memory Map section of this document. Internals of the Writer block are shown below:



Chapter 4 MEMORY MAP

The base address of the L5211 VME gateway is set by the jumpers JMP2 which may be accessed through the side of the unit. The following addresses are offsets from the configured base address:

Hex. Address	Description	Comments
INPUT REGION = Address space to be read from LINK		
$0000 - $0001	Network Status	Link network status as configured in System Monitor in LINK configuration
$0002 - $0003	Input Slot 1	
....	....	....
$0BFE - $0BFF	Input Slot 1535	Total of 1535 LINK inputs
OUTPUT REGION = Address space to be written to LINK		
$0C00 - $0C01	Data for LINK connection 1	Data to be sent to LINK placed in this address space
....	....	....
$17FE - $17FF	Data for LINK connection 1536	Total of 1536 LINK outputs
ROUTING INFORMATION = Output data destination nodes (1:1)		
$1800 - $1801	Destination node for LINK connection 1	Place routing data in this address space
....	....	....
$23FE - $23FF	Destination node for LINK connection 1536	Total of 1536 LINK outputs
ROUTING INFORMATION = Output data destination slots (1:1)		
$2400 - $2401	Destination slot for LINK connection 1	Place routing data in this address space
....	....	....
$2FFE - $2FFF	Destination slot for LINK connection 1536	Total of 1536 LINK outputs
OUTPUT DATA COPY = Used by LINK to send data on change		
$3000 - $3001	Output data copy LINK connection 1	Data here is compared to address space $0C00 through $17FF
....	....	....
$3BFE - $3BFF	Output data copy for LINK connection 1536	Copy for each of the possible 1536 LINK outputs

Hex. Address	Description	Comments
CONTROL BYTES		
$3C00 - $3C01	Active Output Count	Used by the L5211 to loop through the output table (optimizes performance)
$3C02	Control Byte	
	Bit 00	Enable inputs (1 = enable, 0 = disable)
	Bit 01	Enable outputs (1 = enable, 0 = disable)
	Bit 02	Enable lazy outputs (1 = enable, 0 = disable)
	Bit 03	Motorola format (byte swap)(1 = Motorola, 0 = Intel)
	Bit 04 through 07	Unused
UNUSED		
$3C03 - $3FFF	Unused	Remaining area of the 16K address space

APPLICATION NOTES

1. Upon L5211 Gateway power-up or restart, the active Output Count ($3C00 - $3C01) is set to zero by the LINK processor. Leave the Output Count to zero until all routing information has been initialized properly. Output connections will not be active until BOTH the Output Count includes the required connection and Bit 01 of the Control Word ($3C02 - $3C03) is set to 1.
2. Input data ($0002 - $0BFF) will not updated until Bit 00 of the Control Word ($3C02 - $3C03) is set to 1.
3. If included in the output count, output data is sent whenever the output data copy ($3000 through $3BFF) differs from its corresponding output data ($0C00 through $17FF). This requires the user to write a value different than the current output data to the output data copy address space whenever the L5211 Gateway powers-up or restarts.

   If periodic updates of all active output connections is required (like Senders in LINK), Bit 02 of the Control Word ($3C02 - $3C03) may be set to provide a refresh of current output data every 2 seconds.
4. There can be only one output connection per 16 bit register. In order to provide multiple connections, multiple addresses in the output region ($0C00 through $17FF) must be used.

ROUTING EXAMPLES

An example of routing information for a couple of LINK outputs follows:

To route LINK output number 1 to LINK node 100, slot 1			
Description	**Offset address**	**Value**	**Description**
Current data	$0C00 - $0C01	####	Sixteen bit number
Destination node	$1800 - $1801	100	LINK address 100
Destination slot	$2400 - $2401	1	Slot 1 at address 100
Data copy	$3000 - $3001	####	Last value sent

To route LINK output number 1536 to LINK node 45, slot 535			
Description	**Offset address**	**Value**	**Description**
Current data	$17FE - $17FF	####	Sixteen bit number
Destination node	$2FFE - $23FF	45	LINK address 45
Destination slot	$2FFE - $2FFF	535	Slot 1 at address 535
Data copy	$3BFE - $3BFF	####	Last value sent