Genisys® II
Code System Interface Board

ASTS USA Part No.
N17061302

- **Installation**
- **Maintenance**
-

Proprietary Notice

Important Notice

ASTS USA constantly strives to improve our products and keep our customers apprised of changes in technology. Following the recommendations contained in the attached service manual will provide our customers with optimum operational reliability. The data contained herein purports solely to describe the product, and does not create any warranties.

Within the scope of the attached manual, it is impossible to take into account every eventuality that may arise with technical equipment in service. Please consult an ASTS USA local sales representative in the event of any irregularities with our product.

ASTS USA expressly disclaims liability resulting from any improper handling or use of our equipment, even if these instructions contain no specific indication in this respect. We strongly recommend that only approved ASTS USA spare parts are used as replacements.

Revision History

REV.	DATE	NATURE OF REVISION
Original	January 2006	Initial Issue
2	September 2010	Added Section 11 and Appendix J

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1. FUNCTIONAL DESCRIPTION

The Genisys®[1] II Code System Interface Board (CSIB) (N17061302) (Figure 1-1) is an enhanced replacement for the Genisys 2000-based CSIB (N17061401) described in Section 2.3.5 of Service Manual SM 6800A, "MICROLOK II System Description." The CSIB functions as an interface between various non-vital code line protocols commonly used in the railroad industry and is physically identical to the standard MicroLok®[2] II controller board (N17061301) having the same connector pinouts and option jumpers. The Genisys II executive software is non-vital but very similar to the MicroLok II vital executive. When it is the only controller in the cardfile, it supports all of the non-vital MicroLok II physical I/O boards. It does not support vital MicroLok II physical I/O boards. The Genisys II CSIB is supported by the Genisys II Development System (N800202-0001 for complete development system including the maintenance tool or N800203-0001 for maintenance tool only).

NOTE

The Genisys II CSIB is NOT a direct replacement for the Genisys 2000-based MicroLok II CSIB (N17061401). The cardfile connector that mates with the top connector on the Genisys II CSIB must be rewired to accommodate the Genisys II CSIB if it is used to replace N17061401.

The Genisys II CSIB currently supports the following non-vital code line protocols:

- Genisys (Master end)
- Genisys (Slave end)
- MicroLok II Peer
- SCS-128 (Slave end)
- MCS-1 (Slave end)
- ARES (Wayside Interface Unit)
- ATCS (Wayside Interface Unit)
- GETS Serial Local Control Panel
- S2 (Slave end)

MCS-1 and SCS-128 slave end protocol handlers and the enhanced Genisys slave end protocol handler support optional NORMAL and STANDBY physical ports selectable by asserting the data carrier direct (DCD) input on the CSIB serial port that is designated as the STANDBY port.

[1] Genisys® is a registered trademark of Ansaldo STS USA, Inc.

[2] MicroLok®is a registered trademark of Ansaldo STS USA, Inc.

Future releases of the Genisys II CSIB will include support for additional code line protocols.

1.1. Front Panel Operation

The Genisys II CSIB front panel controls and indications are physically identical to those found on the MicroLok II Controller Board. The basic operation of these controls and indications is described in detail in SM 6800C. Only menu items associated with non-vital functions are available on the CSIB. The two four-character alphanumeric displays normally scroll the executive ID and application name. When using the front panel menu controls the alphanumeric displays show the various menu options.

LEDs “1” through “8” may be controlled using application program commands just as they are in MicroLok II. The “ON LINE” LED indicates that the Genisys II CPU is running. The “VPP ON” LED is illuminated when programming executive or application flash memory. The “RESET” LED is illuminated when the CPU is held in reset mode by the “RESET” button. LEDs “A” through “E” display communication activity for the selected physical serial port. The conditions indicated by LEDs “A” through “E” are described in Table 1-1. Protocol-specific front panel control options are described in the protocol-specific sections in this manual.

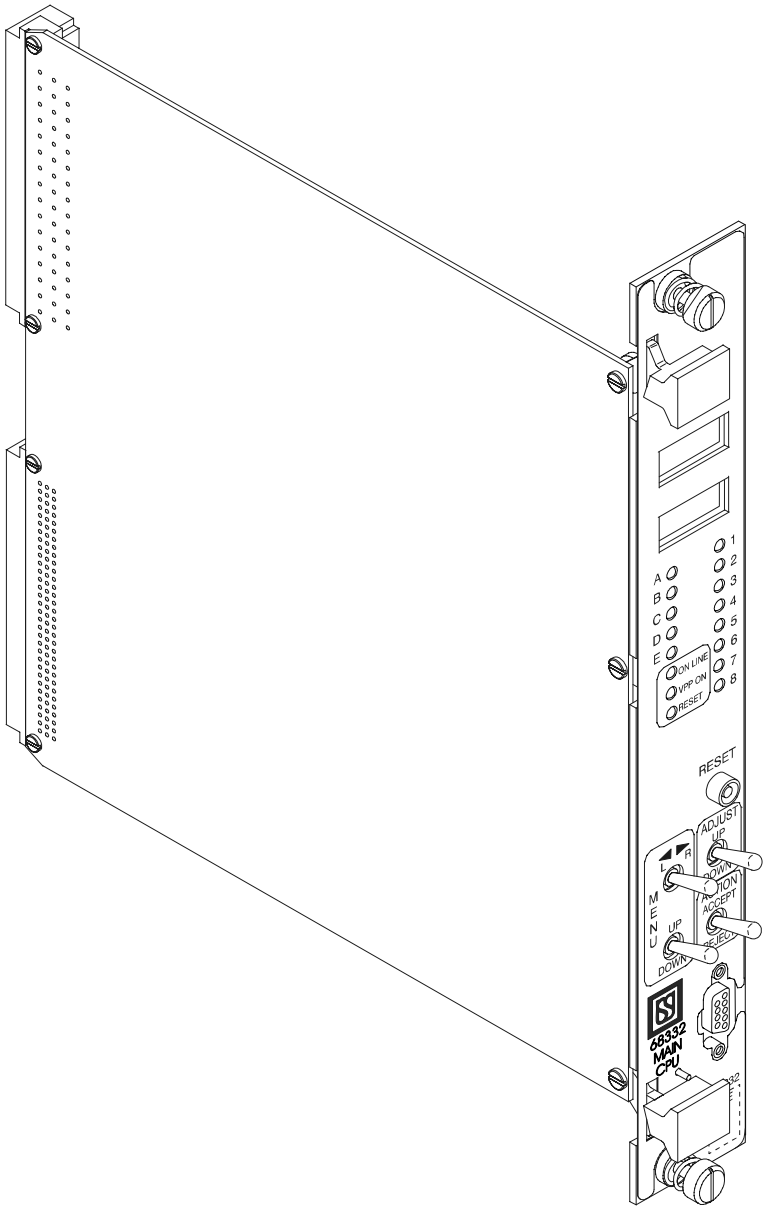


Figure 1-1. Genisys II Code System Interface Board

Table 1-1. Communication LED Functions

LED	Indication
A	Transmitter Active
B	Good Message Received
C	Message Addressed to this Unit
D	Received Carrier Detected
E	Error Detected in Received Message

1.2. External Connections to the Genisys II CSIB

Because the Genisys II Controller Board is physically identical to the MicroLok II Controller Board, external connections to the Genisys II CSIB are defined in Section 2.4 of Service Manual SM 6800B. The "250 Hz" output of the MicroLok II Controller Board is disabled by the Genisys II Executive software and is not available on the Genisys II CSIB.

Normal external connections for serial communication links supported by the Genisys II CSIB are presented in Table 1-2.

Table 1-2. Serial Interface Signal Connections Supported by Genisys II

Signal Name	Signal Designation	Port 1	Port 2	Port 3	Port 4
Serial Data Output	TXD- TXD+	A2 A4	A16 A18	E16	C20
Serial Data Input	RXD- RXD+	C6 C8	A24 A26	E14	C22
Request to Send Output (Required for multi-drop modem connections only)	RTS- RTS+	E2 E4	A20 A22	C14	A14
Clear to Send Input (Required only for multi-drop modem connections where the modem supports CTS)	CTS- CTS+	A10 A12	Not Available	E12	Not Available
Standby Port Active (Standby Port Only. Required only if a standby port is defined.)	DCD- DCD+	C10 C12	A28 A30	E10	C16
Receiver Reference Common	RXREF	Not Available	Not Available	E18	Not Available
Signal Common	COM	A32	C18	C18	A32
+12 Volts	+12V	C24	C24	C24	C24
-12 Volts	-12V	C26	C26	C26	C26

1.3. Genisys II CSIB Board Jumpers

The required jumper positions for the Genisys II CSIB vary depending on the protocol selected for each serial port. The default jumper positions are presented in Table 1-3. The protocol-specific jumper positions are described in the protocol-specific sections in this manual. The factory default position for each jumper is shown in **BOLD TYPE**.

Table 1-3. Jumper Connections

Jumper ID	Description		Position	Notes
JMP1	Bottom PCMCIA Slot Wait States	1 WS **2 WS**	1-2 **2-3**	3
JMP2	Bottom PCMCIA Slot Wait States	3 WS 4 WS	1-2 2-3 **Not Installed**	3
JMP3	On-Board RAM Wait State	0 WS **1 WS**	1-2 **2-3**	1
JMP4	Top PCMCIA Wait States	1 WS **2 WS**	1-2 **2-3**	4
JMP5	Top PCMCIA Wait States	3 WS 4 WS	1-2 2-3 **Not installed**	4
JMP6	On-Board FLASH Wait States	0 W **1 WS**	1-2 **2-3**	1
JMP7	Enable Serial Port 4 RXD Input	**Enabled** Disabled	**1-2** 2-3	
JMP8	Enable Serial Port 4 DCD Input	**Enabled** Disabled	**1-2** 2-3	
JMP9	CPU Reset from Backplane	**Disabled** Enabled	**1-2** 2-3	
JMP10	Serial Port 1 Synchronous TX.CLK	Input **Output**	1-2 **2-3**	
JMP11	Serial Port 3 Driver Level	**RS-232** RS-423	**1-2** 2-3	5
JMP12	Serial Port 3 Driver Level	**RS-232** RS-423	**1-2** 2-3	5
JMP13	Serial Port 3 Synchronous TX.CLK	Input **Output**	1-2 **2-3**	
JMP14	Serial Port 3 Synchronous TX.CLK	**Output** Input	**1-2** 2-3	
JMP15	Serial Port 4 Receiver Clock Input	9.8304 MHz Off	**1-2** 2-3	
JMP16	Serial Port 3 Receiver Clock Input	**9.8304 MHz** External	**1-2** 2-3	
JMP17	Serial Port 2 Receiver Clock Input	**9.8304 MHz** Off	**1-2** 2-3	
JMP18	Serial Port 1 Receiver Clock Input	9.8304 MHz **External**	**1-2** 2-3	
JMP19	Deleted		N/A	
JMP20	FLASH PROM Programming Enable 0x200000 – 0x2FFFFF (Low application program space)	**Locked** Program	**Position 1-2** Position 2-3	2
JMP21	FLASH PROM Programming Enable 0x000000 – 0x0FFFFF (Low executive program space)	**Locked** Program	**Position 1-2** Position 2-3	2
JMP22	FLASH PROM Programming Enable 0x100000 – 0x1FFFFF (High executive program space)	**Locked** Program	**Position 1-2** Position 2-3	2
JMP23	FLASH PROM Programming Enable 0x300000 – 0x3FFFFF (High application program space)	**Locked** Program	**Position 1-2** Position 2-3	2
JMP24	Boot Program Block (Boot space)	**Locked** Program	**Position 1-2** Position 2-3	2

Jumper ID	Description		Position	Notes
JMP25	Speaker Volume	**Soft** Loud Off	**Position 2-3** Position 1-2 Not Installed	
JMP26	Power Fail – Non-Maskable Interrupt Enable	P.F Enable NMI Enable P.F./NMI Disable	1-2 3-4 **2-4**	
JMP27	CPU Output Drivers	**Enable** Disable	**1-2** 2-3	1
JMP28	Top PCMCIA Slot Programming Voltage	**Locked** Program	**Position 1-2** Position 2-3	
JMP29	Bottom PCMCIA Slot Programming Voltage	**Locked** Program	**Position 1-2** Position 2-3	
JMP30	FLASH Memory Programming Voltage	**Off** 5V 12V	**Position 1-2** Position 2-3 Position 3-4	2
JMP31	CPS Drive	**Normal** Direct	**1-2** 2-3	1
JMP 32	Serial Port 4 Tx Pin Select (C20)	**Port 4 Tx** DIAG Tx	**1-2** 2-3	6, 7
JMP 33	Serial Port 4 Rx Pin Select (C22)	**Port 4 Rx** DIAG Rx	**1-2** 2-3	6, 7
JMP 34	+5V Powers Real Time Clock	**Disable** Enable	**1-2** 2-3	6
JMP 35	On-Board Coin Battery Powers Real Time Clock	**Disable** Enable	**1-2** 2-3	6
JMP 36	Backplane SYS.CLK	**Enable** Disable	**1-2** 2-3	6

Notes:

Factory default jumper positions are shown in **bold type**.

1. If header posts are not installed in these locations, no jumper is required.

2. Settings shown in **bold type** are the normal jumper positions, which lock the FLASH devices and prevent their contents from being modified. Jumpers JMP 20, JMP 21, JMP 22, JMP 23, and JMP 30 must be moved to the 2-3 position to re-program the MicroLok II executive or to program the user-supplied application. Jumper JMP 30 MUST NEVER be placed in the 3-4 position. Use of the 3-4 position while programming on-board FLASH memory may damage the CPU board. Refer to the FLASH Programming Instructions for further information.

3. Jumpers JMP 1 and JMP 2 must NEVER be installed at the same time. Install JMP 1 or JMP 2 as required.

4. Jumpers JMP 4 and JMP 5 must NEVER be installed at the same time. Install JMP 4 or JMP 5 as required.

5. Jumpers JMP 11 and JMP 12 must always be installed in the same position.

6. Jumpers JMP 1 through JMP 31 are available on main CPU boards N170013XX and N170034XX. Jumpers JMP 32 through JMP 36 are available only on main CPU board N170034XX.

7. Jumpers JMP 32 and JMP 33 allow the CPU board diagnostic port to be routed to the CPU board rear connector. When this option is selected, Serial Port 4 is not available. Jumpers JMP 32 and JMP 33 must always be in the same position.

1.4. Genisys II Development System

The Genisys II Development System is virtually identical to the MicroLok II Development Syatem in appearance and operation. However, the two development systems are not interoperable. The Genisys II Development System must be used with the Genisys II CPU and the MicroLok II Development System must be used with the MicroLok II CPU.

1.4.1. Genisys II Compiler

Service manual SM 6800D covering the MicroLok II Application Compiler also applies to the Genisys II compiler. However, when compiling a Genisys II application program, the "program title" must be specified using the "Genisys_II PROGRAM" keyword rather than the "MicroLok_II PROGRAM" keyword. Only the non-vital features described for the MicroLok II compiler are supported by the Genisys II compiler. See SM 6800D for additional information regarding the construction of MicroLok II and Genisys II application programs.

1.4.2. Genisys II Maintenance Tool

Service Manual SM 6800C covering the MicroLok II Maintenance Tool also applies to the Genisys II Maintenance Tool. Note, however, that the Genisys II Maintenance Tool provides support only for the non-vital functions that are implemented in the Genisys II executive. Also note that the Genisys II Maintenance Tool cannot be used with the MicroLok II CPU and the MicroLok II Maintenance Tool cannot be used with the Genisys II CPU.

2. GENISYS MASTER PROTOCOL LINK

2.1. Introduction

The Genisys CSIB Executive supports the Genisys master end protocol to permit direct communication with all devices that support the slave end of the Genisys protocol.

2.2. External Connections

Connections for the various serial interface signals supported by the Genisys master end protocol are shown for each physical serial port in Table 1-2. See Section 3.5 and 3.6 of Service Manual SM 6800B for additional information regarding the interconnection of Genisys II and other serial devices.

2.3. Genisys II CSIB Jumper Positions

The enhanced Genisys master end protocol requires standard jumper settings as defined in Table 1-3.

2.4. Front Panel Options

Communication activity for active Genisys master ports may be monitored using the communication status LEDs on the front panel of the CISB by selecting the desired Genisys master port using the front panel menu switches. Using the “UP-DOWN” menu switch, select DOWN once. Select “SERL PRTS” on the front panel alphanumeric display by selecting “LEFT” using the “LEFT-RIGHT” menu switch. Select “DOWN” once to enter the serial port display menu. “PORT pp n” is displayed where “pp” is the serial port protocol and “n” is the physical port number (1 to 4). For Genisys Master Protocol ports the protocol identification “pp” is “GM”. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired port is found. Select “DOWN” using the “UP-DOWN” menu switch to display activity on the selected port. The serial communication display LED functions are described in Table 1-1. Select “UP” using the “UP-DOWN” menu switch until the executive ID is again scrolled on the top alphanumeric display to return to the default front panel display. Note that activity for the physical port assigned to the first defined serial link defined in the application program is displayed on LEDs “A” through “E” by default.

The Genisys Master Protocol Link may be placed in link test mode by selecting the desired Genisys master port. Using the “UP-DOWN” menu switch, select “DOWN” once. Select “SERL TEST” on the front panel alphanumeric display by selecting “LEFT” using the “LEFT-RIGHT” menu switch until “SERL TEST” is displayed on the alphanumeric display. Select “DOWN” once to enter the serial port test menu. “PORT pp n” is displayed where “pp” is the serial port protocol and “n” is the physical port number (1 to 4). For Genisys Master Protocol ports protocol identification “pp” is “GM”. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired port is found. Place the desired port in test mode by

selecting “DOWN” once using the “UP-DOWN” menu switch. Scroll through the test modes using the “LEFT-RIGHT” menu switch. Available test modes include “steady MARK”, “steady SPACe”, and “50% duty CYCLe” at the configured data rate. Select the desired test mode by selecting “DOWN” once using the “UP-DOWN” menu switch. When the Genisys master link is placed in test mode, the selected test signal will be transmitted over the selected port. Return the port under test to normal operation by selecting “NORMal” using the “LEFT-RIGHT” menu switch then selecting “DOWN” using the “UP-DOWN” menu switch.

See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

2.5. Defining a Genisys Master Protocol Link in a Genisys II Application Program

A typical Genisys II application program that defines a Genisys master end link is shown in Appendix A.

2.6. Genisys Master Protocol Link Compiler Declarations and Configuration Commands

Compiler declarations and configuration commands can be declared adjustable unless otherwise noted and are presented in Table 2-1.

Table 2-1. Genisys Master Link Compiler Commands and Their Functions

Command	Function
LINK	Declares a new Genisys master protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the Genisys master protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	“Genisys.MASTER” declares that this link will support the Genisys master protocol. No default. Not adjustable.
POINT.POINT	For physical ports 1, 2, and 3, specifies whether or not the physical port hardware will operate in point-to-point (1) or multi-drop (0) mode. The default is point-to-point. Physical port 4 is point-to-point only regardless of the value assigned to POINT.POINT.
PORT	The physical port to which the Genisys master link will be attached. Available ports are 1, 2, 3, and 4. There is no default.
BAUD	The data rate at which the link will operate. Available selections are 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits per second. The default rate is 300.
STOPBITS	The number of stop bits (1 or 2) that will be attached to the end of each message byte as it is transmitted. The default number is “1”.
PARITY	The type of parity calculation applied to each transmitted and received byte for the Genisys master protocol. The available selections are NONE, EVEN, ODD, MARK, and SPACE. The default parity selection for the Genisys master protocol is NONE.

Command	Function
KEY.ON.DELAY	The time (in bit times) between the assertion of RTS and the leading edge of the start bit of the first byte of the transmitted Genisys message. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
KEY.OFF.DELAY	The time (in bit times) between the end of the last stop bit of the last byte of a transmitted Genisys message and the de-assertion of RTS. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
STALE.DATA.TIMEOUT	The elapsed time after which a slave is declared failed during which no valid messages from the addressed slave have been received. The allowable range is 10 to 600 seconds. The default value is 300 seconds.
POLLING.INTERVAL	The time interval inserted by the Genisys master between the completion of one message exchange initiated by the master and the beginning of the next. The purpose of the polling interval is to reduce loading on the microprocessor by reducing the load imposed by serial communication. Increasing the interval decreases serial communication loading while increasing serial communication delays for the affected link. Decreasing the interval increases communication loading while decreasing communication delays. The allowable range of values is 0 to 2000 milliseconds. The default value is 50 milliseconds. The default value is normally adequate.
MASTER.TIMEOUT	The time the Genisys master protocol handler will wait for a response after addressing a slave. This delay must be long enough to accommodate the worst expected communication delays imposed by the communication circuit. Consult documentation provided by the communication equipment supplier for specific information. The allowable range of values is 30 to 25000 milliseconds. The default value is 500 milliseconds. The default value is usually adequate although when using a communication circuit with smaller end-to-end delays, a lower timeout can improve link performance when some slaves are not answering regularly due to intermittent communication problems.
CARRIER.MODE	Specifies whether or not the master end of the link will have carrier keyed on continuously. The “CONSTANT” carrier option requires a full duplex communication circuit. The “KEYED” carrier option is used only when carrier outbound from the master might interfere with slave transmissions. In all other cases (including direct wire), CONSTANT carrier operation should be specified. The default carrier mode is CONSTANT.
CRC.SIZE	The size of the CRC checksum, in bits, that is to be attached to Genisys protocol messages. The standard CRC size for the Genisys protocol is 16 bits. For greater security, a 24 bit CRC checksum may be selected. However, at the present time, only MicroLok II and Genisys II controller boards support the Genisys protocol using a 24 bit CRC checksum. The default CRC size is 16 bits.
SECURE.MODE	Specifies whether or not the Genisys protocol master should send secure polling messages. Setting secure mode to “OFF” slightly improves the efficiency of a Genisys protocol communication link on a “clean” communication circuit where few message errors are encountered. Setting secure mode to “ON” significantly improves data link security. The default setting is “ON”. Use of the default setting is recommended.

Command	Function
MASTER.CHECKBACK	Specifies whether or not the Genisys master should send data to slaves using CHECKBACK mode. Setting checkback mode to "ON" forces the Genisys master to send data to slaves using CHECKBACK mode. Setting checkback mode to "OFF" causes the Genisys master to send data to slaves without using CHECKBACK mode. The default setting for checkback mode is "ON". The default setting is usually adequate.

2.7. Genisys Master Protocol Link Compiler Declarations

Table 2-2 presents the Genisys Master Compiler declarations.

Table 2-2. Genisys Master Protocol Compiler Declarations

Command	Function
ADDRESS	Declares a slave on an Genisys master protocol link and assigns its address. An Genisys master link may include 1 to 32 slave declarations. The address of an Genisys slave may be 1 to 255. There is no default. If a Genisys slave address is declared as "0", the "configurable" address is used for that slave. Only one address declaration on an Genisys master protocol link may use address 0. Not adjustable.
ENABLE	Specifies whether or not an Genisys slave will be enabled on unit initialization. 0 = Disabled; 1 = Enabled. There is no default.
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially to a slave. The list may include 1 to 512 Booleans. The NV.OUTPUT declaration is optional. Not adjustable.
NV.INPUT	Defines a list of Boolean values (logic bits) to be received from a slave. The list may include 1 to 512 Booleans. The NV.INPUT declaration is optional. Not adjustable.

2.8. Genisys Master Protocol Link System Boolean Bits

Table 2-3 presents the System Boolean Bits available with the Genisys slave protocol.

Table 2-3. Genisys Master Protocol Link System Boolean Bits

Expression	Function
<link_name>.ENABLED	A read-only Boolean bit that indicates to the application whether or not the Genisys master protocol link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.DISABLE	A read/write Boolean bit that allows the application program to disable the Genisys master protocol link. 0 = ENABLED; 1 = DISABLED.
<link_name>.STANDBY	Defined but not implemented for Genisys master protocol links.
<link_name>.nn.ENABLED	A read-only Boolean bit that indicates whether or not a slave is enabled. "nn" is the slave address. 0 = DISABLED; 1 = ENABLED.
<link_name>.nn.STATUS	A read-only Boolean bit that indicates the current status of slave communication. "nn" is the slave address. 0 = FAILED; 1 = NORMAL.
<link_name>.nn.INPUTS.RECEIVED	A special Boolean bit that is used to trigger logic blocks when serial input data is received from a slave. This bit cannot be directly accessed by the application program.

2.9. Maintenance Tool Support

This section describes the part of the Maintenance Tool that is specifically applicable to the Genisys Master End link. For a complete description of the maintenance tool, please refer to Chapter 4 of Service Manual SM 6800C.

2.9.1. Genisys Master Protocol Link Configuration

In the main launch menu, click on the button labeled “System Configuration”. The user may either examine or modify the configuration database. Select the appropriate button to modify or view the Genisys Master End Link configuration elements. Figure 2-1 presents the Genisys Master End Link configuration. Genisys Master Protocol configuration parameters are described in Section 2.6 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

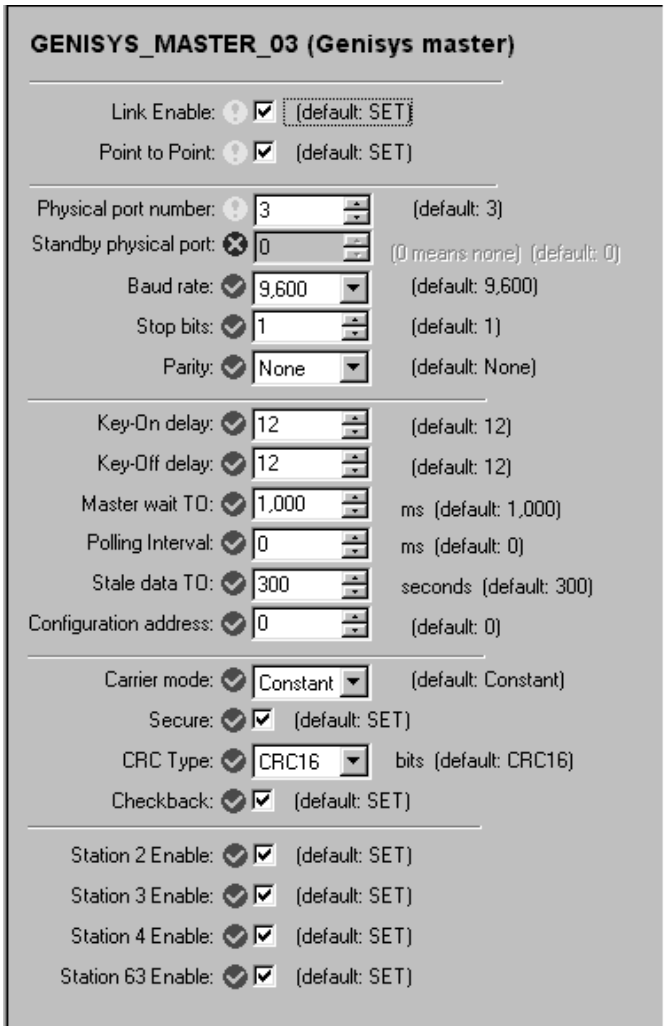


Figure 2-1. Genisys Master Link Configuration

2.9.2. Genisys Master Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and communication links. To enter the Link Information view for a particular link, simply click on the appropriate button. Figure 2-2 presents a typical Genisys Master Protocol Link Statistics display. This display presents a summary of communication statistics for all slaves defined on the selected Genisys Master Protocol Link.

Please refer to Section 7.3.3 of Service Manual SM 6800C for additional information regarding the interpretation of Genisys protocol statistics.

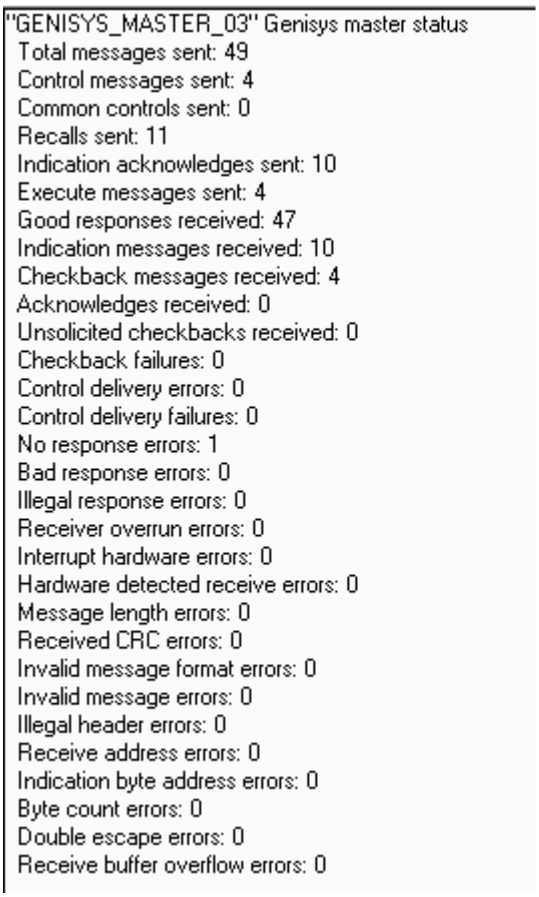


Figure 2-2. Genisys Master Protocol Link Statistics

2.9.3. Genisys Master Protocol Slave Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and communication links. To enter the Link Information view for a particular link, simply click on the appropriate button. Figure 2-3 presents a typical Genisys Master Protocol Link Statistics display. Scroll down to the communication statistics for the slave that is of interest. This display presents the communication statistics for a selected slave defined on the selected Genisys Master Protocol Link.

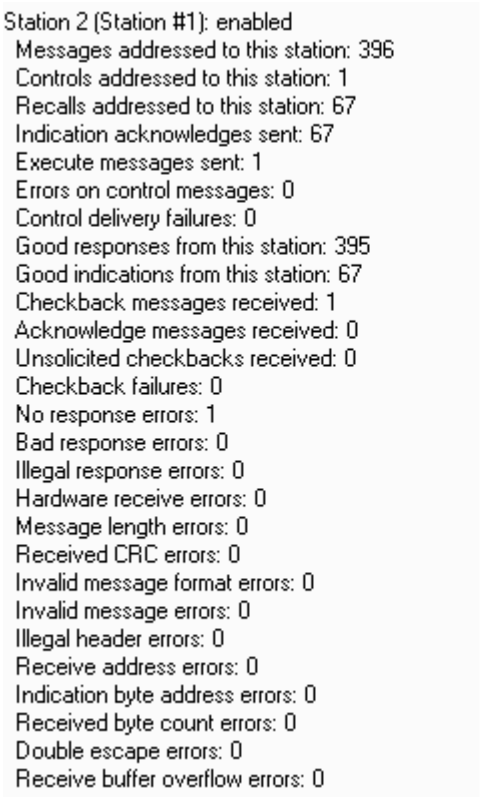


Figure 2-3. Genisys Master Protocol Station Statistics

2.9.4. Genisys Master Protocol Link Protocol Monitor

In the main launch menu, click on the button labeled “Serial Message Monitor.” Select the appropriate link to monitor from the list on the left to monitor. Figure 2-4 presents a typical display for the Genisys Master Protocol Monitor. The protocol monitor display for the Genisys Master Protocol Link shows message time, message direction (transmitted or received), and message type followed by the full transmitted or received message in hexadecimal bytes. Please refer to Genisys Protocol descriptions in SM 6300A, Section VII, or SM 6408F, Section V, for additional information on the Genisys Protocol.

Please refer to Section 7.3.4 of Service Manual SM 6800C for additional information on the Serial Message Monitor.

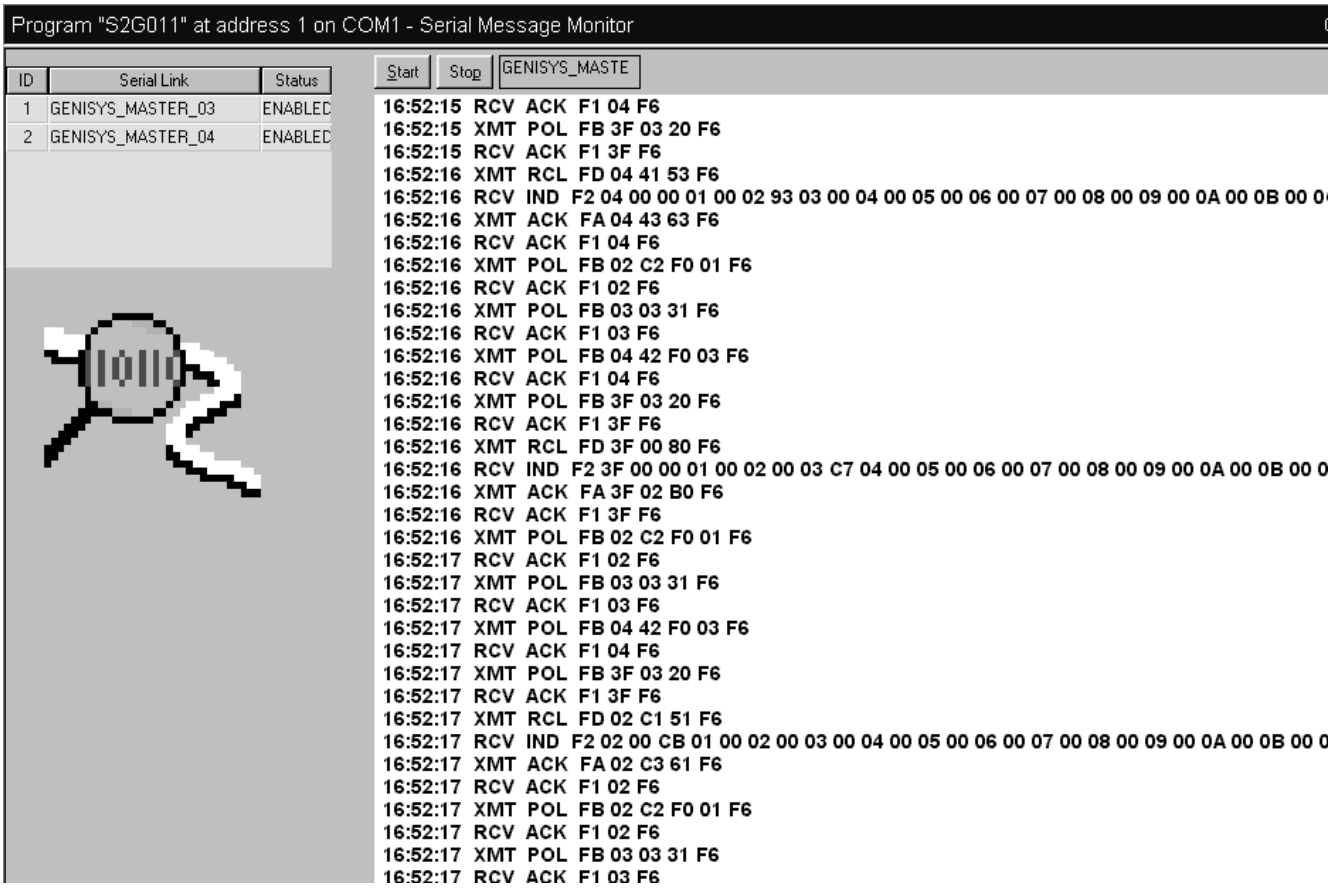


Figure 2-4. Genisys Master Protocol Monitor

3. ENHANCED GENISYS SLAVE PROTOCOL LINK

3.1. Introduction

The Genisys CSIB Executive supports the assignment of a STANDBY serial port to a Genisys.SLAVE communication link. The STANDBY port is enabled (and the NORMAL port is disabled) when the DCD input to the STANDBY port is asserted. The NORMAL port is enabled when the DCD input to the STANDBY port is de-asserted or when no good messages addressed to a slave defined on the Genisys.SLAVE link have been received for five minutes.

Half-duplex (keyed carrier) mode is disabled and CARRIER.MODE defaults to "CONSTANT" on any Genisys.SLAVE link that has a STANDBY port assigned.

3.2. External Connections

Connections for the various serial interface signals supported by the enhanced Genisys slave end protocol are shown for each physical serial port in Table 1-2. See Section 3.5 of Service Manual SM 6800B for additional information regarding the interconnection of Genisys II and other serial devices. See Figure 3-1 for typical interconnections when a STANDBY serial port is defined.

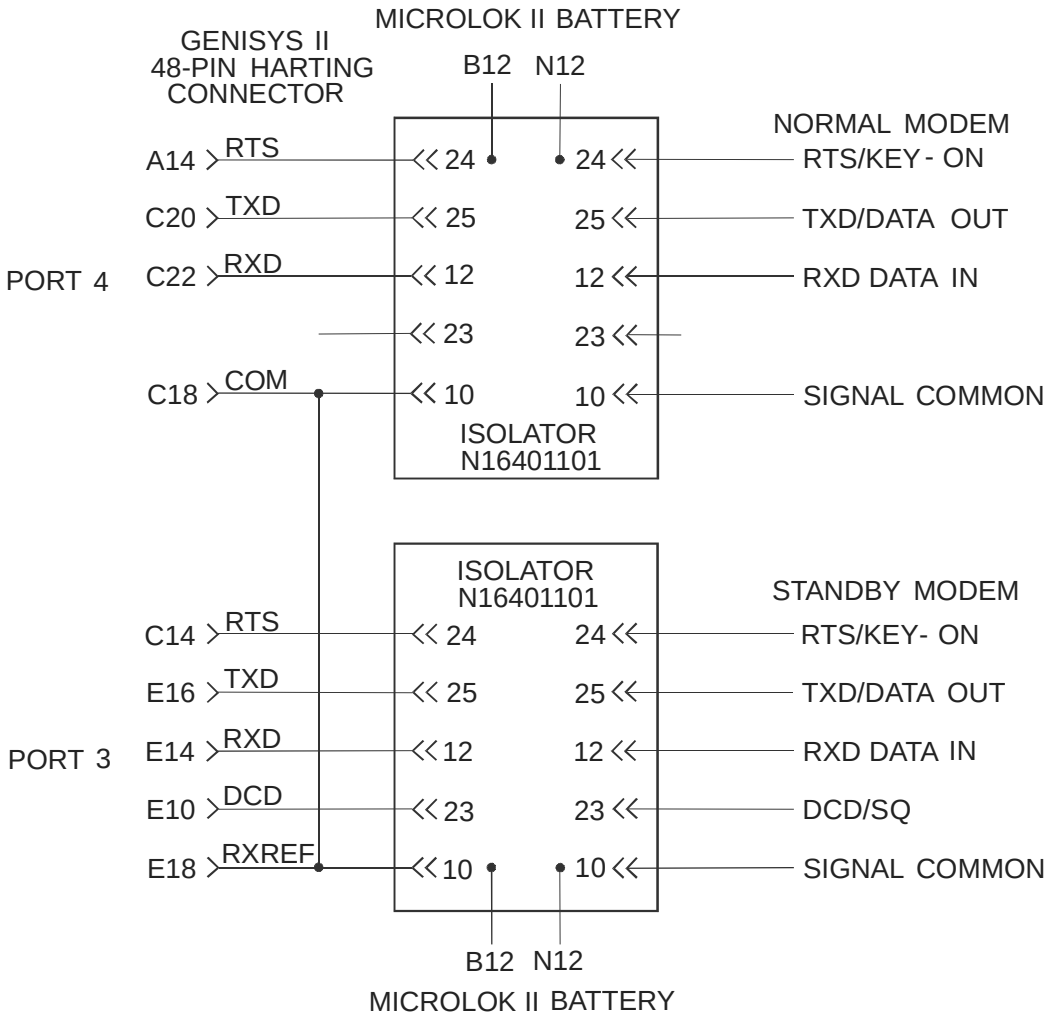
3.3. Genisys II CSIB Jumper Positions

The enhanced Genisys slave end protocol requires standard jumper settings as defined in Table 1-3.

3.4. Front Panel Options

Communication activity for active Genisys slave ports (NORMAL or STANDBY) may be monitored using the communication status LEDs on the front panel of the CISB by selecting the desired Genisys slave port identified as the NORMAL port for a link using the front panel menu switches. Using the "UP-DOWN" menu switch, select DOWN once. Select "SERL PRTS" on the front panel alphanumeric display by selecting "LEFT" using the "LEFT-RIGHT" menu switch. Select "DOWN" once to enter the serial port display menu. "PORT pp n" is displayed where "pp" is the serial port protocol and "n" is the physical port number (1 to 4). For Genisys Slave Protocol ports the protocol identification "pp" is "GS". Scroll through the active ports using the "LEFT-RIGHT" menu switch until the desired port is found. Select "DOWN" using the "UP-DOWN" menu switch to display activity on the selected port. Communication activity on the currently active port (NORMAL or STANDBY) is displayed. The serial communication display LED functions are described in Table 1-1. Select "UP" using the "UP-DOWN" menu switch until the executive ID is again scrolled on the top alphanumeric display to return to the default front panel display. Note that activity for the physical port assigned to the first serial link defined in the application program is displayed on LEDs "A" through "E" by default.

The Genisys Slave Protocol Link may be placed in link test mode by selecting the desired Genisys slave port identified as the NORMAL port. Using the “UP-DOWN” menu switch, select “DOWN” once. Select “SERL TEST” on the front panel alphanumeric display by selecting “LEFT” using the “LEFT-RIGHT” menu switch until “SERL TEST” is displayed on the alphanumeric display. Select “DOWN” once to enter the serial port test menu. “PORT pp n” is displayed where “pp” is the serial port protocol and “n” is the physical port number (1 to 4). For Genisys Slave Protocol ports the protocol identification “pp” is “GS”. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired NORMAL port is found. Place the desired port in test mode by selecting “DOWN” once using the “UP-DOWN” menu switch. Scroll through the test modes using the “LEFT-RIGHT” menu switch. Available test modes include “steady MARK”, “steady SPACe”, and “50% duty CYCLe” at the configured data rate. Select the desired test mode by selecting



NOTES :

1 SERIAL ISOLATORS (N16401101) MAY BE ELIMINATED IF MODEMS PROVIDE 2KV OR GREATER ISOLATION FROM GROUND.

2 MODEMS MAY BE POWERED BY MICROLOK II +12V POWER SUPPLY IF TOTAL MODEM LOAD DOES NOT EXCEED 50 mA. AND MODEMS PROVIDE 2KV OR GREATER ISOLATION FROM GROUND.

Figure 3-1. Typical Connections for Genisys Slave, MCS-1 Slave, and SCS-128 Slave Protocols with Normal and Standby Ports

"DOWN" once using the "UP-DOWN" menu switch. When the Genisys slave link is placed in test mode, the selected test signal will be transmitted over the selected currently active port (NORMAL or STANDBY). Return the port under test to normal operation by selecting "NORMal" using the "LEFT-RIGHT" menu switch then selecting "DOWN" using the "UP-DOWN" menu switch.

See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

3.5. Defining an Enhanced Genisys Slave Protocol Link in a Genisys II Application Program

A typical Genisys II application program that defines an enhanced Genisys slave end link is shown in Appendix B.

The definition of enhanced Genisys protocol slave end link is identical to that of the conventional Genisys.SLAVE link described in Service Manual SM 6800D except that an additional configuration parameter, STANDBY.PORT is available. If a STANDBY port is defined the link operates as described in Section 3.1 above. If no STANDBY port is defined the Genisys.SLAVE link supports all of the Genisys.SLAVE link features available in MicroLok II.

The enhanced Genisys slave end link supports the system Boolean bit <link_name>.nn.STANDBY code. When a STANDBY port is assigned, this bit indicates the status of the STANDBY port. The bit is "1" when the STANDBY port is active and "0" when the NORMAL port is active. If no STANDBY port is assigned, <link_name>.nn.STANDBY has a constant value of "0".

3.6. Genisys Slave Protocol Link Compiler Declarations and Configuration Commands

Compiler declarations and configuration commands can be declared adjustable unless otherwise noted and are presented in Table 3-1.

Table 3-1. Genisys Slave Protocol Link Compiler Commands and Their Functions

Command	Function
LINK	Declares a new Genisys slave protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the Genisys slave protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	"Genisys.SLAVE" declares that this link will support the Genisys slave protocol. No default. Not adjustable.
POINT.POINT	For physical ports 1, 2, and 3, specifies whether or not the physical port hardware will operate in point-to-point (1) or multi-drop (0) mode. The default is multi-drop. Physical port 4 is point-to-point only regardless of the value assigned to POINT.POINT.
PORT	The NORMAL physical port to which the Genisys slave link will be attached. Available ports are 1, 2, 3, and 4. There is no default.
STANDBY.PORT	The STANDBY physical port to which the Genisys slave link will be attached. Available ports are 0 (No STANDBY port), 1, 2, 3, and 4. The default port is 0.

Command	Function
BAUD	The data rate at which the link will operate. Available selections are 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits per second. The default rate is 300.
STOPBITS	The number of stop bits (1 or 2) that will be attached to the end of each message byte as it is transmitted. The default number is "1".
PARITY	The type of parity calculation applied to each transmitted and received byte for the Genisys slave protocol. The available selections are NONE, EVEN, ODD, MARK, and SPACE. The default parity selection for the Genisys slave protocol is NONE.
KEY.ON.DELAY	The time (in bit times) between the assertion of RTS and the leading edge of the start bit of the first byte of the transmitted Genisys message. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
KEY.OFF.DELAY	The time (in bit times) between the end of the last stop bit of the last byte of a transmitted Genisys message and the de-assertion of RTS. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
STALE.DATA.TIMEOUT	The elapsed time after which a slave is declared failed during which no valid messages addressed to the slave have been received. The allowable range is 10 to 600 seconds. The default value is 300 seconds.
CARRIER.MODE	Specifies whether or not the master end of the link will have carrier keyed on continuously. The "CONSTANT" carrier option requires a full duplex communication circuit. The "KEYED" carrier option is used only when carrier outbound from the master might interfere with slave transmissions. In all other cases (including direct wire), CONSTANT carrier operation should be specified. The default carrier mode is CONSTANT.
CRC.SIZE	The size of the CRC checksum, in bits, that is to be attached to Genisys protocol messages. The standard CRC size for the Genisys protocol is 16 bits. For greater security, a 24 bit CRC checksum may be selected. However, at the present time, only MicroLok II and Genisys II controller boards support the Genisys protocol using a 24 bit CRC checksum. The default CRC size is 16 bits.

3.7. Genisys Slave Protocol Link Compiler Declarations

Table 3-2 presents the Genisys Slave Compiler declarations.

Table 3-2. Genisys Slave Protocol Link Compiler Declarations

Command	Function
ADDRESS	Declares a slave on an Genisys slave protocol link and assigns its address. An Genisys slave link may include 1 to 32 slave declarations. The address of a Genisys slave may be 1 to 255. There is no default. If a Genisys slave address is declared as "0", the "configurable" address is used for that slave. Only one address declaration on an Genisys slave protocol link may use address 0. Not adjustable.
ENABLE	Specifies whether or not an Genisys slave will be enabled on unit initialization. 0 = Disabled; 1 = Enabled. There is no default.
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially by a slave. The list may include 1 to 128 Booleans. Each Genisys slave must have an NV.OUTPUT declaration. Not adjustable.
NV.INPUT	Defines a list of Boolean values (logic bits) to be received serially by a slave. The list may include 1 to 128 Booleans. The NV.INPUT declaration is optional. Not adjustable.

3.8. Genisys Slave Protocol Link System Boolean Bits

Table 3-3 presents the System Boolean Bits available with the Genisys slave protocol.

Table 3-3. Genisys Slave Protocol Link System Boolean Bits

Expression	Function
<link_name>.ENABLED	A read-only Boolean bit that indicates to the application whether or not the Genisys slave protocol link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.DISABLE	A read/write Boolean bit that allows the application program to disable the Genisys slave protocol link. 0 = ENABLED; 1 = DISABLED.
<link_name>.STANDBY	A read-only Boolean bit that indicates whether or not the Genisys slave link STANDBY port is active. 0 = INACTIVE; 1 = ACTIVE.
<link_name>.nn.ENABLED	A read-only Boolean bit that indicates whether or not a slave is enabled. “nn” is the slave address. 0 = DISABLED; 1 = ENABLED.
<link_name>.nn.STATUS	A read-only Boolean bit that indicates the current status of slave communication. “nn” is the slave address. 0 = FAILED; 1 = NORMAL.
<link_name>.nn.INPUTS.RECEIVED	A special Boolean bit that is used to trigger logic blocks when a slave receives serial input data. This bit cannot be directly accessed by the application program.

3.9. Maintenance Tool Support

This section describes the part of the Maintenance Tool that is specifically applicable to the Genisys Slave End link. For a complete description of the maintenance tool, please refer to Chapter 4 of Service Manual SM 6800C.

3.9.1. Enhanced Genisys Slave Protocol Link Configuration

In the main launch menu, click on the button labeled “System Configuration”. The user may either examine of modify the configuration database. Select the appropriate button to modify or view the Genisys Slave End Link configuration elements. Figure 3-2 presents the Genisys Slave End Link configuration. Genisys Slave Protocol configuration parameters are described in Section 3.6 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

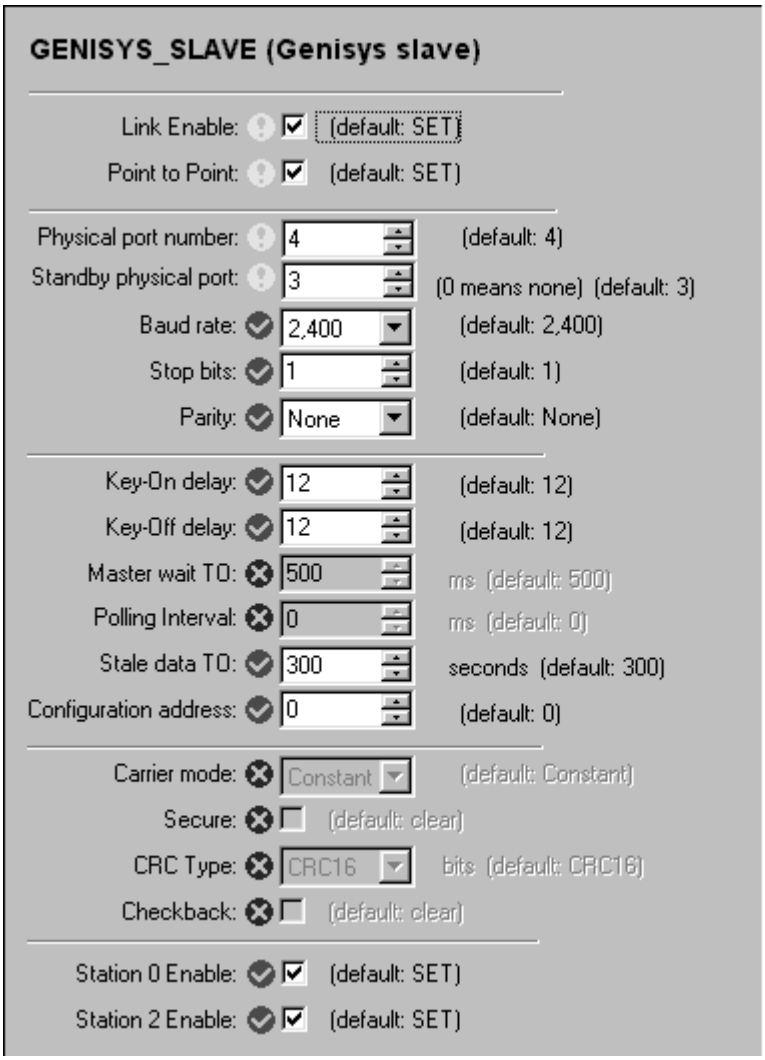


Figure 3-2. Genisys Slave Configuration

3.9.2. Enhanced Genisys Slave Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and communication links. To enter the Link Information view for a particular link, simply click on the appropriate button. Figure 3-3 presents a typical Genisys Slave Protocol Link Statistics display. This display presents a summary of communication statistics for all slaves defined on the selected Genisys Slave Protocol Link.

Please refer to Section 7.3.3 of Service Manual SM 6800C for additional information regarding the interpretation of Genisys protocol statistics.

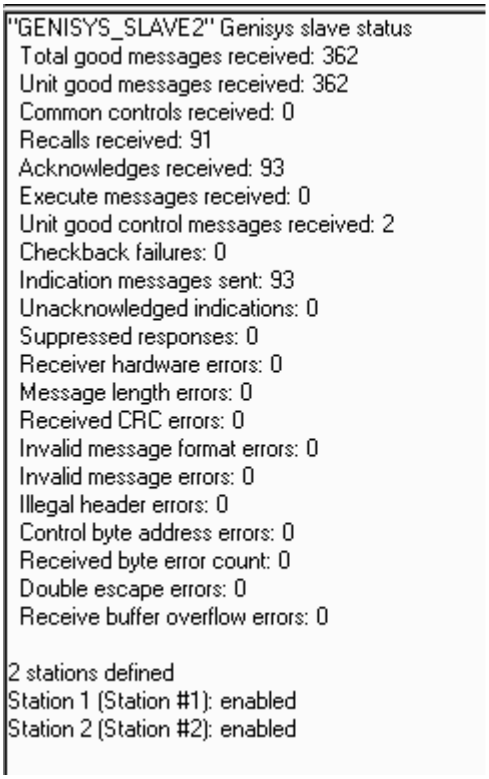


Figure 3-3. Genisys Slave Protocol Link Statistics

3.9.3. Enhanced Genisys Slave Protocol Link Protocol Monitor

In the main launch menu, click on the button labeled “Serial Message Monitor.” Select the appropriate link to monitor from the list on the left to monitor. Figure 3-4 presents a typical display for the Genisys Slave Protocol Monitor. The protocol monitor display for the Genisys Slave Protocol Link shows message time, message direction (transmitted or received), and message type followed by the full transmitted or received message in hexadecimal bytes. Please refer to Genisys Protocol descriptions in SM 6300A, Section VII or SM 6408F, Section V for additional information on the Genisys Protocol.

Please refer to Section 7.3.4 of Service Manual SM 6800C for additional information on the Serial Message Monitor.

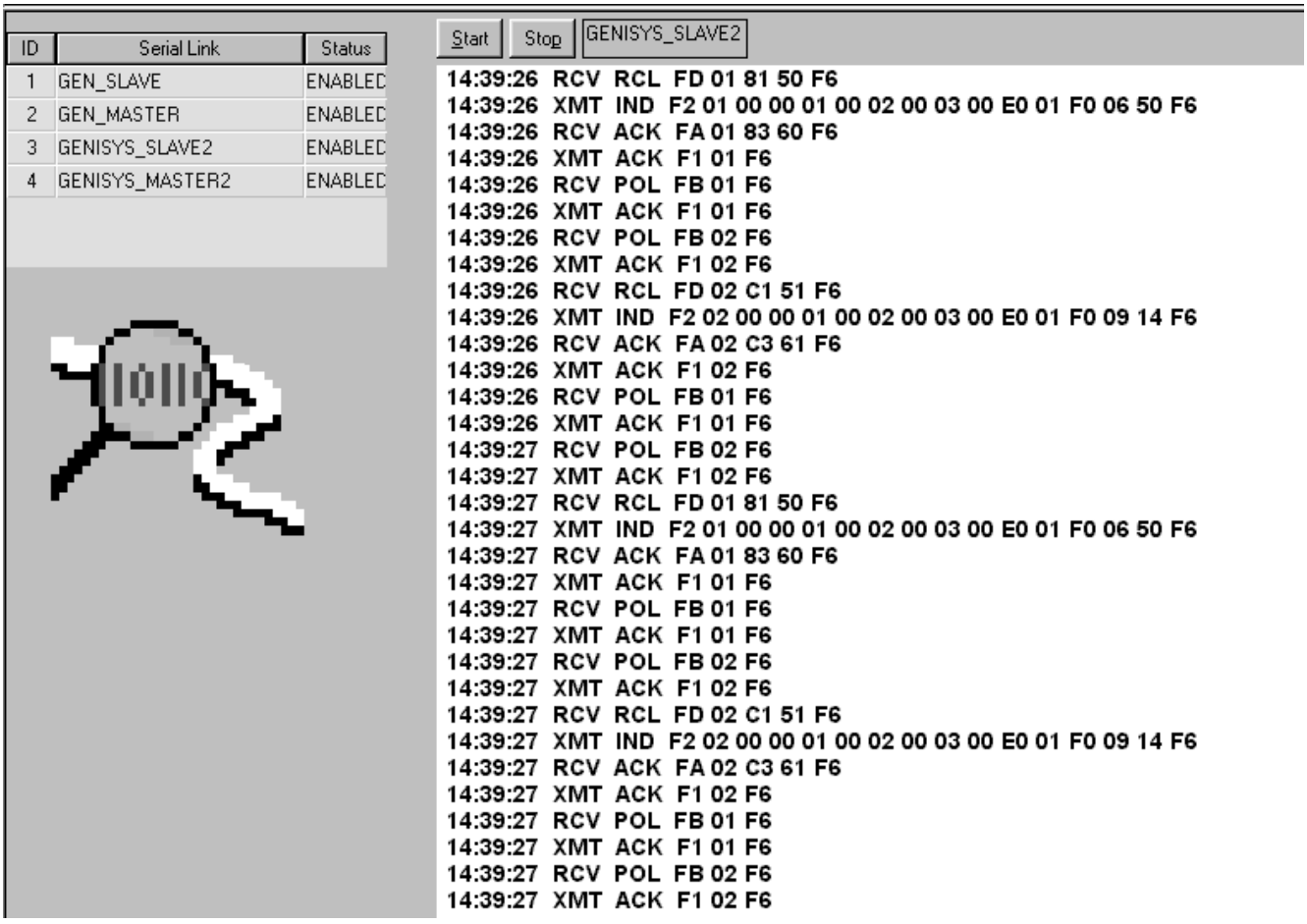


Figure 3-4. Genisys Slave Protocol Link Monitor

4. MICROLOK II PEER PROTOCOL LINK

4.1. Introduction

The Genisys II CSIB Executive supports communication using the MicroLok II Peer protocol. Only non-vital Peer stations may be declared in the Genisys II CSIB application program. A typical MicroLok II Peer protocol link test application is presented in Appendix C.

4.2. External Connections

Connections for the various serial interface signals supported by the MicroLok II Peer protocol are shown for each type of physical serial port in Table 1-2. For connections to the MicroLok II Peer Protocol hub or US&S Network Interface Adapter (NIA), see Service Manual SM 6800K. See Figure 4-1 for typical direct interconnection of two peer units.

4.3. Genisys II CSIB Jumper Positions

The MicroLok II Peer protocol requires standard jumper settings as defined in Table 1-3.

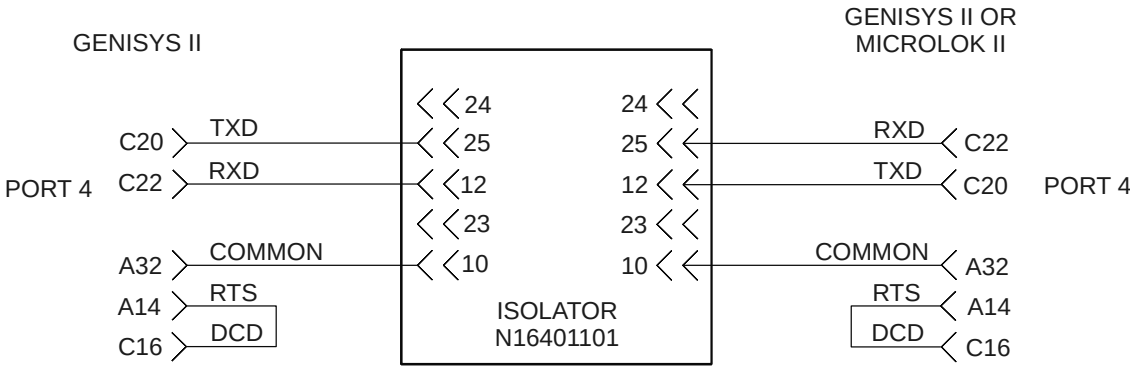
4.4. Front Panel Options

Communication activity for active MicroLok II Peer Protocol ports may be monitored using the communication status LEDs on the front panel of the CISB by selecting the desired MicroLok II Peer Protocol port using the front panel menu switches. Using the “UP-DOWN” menu switch, select DOWN once. Select “SERL PRTS” on the front panel alphanumeric display by selecting “LEFT” using the “LEFT-RIGHT” menu switch. Select “DOWN” once to enter the serial port display menu. “PORT pp n” is displayed where “pp” is the serial port protocol and “n” is the physical port number (1 to 4). For MicroLok II Peer Protocol ports the protocol identification “pp” is “PR”. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired port is found. Select “DOWN” using the “UP-DOWN” menu switch to display activity on the selected port. The serial communication display LED functions are described in Table 1-1. Select “UP” using the “UP-DOWN” menu switch until the executive ID is again scrolled on the top alphanumeric display to return to the default front panel display. Note that activity for the physical port assigned to the first serial link defined in the application program is displayed on LEDs “A” through “E” by default.

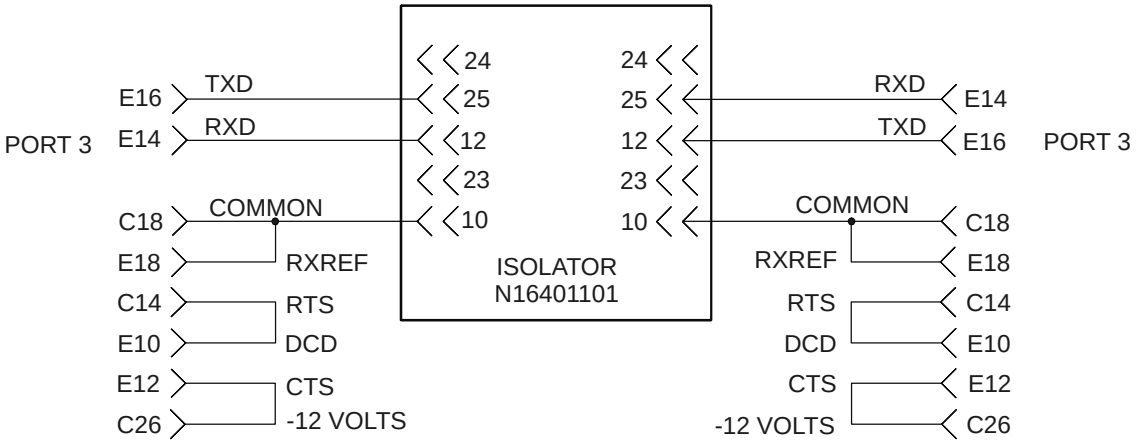
See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

4.5. Defining a MicroLok II Peer Protocol Link in a Genisys II Application Program

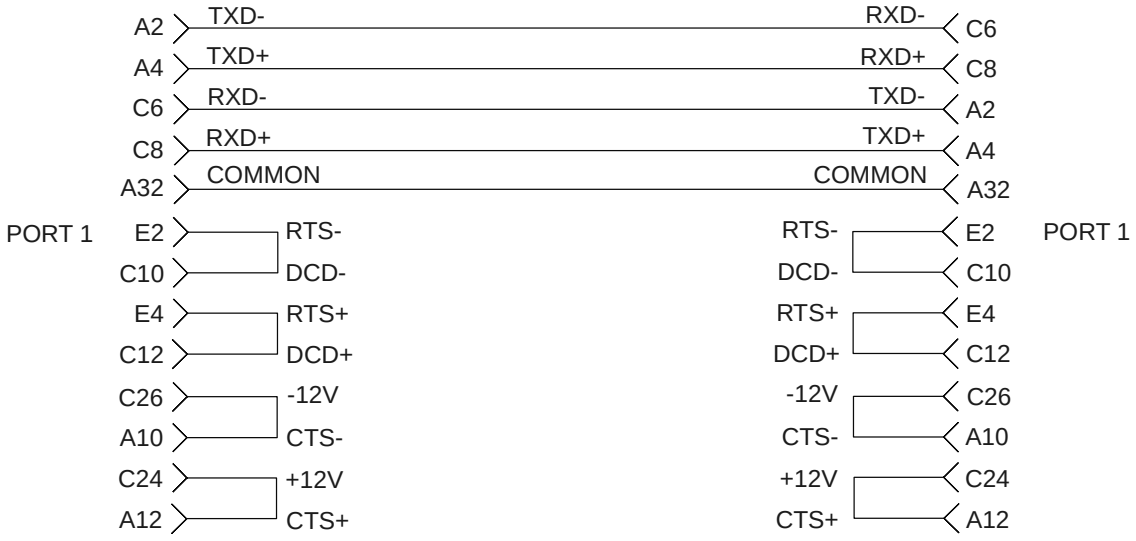
A typical Genisys II application program that defines a MicroLok II Peer Protocol link is shown in Appendix C.



NOTE: ISOLATOR MAY BE ELIMINATED IF UNITS POWERED BY THE SAME BATTERY.



NOTE: ISOLATOR MAY BE ELIMINATED IF UNITS ARE POWERED BY THE SAME BATTERY.



NOTE: USE DIRECT CONNECTION ONLY WHEN UNITS ARE POWERED BY THE SAME BATTERY.

Figure 4-1. Typical Connections for MicroLok Peer Protocol Ports

4.6. MicroLok II Peer Protocol Link Compiler Declaration and Configuration Commands

Compiler declarations and configuration commands for the MicroLok II Peer protocol link can be declared adjustable unless otherwise noted and are presented in Table 4-1.

Table 4-1. MicroLok II Peer Protocol Link Compiler Commands and Their Functions

Command	Function
LINK	Declares a new MicroLok II Peer protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the MicroLok II Peer protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	"MII.PEER" declares that this link will support the MicroLok II Peer protocol. No default. Not adjustable.
POINT.POINT	For physical ports 1, 2, and 3, specifies whether or not the physical port hardware will operate in point-to-point (1) or multi-drop (0) mode. The default is point-to-point. Physical port 4 is point-to-point only regardless of the value assigned to POINT.POINT.
PORT	The physical port to which the MicroLok II Peer protocol link will be attached. Available ports are 1, 2, 3, and 4. There is no default.
BAUD	The data rate at which the link will operate. Available selections are 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400 bits per second. The default rate is 19200.
STOPBITS	The number of stop bits (1 or 2) that will be attached to the end of each message byte as it is transmitted. The default number is "1".
PARITY	The type of parity calculation applied to each transmitted and received byte for the MicroLok II Peer protocol. The available selections are NONE, EVEN, ODD, MARK, and SPACE. The default parity selection for the MicroLok II Peer protocol is NONE.
KEY.ON.DELAY	The time (in bit times) between the assertion of the "GRANT" (DCD) signal and the leading edge of the start bit of the first byte of the transmitted MicroLok II Peer protocol message. The allowable values are 0 and 8 to 280 bit times. The default value is 0 bit times.
KEY.OFF.DELAY	The time (in bit times) between the end of the last stop bit of the last byte of a transmitted MicroLok II Peer protocol message and the de-assertion of RTS. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
GRANT.DELAY	The maximum time in milliseconds that the MicroLok II Peer protocol link will wait for the GRANT (DCD) signal after the Request To Send signal has been asserted. The allowable values are 10 to 10000 milliseconds. The default value is 1000 milliseconds.

4.7. MicroLok II Peer Protocol Station Compiler Declarations and Configuration Commands

Compiler declarations and configuration commands can be declared adjustable unless otherwise noted and are presented in Table 4-2.

Table 4-2. MicroLok II Peer Protocol Station Compiler Declaration and Configuration Commands and Their Functions

Command	Function
NV.MII.ADDRESS	Sets the address for a MicroLok II Peer protocol station in MicroLok II Peer address format. Allowable addresses are 0 to 65534. There is no default. Note that a MicroLok II Peer protocol station may have either a MicroLok II Peer format address or an ATCS format address.
NV.ATCS.ADDRESS	Sets the address for a MicroLok II Peer protocol station in ATCS address format. Allowable values are 0 or a valid ATCS address. See ATCS Specification 200, Appendix T for the ATCS address format. There is no default. Note that a MicroLok II Peer protocol station may have either a MicroLok II Peer format address or an ATCS format address.
ENABLE	Specifies whether or not a MicroLok Peer protocol station will be enabled on unit initialization. 0 = Disabled; 1 = Enabled. There is no default.
STATION.NAME	Allows the application programmer to specify a name for a MicroLok II Peer protocol station. The station name has no default value and is not adjustable.
PEER.ADDRESS	Sets the peer address for a MicroLok II Peer protocol station. The peer address must be in the same format as the station address.
TIME.STAMP	Configures the peer station to include an optional time stamp in all messages sent by the affected station. 0 = No Timestamp Included; 1 = Timestamp Included. The default value is 0.
CLOCK.MASTER	Designates a MicroLok II Peer protocol station as a “Clock Master”. When CLOCK.MASTER is set to “1”, the station is allowed to set the clock in the unit that hosts its peer station. Allowable values are 0 and 1. The default value is 0.
ACK.TIMEOUT	Sets the length of time that a MicroLok II Peer protocol station will wait for an acknowledgement for a transmitted message that requires acknowledgement. When the acknowledge timeout expires, delivery failure is declared for the transmitted message. Allowable values are 50 to 60,000 milliseconds. The default value is the value of the heartbeat interval.
HEARTBEAT.INTERVAL	Sets the maximum length of time between the transmission of data or status messages from MicroLok II Peer protocol stations where serial outputs are not changing. The allowable range is 100 to 600,000 milliseconds. The default value is 40% of the stale data timeout for the station.
INDICATION.UPDATE.CYCLE	Sets the rate at which data messages are sent on the heartbeat interval. A value of “1” causes a full data message to be sent on every heartbeat interval. A value of “2” causes a data message to be sent on every other heartbeat interval, etc. Allowable values are 1 to 100. The default value is 10.
STALE.DATA.TIMEOUT	The elapsed time after which a slave is declared failed during which no valid messages addressed to the slave have been received. The allowable range is 500 to 600,000 milliseconds. The default value is 60,000 milliseconds.

4.8. MicroLok II Peer Protocol Link Fixed Compiler Declarations

Table 4-3 presents the MicroLok II Peer protocol link fixed Compiler declarations.

Table 4-3. MicroLok II Peer Protocol Fixed Compiler Declarations

Command	Function
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially by a slave. The list may include 1 to 128 Booleans. The NV.OUTPUT declaration is optional. Not adjustable.
NV.NUMERIC.OUTPUT.8	Defines a list of 8-bit numeric outputs. (Optional)
NV.NUMERIC.OUTPUT.16	Defines a list of 16-bit numeric outputs. (Optional)
NV.NUMERIC.OUTPUT.24	Defines a list of 24-bit numeric outputs. (Optional)
NV.NUMERIC.OUTPUT.32	Defines a list of 32-bit numeric outputs. (Optional)
NV.INPUT	Defines a list of Boolean values (logic bits) to be received serially by a slave. The list may include 1 to 128 Booleans. The NV.INPUT declaration is optional. Not adjustable.
NV.NUMERIC.INPUT.8	Defines a list of 8-bit numeric inputs. (Optional)
NV.NUMERIC.INPUT.16	Defines a list of 16-bit numeric inputs. (Optional)
NV.NUMERIC.INPUT.24	Defines a list of 24-bit numeric inputs. (Optional)
NV.NUMERIC.INPUT.32	Defines a list of 32-bit numeric inputs. (Optional)

4.9. MicroLok II Peer Protocol Link System Boolean Bits

Table 4-4 presents the System Boolean Bits available with MicroLok Peer protocol stations.

Table 4-4. MicroLok II Peer Protocol Link System Boolean Bits

Expression	Function
<link_name>.ENABLED	A read-only Boolean bit that indicates to the application whether or not the MicroLok II Peer protocol link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.DISABLE	This Boolean bit has no function.
<link_name>.STANDBY	This Boolean bit has no function.
<link_name>.<station_name>.ENABLED	A read-only Boolean bit that indicates whether or not a MicroLok II Peer protocol station is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.<station_name>.STATUS	A read-only Boolean bit that indicates the current communication status for a MicroLok II Peer protocol station. 0 = FAILED; 1 = NORMAL.
<link_name>.<station_name>. INPUTS.RECEIVED	A special Boolean input bit that is used to trigger logic blocks when a station receives serial input data. This bit cannot be directly accessed by the application program.
<link_name>.<station_name>.DISABLE	A read/write Boolean bit used to dynamically DISABLE/ENABLE a MicroLok II Peer protocol station. 0 = ENABLED; 1 = DISABLED.

4.10. Maintenance Tool Support

This section describes the part of the Maintenance Tool that is applicable to MicroLok II Peer protocol links. For a complete description of the maintenance tool, please refer to Chapter 4 of Service Manual SM 6800C.

4.10.1. MicroLok II Peer Protocol Link Configuration

In the main launch menu, click on the button labeled “System Configuration”. The user may either examine of modify the configuration database. Select the appropriate button to modify or view the MicroLok II Peer Protocol Link configuration elements. Figure 4-2 presents the MicroLok II Peer Protocol Link Configuration display. MicroLok II Peer Protocol link configuration parameters are described in Section 4.6 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

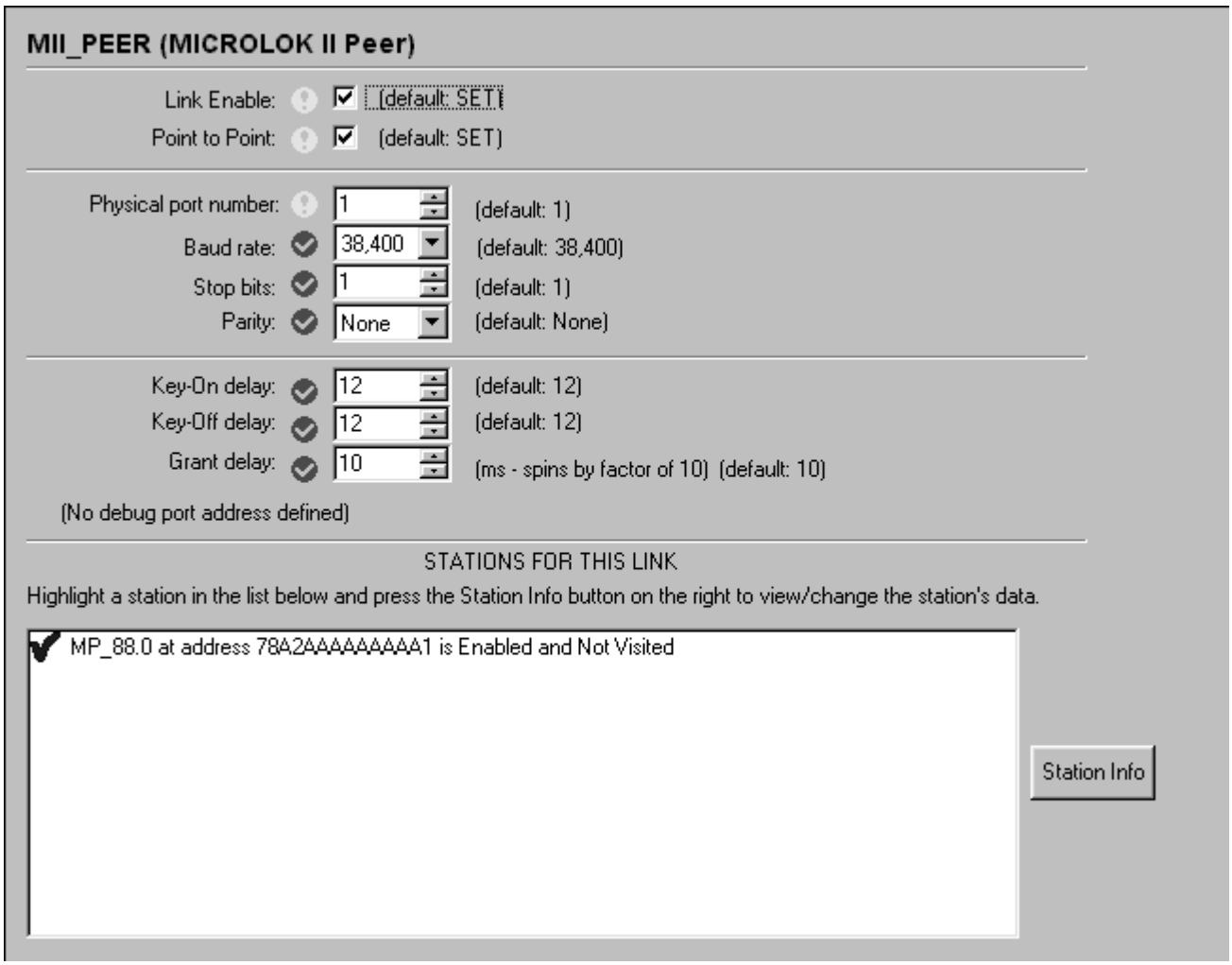


Figure 4-2. MicroLok II Peer Protocol Link Configuration

4.10.2. MicroLok II Peer Protocol Station Configuration

In the main launch menu, click on the button labeled “System Configuration”. The user may either examine of modify the configuration database. Select the appropriate button to modify or view the MicroLok II Peer Protocol Link configuration elements. Select the desired station and click on “Station Info” to modify or view the configuration for the desiresd station. Figure 4-3 presents the MicroLok II Peer Protocol Station Configuration display. MicroLok II Peer Protocol station configuration parameters are described in Section 4.7 of this manual. See SM 6800C, Section 6.2.17 for additional general information on link configuration using the Genisys II Maintenance Tool.

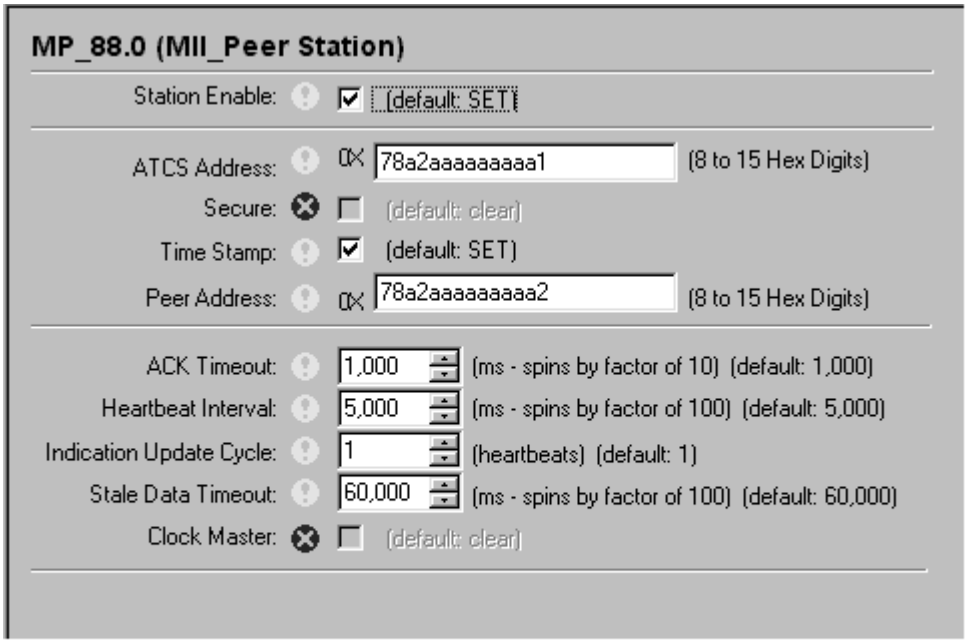


Figure 4-3. MicroLok II Peer Protocol Station Configuration

4.10.3. MicroLok II Peer Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and communication links. To enter the Link Information view for a particular link, simply click on the appropriate button. Figure 4-4 presents a typical MicroLok II Peer Protocol Link Statistics display. This display presents a summary of communication statistics for all stations defined on the selected MicroLok II Peer Protocol Link.

A MicroLok II Peer Protocol link that is functioning properly generally has a low count for transmitted and received initialization messages. (A count of 1 or 2 is desirable.) Total receive error counts are generally a small percentage of the count of properly framed messages (generally 1% to 5%). The rate of accumulation of transmitted and received message counts may vary significantly depending on the configuration parmeters for stations on the link.

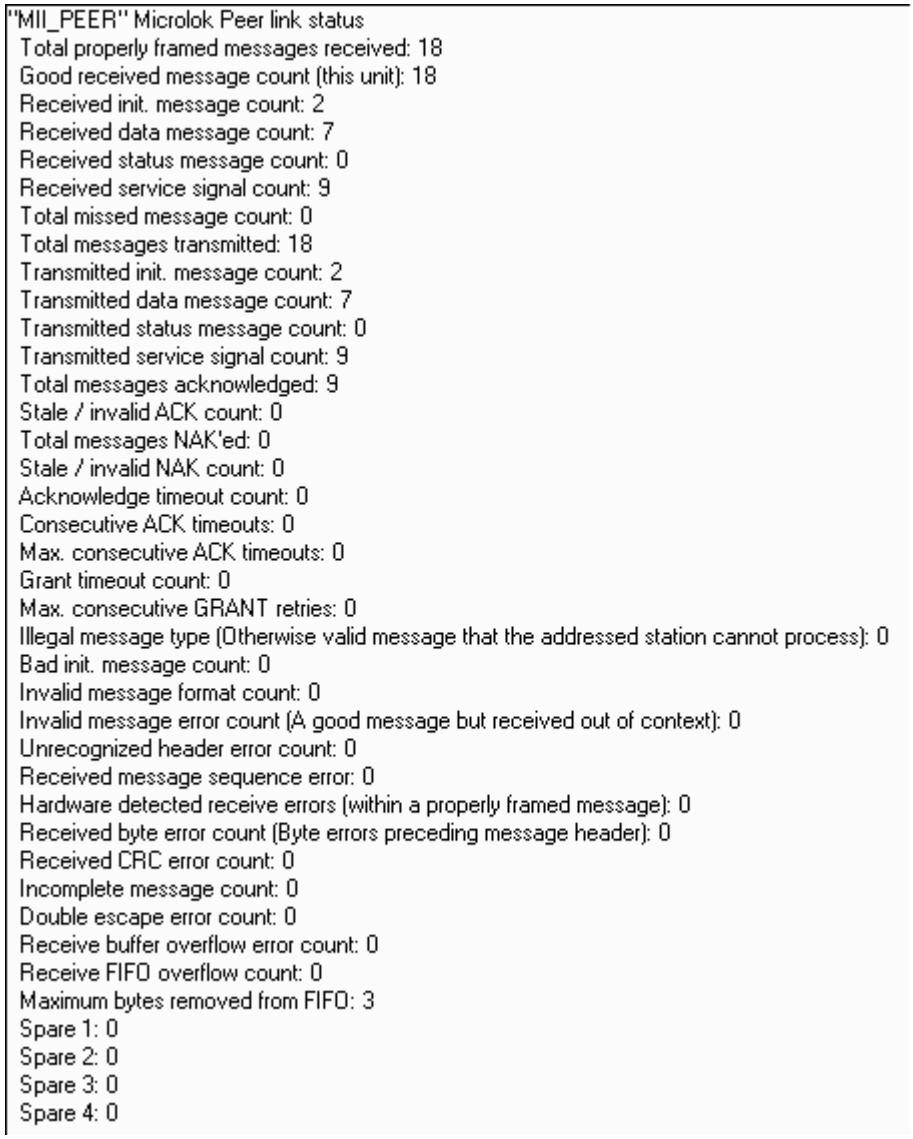


Figure 4-4. MicroLok II Peer Protocol Link Statistics

4.10.4. MicroLok II Peer Protocol Station Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and communication links. To enter the Link Information view for a particular link, simply click on the appropriate button. Scroll down through the link statistics to locate and view the communication statistics for the desired station. Figure 4-5 presents a typical MicroLok II Peer Protocol Station Statistics display.

Figure 4-5. MicroLok II Peer Protocol Station Statistics

4.10.5. MicroLok II Peer Protocol Link Protocol Monitor

In the main launch menu, click on the button labeled “Serial Message Monitor.” Select the appropriate link to monitor from the list on the left to monitor. Figure 4-6 presents a typical display for the MicroLok II Peer Protocol Monitor. The protocol monitor display for the MicroLok II Peer Protocol Link shows a descriptive message summary followed by the full transmitted or received message in hexadecimal bytes. Please refer to the “MicroLok II Peer Protocol Users Guide” for a detailed description of the MicroLok II Peer Protocol.

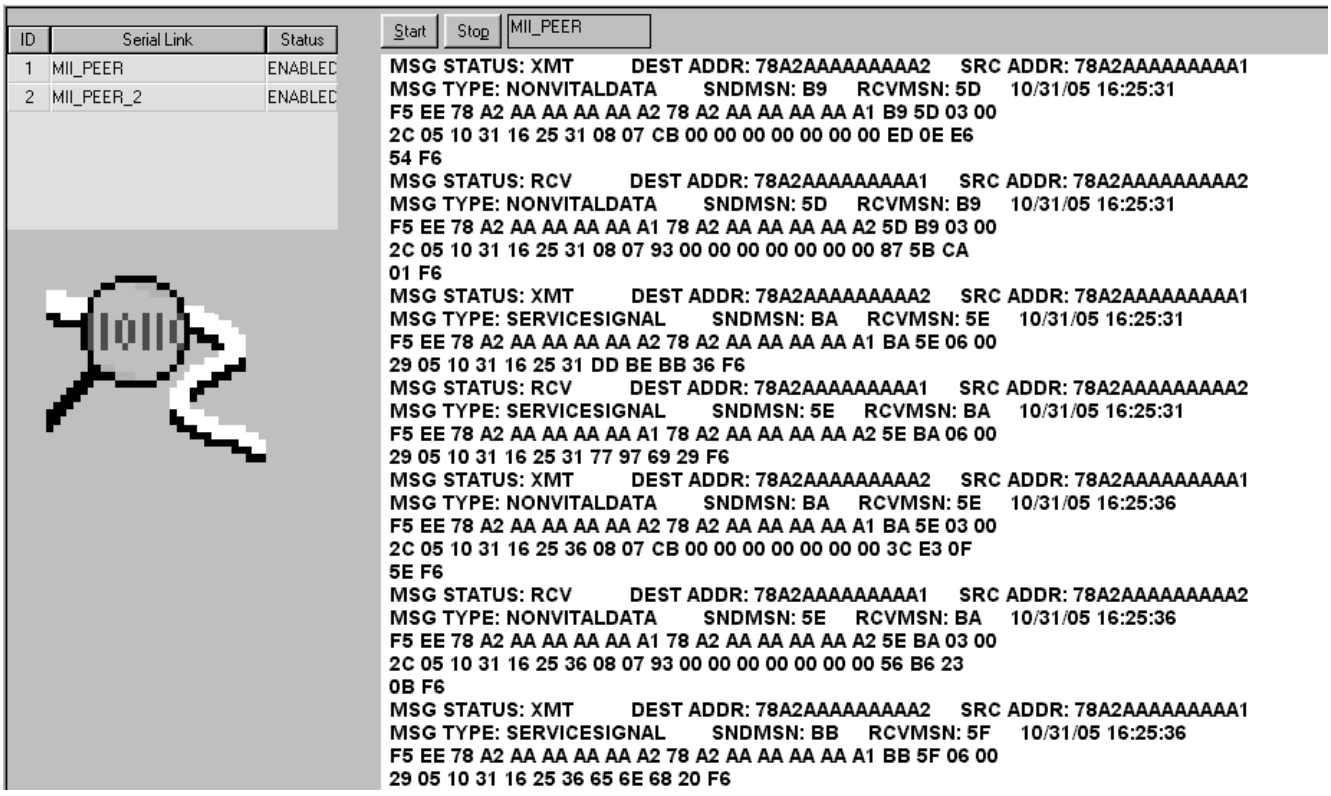


Figure 4-6. MicroLok II Peer Protocol Link Monitor

5. ENHANCED SCS-128 SLAVE PROTOCOL LINK

5.1. Introduction

The Genisys II CSIB Executive supports communication using the SCS-128 protocol; however, it supports only the slave end of the SCS-128 protocol; it cannot be an SCS-128 master.

The enhanced SCS-128 Slave End Protocol Link supports the assignment of NORMAL and STANDBY serial ports. The STANDBY port is enabled (and the NORMAL port is disabled) when the DCD input to the STANDBY port is asserted. The NORMAL port is enabled when the DCD input to the STANDBY port is de-asserted or when no good messages addressed to a slave defined on the Genisys.SLAVE have been received for five minutes. The enhanced SCS-128 Slave End Protocol Link does not support operation on half-duplex connunication links.

5.2. External Connections

Connections for the various serial interface signals supported by the SCS-128 slave end protocol are shown for each physical serial port in Table 1-2. Refer to Section 3.5 of Service Manual SM 6800B for additional information regarding the interconnection of Genisys II and other serial devices. See Figure 3-1 for typical interconnections when a STANDBY serial port is defined.

5.3. Genisys II CSIB Jumper Positions

The enhanced Genisys slave end protocol requires standard jumper settings as defined in Table 1-3.

5.4. Front Panel Options

Communication activity for active SCS-128 slave ports (NORMAL or STANDBY) may be monitored using the communication status LEDs on the front panel of the CISB by selecting the desired SCS-128 slave port identified as the NORMAL port for a link using the front panel menu switches. Using the “UP-DOWN” menu switch, select DOWN once. Select “SERL PRTS” on the front panel alphanumeric display by selecting “LEFT” using the “LEFT-RIGHT” menu switch. Select “DOWN” once to enter the serial port display menu. “PORT pp n” is displayed where “pp” is the serial port protocol and “n” is the physical port number (1 to 4). For SCS-128 Slave Protocol ports the protocol identification “pp” is “SS”. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired port is found. Select “DOWN” using the “UP-DOWN” menu switch to display activity on the selected port. Communication activity on the currently active port (NORMAL or STANDBY) is displayed. The serial communication display LED functions are described in Table 1-1. LED “D” (Received Carrier Detected) is not supported for the SCS-128 Slave Protocol. Select “UP” using the “UP-DOWN” menu switch until the executive ID is again scrolled on the top alphanumeric display to return to the default front panel display. Note that activity for the physical port assigned to the first serial link defined in the application program is displayed on LEDs “A” through “E” by default.

The SCS-128 Slave Protocol Link may be placed in link test mode by selecting the desired SCS-128 slave port identified as the NORMAL port. Using the "UP-DOWN" menu switch, select "DOWN" once. Select "SERL TEST" on the front panel alphanumeric display by selecting "LEFT" using the "LEFT-RIGHT" menu switch until "SERL TEST" is displayed on the alphanumeric display. Select "DOWN" once to enter the serial port test menu. "PORT pp n" is displayed where "pp" is the serial port protocol and "n" is the physical port number (1 to 4). For SCS-128 Slave Protocol ports the protocol identification "pp" is "SS". Scroll through the active ports using the "LEFT-RIGHT" menu switch until the desired NORMAL port is found. Place the desired port in test mode by selecting "DOWN" once using the "UP-DOWN" menu switch. Scroll through the test modes using the "LEFT-RIGHT" menu switch. Available test modes include "steady MARK", "steady SPACe", and "50% duty CYCLe" at the configured data rate. Select the desired test mode by selecting "DOWN" once using the "UP-DOWN" menu switch. When the SCS-128 slave link is placed in test mode, the selected test signal will be transmitted over the selected currently active port (NORMAL or STANDBY). Return the port under test to normal operation by selecting "NORMal" using the "LEFT-RIGHT" menu switch then selecting "DOWN" using the "UP-DOWN" menu switch.

See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

5.5. Defining an SCS-128 Slave Protocol Link in a Genisys II Application Program

A typical Genisys II application program that defines an enhanced SCS-128 slave end link is shown in Appendix D.

The basic structure of the SCS-128 slave link definition is similar to that of a Genisys slave link. Up to six SCS-128 links may be defined in the same application program although only four may be enabled at the same time.

5.6. SCS-128 Slave Protocol Link Compiler Declarations and Configuration Commands

Compiler declarations and configuration commands can be declared adjustable unless otherwise noted and are presented in Table 5-1.

Table 5-1. SCS-128 Slave Protocol Link Compiler Commands and Their Functions

Command	Function
LINK	Declares a new SCS-128 protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the SCS-128 protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	"SCS.SLAVE" declares that this link will support the SCS-128 slave protocol. No default. Not adjustable.

Command	Function
POINT.POINT	For physical ports 1, 2, and 3, specifies whether or not the physical port hardware will operate in point-to-point (1) or multi-drop (0) mode. The default is multi-drop. Physical port 4 is point-to-point only regardless of the value assigned to POINT.POINT.
PORT	The NORMAL physical port to which the SCS-128 link will be attached. Available ports are 1, 2, 3, and 4. There is no default.
STANDBY.PORT	The STANDBY physical port to which the SCS-128 link will be attached. Available ports are 0 (No STANDBY port), 1, 2, 3, and 4. The default port is 0.
BAUD	The data rate at which the link will operate. Available selections are 75, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits per second. The default rate is 300.
ALTERNATE.BAUD	Specifies a data rate to which the SCS-128 serial port is set on Genisys II initialization and after an SCS-128 link communication failure has been detected. The ALTERNATE.BAUD data rate, when specified, is normally 75 bits per second although any data rate that is valid for the BAUD parameter may be set. If ALTERNATE.BAUD is not specified or it is set to “0”, no alternate data rate will be available and the data rate for the SCS-128 serial port will always be set to the data rate specified by BAUD.
STOPBITS	The number of stop bits (1 or 2) that will be attached to the end of each message byte as it is transmitted. The default number is “1”.
PARITY	The type of parity calculation applied to each transmitted and received byte for the SCS-128 protocol. The available selections are NONE, EVEN, ODD, MARK, and SPACE. The default parity selection for the SCS-128 protocol is EVEN.
KEY.ON.DELAY	The time (in bit times) between the assertion of RTS and the leading edge of the start bit of the first byte of the transmitted SCS-128 message. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
KEY.OFF.DELAY	The time (in bit times) between the end of the last stop bit of the last byte of a transmitted SCS-128 message and the de-assertion of RTS. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
INTERBYTE.TIMEOUT	The time allowed between consecutive bytes of a received message. If the inter-byte timeout is exceeded, end of message processing is initiated. The default value of “0” allows the Genisys II executive to automatically calculate the inter-byte timeout value. Otherwise, values between 10 and 500 milliseconds may be selected. The default value is recommended most applications.
STALE.DATA.TIMEOUT	The elapsed time after which a slave is declared failed during which no valid messages addressed to the slave have been received. The allowable range is 1 to 600 seconds. The default value is 300 seconds.
INDICATION.ACK	Indicates whether or not indication acknowledge will be supported by this SCS-128 link. “0” disables indication acknowledge support; “1” enables support. “Indication acknowledge” is a non-standard extension of the SCS-128 protocol and, if enabled, it must be supported by the connected SCS-128 master.

5.7. SCS-128 Slave Protocol Link Compiler Declarations

Table 5-2 presents the SCS-128 Slave Compiler declarations.

Table 5-2. SCS-128 Slave Protocol Link Compiler Declarations

Command	Function
ADDRESS	Declares a slave on an SCS-128 protocol link and assigns its address. An SCS-128 link may include 1 to 32 slave declarations. The address of an SCS-128 slave may be 1 to 63. There is no default. If an SCS-128 slave address is declared as "0", the "configurable" address is used for that slave. Only one address declaration on an SCS-128 link may use address 0. Not adjustable.
ENABLE	Specifies whether or not an SCS-128 slave will be enabled on unit initialization. 0 = Disabled; 1 = Enabled. There is no default.
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially by a slave. The list may include 1 to 128 Booleans. Each SCS-128 slave must have an NV.OUTPUT declaration. Not adjustable.
NV.INPUT	Defines a list of Boolean values (logic bits) to be received serially by a slave. The list may include 1 to 128 Booleans. The NV.INPUT declaration is optional. Not adjustable.

5.8. SCS-128 Slave Protocol Link System Boolean Bits

Table 5-3 presents the System Boolean Bits available with the SCS-128 protocol.

Table 5-3. SCS-128 Slave Protocol Link System Boolean Expressions

Expression	Function
<link_name>.ENABLED	A read-only Boolean bit that indicates to the application whether or not the SCS-128 link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.DISABLE	A read/write Boolean bit that allows the application program to disable the SCS-128 link. 0 = ENABLED; 1 = DISABLED.
<link_name>.STANDBY	A read-only Boolean bit that indicates whether or not the SCS-128 STANDBY port is active. 0 = INACTIVE; 1 = ACTIVE.
<link_name>.nn.ENABLED	A read-only Boolean bit that indicates whether or not a slave is enabled. "nn" is the slave address. 0 = DISABLED; 1 = ENABLED.
<link_name>.nn.STATUS	A read-only Boolean bit that indicates the current status of slave communication. "nn" is the slave address. 0 = FAILED; 1 = NORMAL.
<link_name>.nn.INPUTS.RECEIVED	A special Boolean bit that is used to trigger logic blocks when a slave receives serial input data. This bit cannot be directly accessed by the applictaion program.

5.9. Maintenance Tool Support for the SCS-128 Protocol

This section describes the part of the Maintenance Tool that is applicable to the Genisys II SCS-128 Protocol. For a complete description of the maintenance tool, please refer to Service Manual SM 6800C.

5.9.1. SCS-128 Slave Protocol Link Configuration

In the main launch menu, click on the button labeled "System Configuration." The user may either examine or modify the configuration database. Select the appropriate link button to modify or view the configuration elements. Figure 5-1 presents the SCS-128 Slave Protocol Link Configuration. SCS-128 Slave Protocol configuration parameters are described in Section 5.6 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

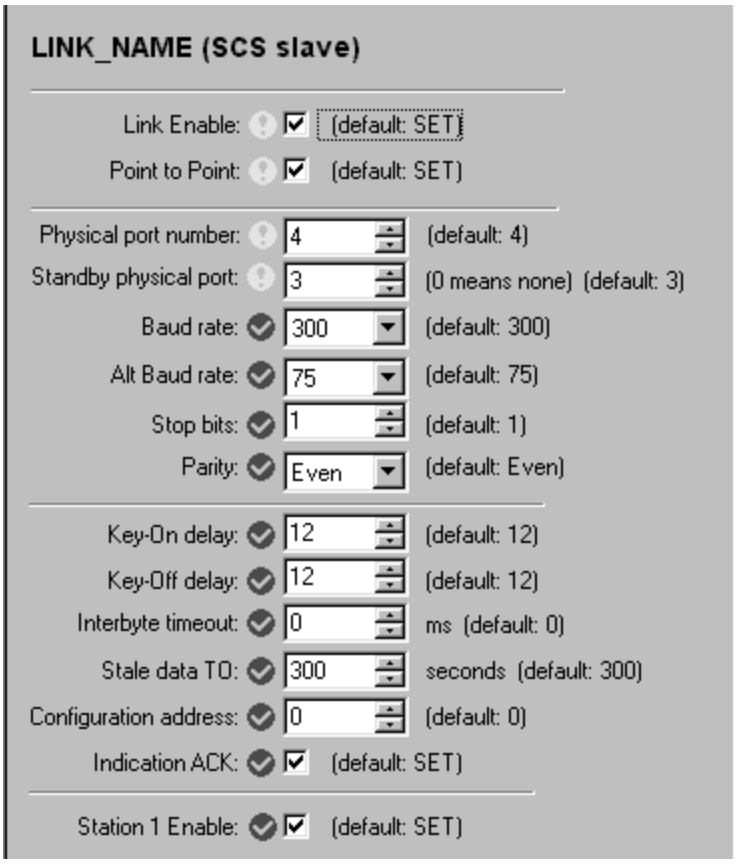


Figure 5-1. SCS-128 Slave Protocol Link Configuration

5.9.2. SCS-128 Slave Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and protocol links (Figure 5-2). To enter the Link Information view for a particular link, simply click on the appropriate button.

An SCS-128 protocol link that is functioning properly generally has receiver error counts that are substantially lower than (less than 5% of) the “Good message count.” Higher error counts indicated the need to test the integrity of the communication circuit. Elevated error counts will usually cause an apparent slowdown of data flow on the circuit. Loss of data may not be readily apparent until error counts become very high (30% or more of the “Good message count”).

The count of messages sent should roughly equal the count of messages received. An SCS-128 slave protocol link that receives no messages can transmit no messages as a slave can only respond to received messages. High error counts often indicate a higher than normal level of noise on the communication circuit. A high “receive timeout error count” suggests possible momentary interruptions of the signal on the communication circuit.

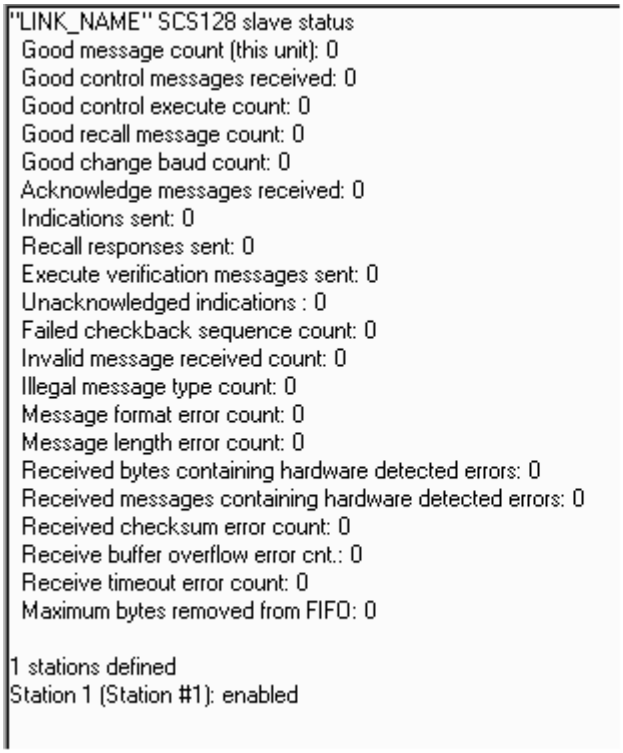


Figure 5-2. SCS-128 Slave Protocol Link Statistics

5.9.3. SCS-128 Slave Protocol Link Protocol Monitor

In the main launch menu, click on the button labeled "Serial Message Monitor." Select the appropriate link to monitor from the list on the left to monitor. Figure 5-3 presents a typical display for the SCS-128 Slave Protocol Monitor. The protocol monitor display for the SCS-128 Slave Protocol Link shows message time, message direction (transmitted or received), and message type followed by the full text of the transmitted or received message in hexadecimal bytes. Please refer to the SCS-128 Protocol description in SM 6408N, Section IV or other appropriate SCS-128 Protocol document for additional information on the SCS-128 Protocol.

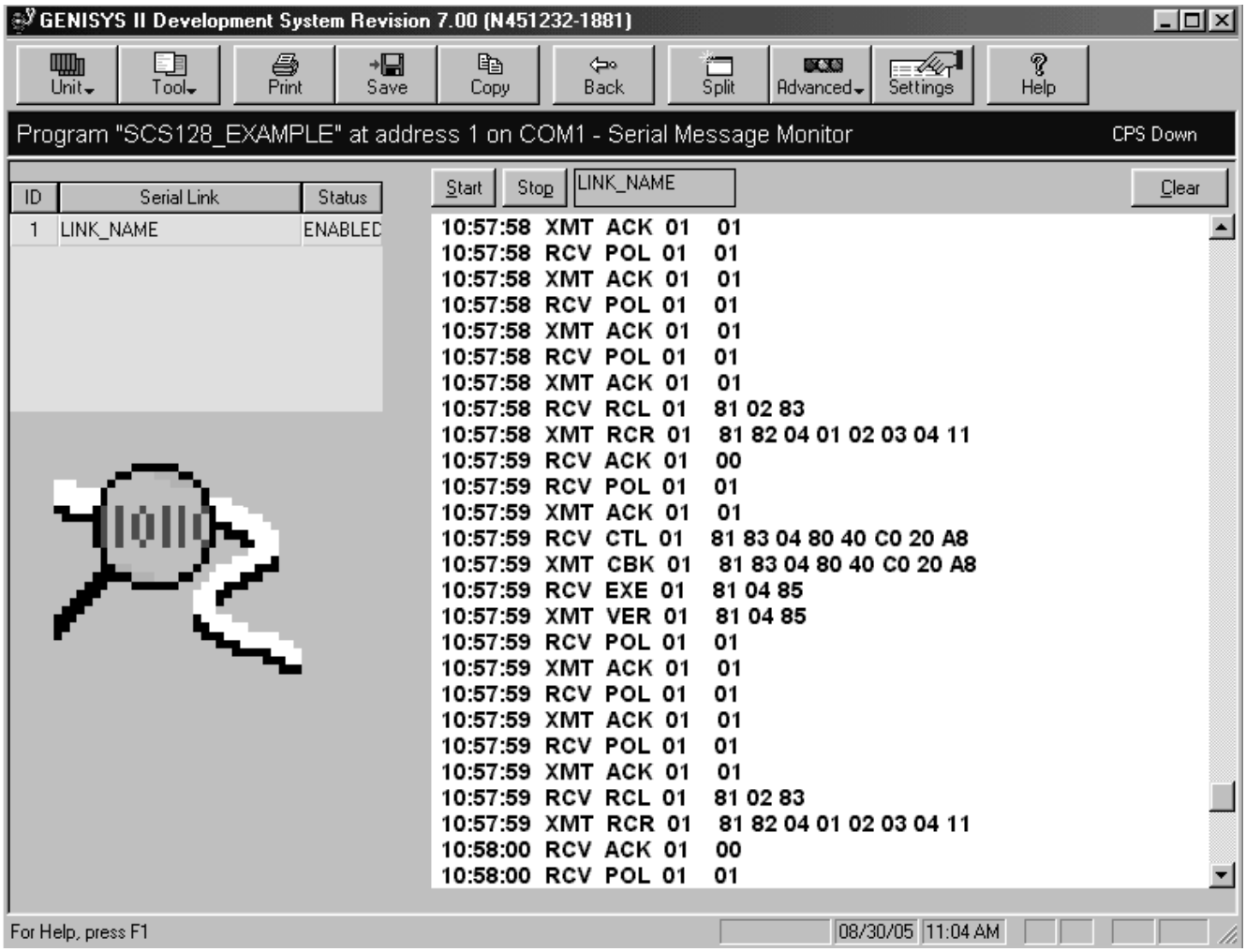


Figure 5-3. SCS128 Slave Protocol Link Protocol Monitor

6. ENHANCED MCS-1 SLAVE PROTOCOL LINK

6.1. Introduction

The Genisys II CSIB Executive supports communication using the MCS-1 protocol. The Genisys II CSIB supports only the slave end of the MCS-1 protocol. (It cannot be an MCS-1 master.)

6.2. External Connections

Connections for the various serial interface signals supported by the MCS-1 slave end protocol are shown for each physical serial port in Table 1-2. Refer to Section 3.5 of Service Manual SM 6800B, for additional information regarding the interconnection of Genisys II and other serial devices. See Figure 3-1 for typical interconnections when a STANDBY serial port is defined.

6.3. Genisys II CSIB Jumper Positions

The MCS-1 protocol requires the standard CPU board jumper settings shown in Table 1-3.

6.4. Front Panel Options

Communication activity for active MCS-1 slave ports (NORMAL or STANDBY) may be monitored using the communication status LEDs on the front panel of the CISB by selecting the desired MCS-1 slave port identified as the NORMAL port for a link using the front panel menu switches. Using the “UP-DOWN” menu switch, select DOWN once. Select “SERL PRTS” on the front panel alphanumeric display by selecting “LEFT” using the “LEFT-RIGHT” menu switch. Select “DOWN” once to enter the serial port display menu. “PORT pp n” is displayed where “pp” is the serial port protocol and “n” is the physical port number (1 to 4). For MCS-1 Slave Protocol ports the protocol identification “pp” is “HS”. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired port is found. Select “DOWN” using the “UP-DOWN” menu switch to display activity on the selected port. Communication activity on the currently active port (NORMAL or STANDBY) is displayed. The serial communication display LED functions are described in Table 1-1. LED “D” (Received Carrier Detected) is not supported for the MCS-1 Slave Protocol. Select “UP” using the “UP-DOWN” menu switch until the executive ID is again scrolled on the top alphanumeric display to return to the default front panel display. Note that activity for the physical port assigned to the first serial link defined in the application program is displayed on LEDs “A” through “E” by default.

The MCS-1 Slave Protocol Link may be placed in link test mode by selecting the desired MCS-1 slave port identified as the NORMAL port. Using the “UP-DOWN” menu switch, select “DOWN” once. Select “SERL TEST” on the front panel alphanumeric display by selecting “LEFT” using the “LEFT-RIGHT” menu switch until “SERL TEST” is displayed on the alphanumeric display. Select “DOWN” once to enter the serial port test menu. “PORT pp n” is displayed where “pp” is the serial port protocol and “n” is the physical port number (1 to 4). For

MCS-1 Slave Protocol ports the protocol identification “pp” is “HS”. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired NORMAL port is found. Place the desired port in test mode by selecting “DOWN” once using the “UP-DOWN” menu switch. Scroll through the test modes using the “LEFT-RIGHT” menu switch. Available test modes include “steady MARK”, “steady SPACe”, and “50% duty CYCLe” at the configured data rate. Select the desired test mode by selecting “DOWN” once using the “UP-DOWN” menu switch. When the SCS-128 slave link is placed in test mode, the selected test signal will be transmitted over the selected currently active port (NORMAL or STANDBY). Return the port under test to normal operation by selecting “NORMal” using the “LEFT-RIGHT” menu switch then selecting “DOWN” using the “UP-DOWN” menu switch.

See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

6.5. Defining an MCS-1 Slave Protocol Link in a Genisys II Application Program

A typical Genisys II application program that defines an enhanced MCS-1 slave end link is shown in Appendix E.

The basic structure of the MCS-1 slave link definition is similar to that of a Genisys slave link.

Up to 6 MCS-1 links may be defined in the same application program although only four may be enabled at the same time.

6.6. MCS-1 Slave Protocol Link Compiler Declarations and Configuration Commands

Compiler declarations and configuration commands can be declared adjustable unless otherwise noted. Table 6-1 presents the MCS-1 compiler commands and their functions

Table 6-1. MCS-1 Slave Protocol Link Compiler Commands and Their Functions

Command	Function
LINK	Declares a new MCS-1 protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the MCS-1 protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	“MCS.SLAVE” declares that this link will support the MCS-1 slave protocol. No default. Not adjustable.
POINT.POINT	For physical ports 1, 2, and 3, specifies whether or not the physical port hardware will operate in point-to-point (1) or multi-drop (0) mode. The default is multi-drop. Physical port 4 is point-to-point only regardless of the value assigned to POINT.POINT.
PORT	The NORMAL physical port to which the MCS-1 link will be attached. Available ports are 1, 2, 3, and 4. There is no default.

Command	Function
STANDBY.PORT	The STANDBY physical port to which the MCS-1 link will be attached. Available ports are 0 (No STANDBY port), 1, 2, 3, and 4. The default port is 0.
BAUD	The data rate at which the link will operate. Available selections are 75, 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits per second. The default rate is 300.
STOPBITS	The number of stop bits (1 or 2) that will be attached to the end of each message byte as it is transmitted. The default number is "1".
PARITY	The type of parity calculation applied to each transmitted and received byte for the MCS-1 protocol. The available selections are NONE, EVEN, ODD, MARK, and SPACE. The default parity selection for the MCS-1 protocol is EVEN.
KEY.ON.DELAY	The time (in bit times) between the assertion of RTS and the leading edge of the start bit of the first byte of the transmitted MCS-1 message. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
KEY.OFF.DELAY	The time (in bit times) between the end of the last stop bit of the last byte of a transmitted MCS-1 message and the de-assertion of RTS. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
INTERBYTE.TIMEOUT	The time allowed between consecutive bytes of a received message. If the inter-byte timeout is exceeded, end of message processing is initiated. The default value of "0" allows the Genisys II executive to automatically calculate the inter-byte timeout value. Otherwise, values between 10 and 500 milliseconds may be selected. The default value is recommended for most applications.
STALE.DATA.TIMEOUT	The elapsed time after which a slave is declared failed during which no valid messages addressed to the slave have been received. The allowable range is 1 to 600 seconds. The default value is 300 seconds.

6.7. MCS-1 Slave Protocol Link Compiler Declarations

Table 6-2 presents the MCS-1 Compiler declarations for the MCS-1 protocol.

Table 6-2. MCS-1 Slave Protocol Link Compiler Declarations

Declaration	Function
ADDRESS	Declares a slave on an MCS-1 protocol link and assigns its address. An MCS-1 link may include 1 to 32 slave declarations. The address of an MCS-1 slave may be 1 to 63. There is no default. If an MCS-1 slave address is declared as "0", the "configurable" address is used for that slave. Only one address declaration on an MCS-1 link may use address 0. Not adjustable.
ENABLE	Specifies whether or not an MCS-1 slave will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. There is no default.
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially by a slave. The list may include 1 to 120 Booleans. Each MCS-1 slave must have an NV.OUTPUT declaration. Not adjustable.
NV.INPUT	Defines a list of Boolean values (logic bits) to be received serially by a slave. The list may include 1 to 120 Booleans. The NV.INPUT declaration is optional. Not adjustable.

6.8. MCS-1 Slave Protocol Link System Boolean Bits

Table 6-3 presents the System Boolean Bits available with the MCS-1 protocol.

Table 6-3. MCS-1 Slave Protocol Link System Boolean Bits

Expression	Function
<link_name>.ENABLED	A read-only Boolean bit that indicates to the application whether or not the MCS-1 link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.DISABLE	A read/write Boolean bit that allows the application program to disable the MCS-1 link. 0 = ENABLED; 1 = DISABLED.
<link_name>.STANDBY	A read-only Boolean bit that indicates whether or not the MCS-1 STANDBY port is active. 0 = INACTIVE; 1 = ACTIVE.
<link_name>.nn.ENABLED	A read-only Boolean bit that indicates whether or not a slave is enabled. "nn" is the slave address. 0 = DISABLED; 1 = ENABLED.
<link_name>.nn.STATUS	A read-only Boolean bit that indicates the current status of slave communication. "nn" is the slave address. 0 = FAILED; 1 = NORMAL.
<link_name>.nn.INPUTS.RECEIVED	A special Boolean bit that is used to trigger logic blocks when a slave receives serial input data. This bit cannot be directly accessed by the application program.

6.9. Maintenance Tool Support for the MCS-1 Slave Protocol Link

This section describes the part of the Maintenance Tool that is applicable to the Genisys II MCS-1 Protocol. For a complete description of the maintenance tool, please refer to SM 6800C.

6.9.1. MCS-1 Slave Protocol Link Configuration

In the main launch menu, click on the button labeled "System Configuration." The user may either examine or modify the configuration database. Select the appropriate link button to modify or view the configuration elements. Figure 6-1 presents the configuration of the MCS-1 Slave Protocol Link. MCS-1 Slave Protocol configuration parameters are described in Section 6.6 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

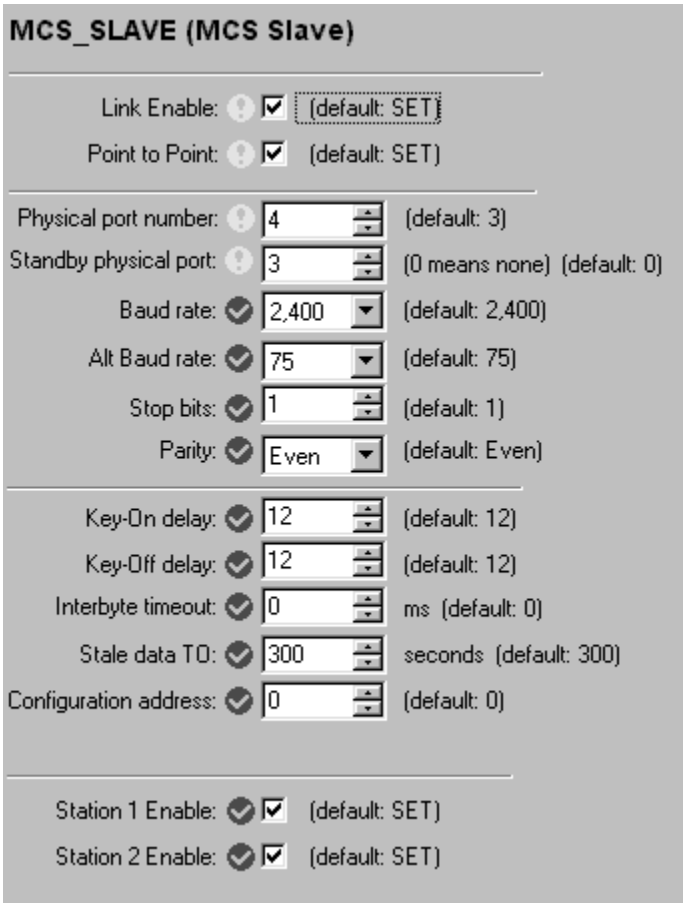


Figure 6-1. MCS-1 Slave Protocol Link Configuration

6.9.2. MCS-1 Slave Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and protocol links (Figure 6-2). To enter the Link Information view for a particular link, simply click on the appropriate button.

An MCS-1 protocol link that is functioning properly generally has receiver error counts that are substantially lower than (less than 5% of) the “Good message count.” Higher error counts indicated the need to test the integrity of the communication circuit. Elevated error counts will usually cause an apparent slowdown of data flow on the circuit. Loss of data may not be readily apparent until error counts become very high (30% or more of the “Good message count”).

The count of messages sent should roughly equal the count of messages received. An MCS-1 slave protocol link that receives no messages can transmit no messages as a slave can only respond to received messages. High error counts often indicate a higher than normal level of noise on the communication circuit. A high “receive timeout error count” suggests possible momentary interruptions of the signal on the communication circuit.

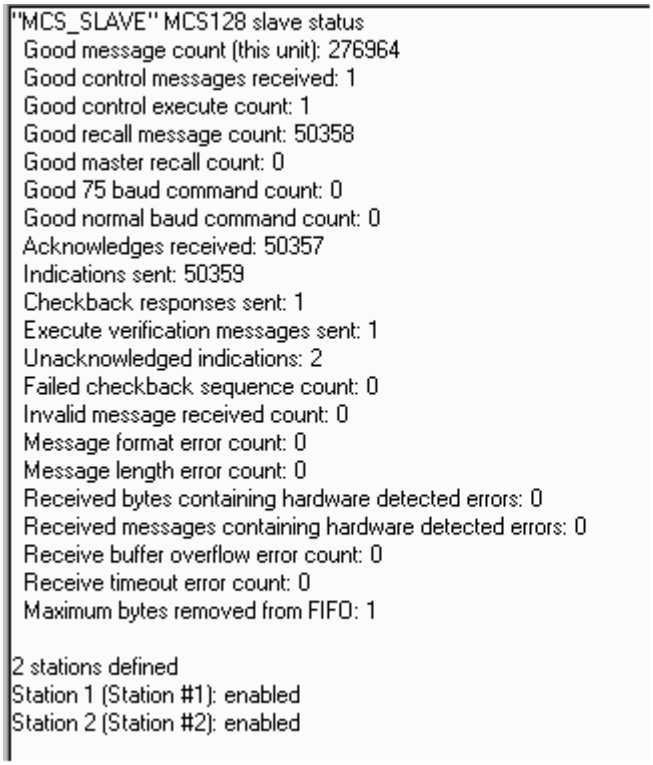


Figure 6-2. MCS-1 Slave Protocol Link Statistics

6.9.3. MCS-1 Slave Protocol Link Protocol Monitor

In the main launch menu, click on the button labeled “Serial Message Monitor.” Select the appropriate link to monitor from the list on the left to monitor. Figure 6-3 presents a typical display for the MCS-1 Slave Protocol Monitor. The protocol monitor display for the MCS-1 Slave Protocol Link shows message time, message direction (transmitted or received), and message type followed by the full text of the transmitted or received message in hexadecimal bytes. Please refer to the MCS-1 Protocol description in SM 6408M, Section IV or other appropriate MCS-1 Protocol document for additional information on the MCS-1 Protocol.

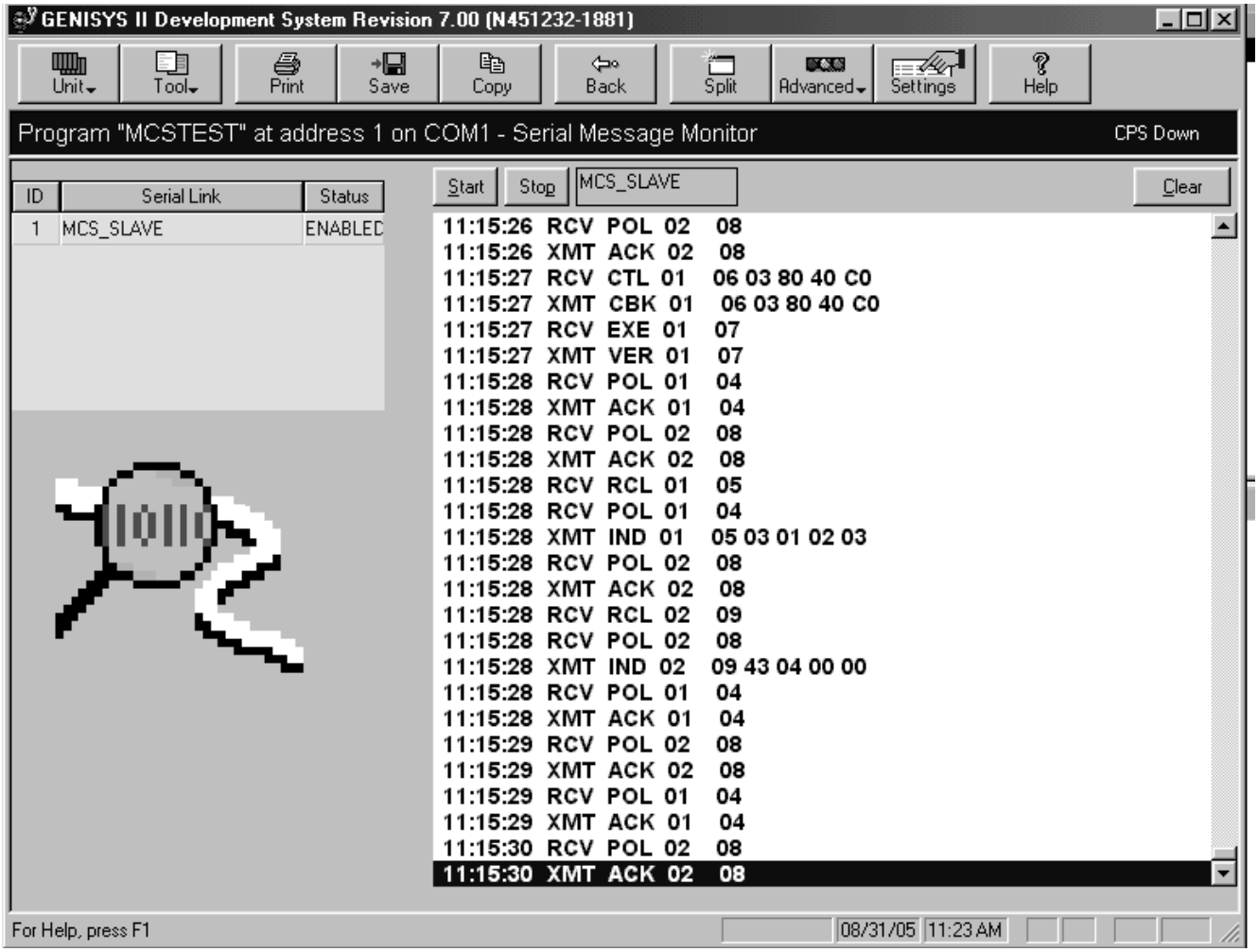


Figure 6-3. MCS-1 Slave Protocol Link Protocol Monitor

7. ARES WIU PROTOCOL LINK

7.1. Introduction

The Genisys II CSIB Executive supports communication using the ARES WIU protocol. Only one ARES protocol link may be defined in a Genisys II application program and it must be assigned to Serial Port 3.

7.2. External Connections

Connections for the various serial interface signals supported by the ARES protocol are shown for physical Port 3 in Table 7-1. Refer to Section 3.5 of SM 6800B for additional information regarding the interconnection of Genisys II and other serial devices. Table 7-2 presents the connections for the radio control protocol for Port 4. A serial isolator is required between the Genisys II serial port and the ARES radio-modem.

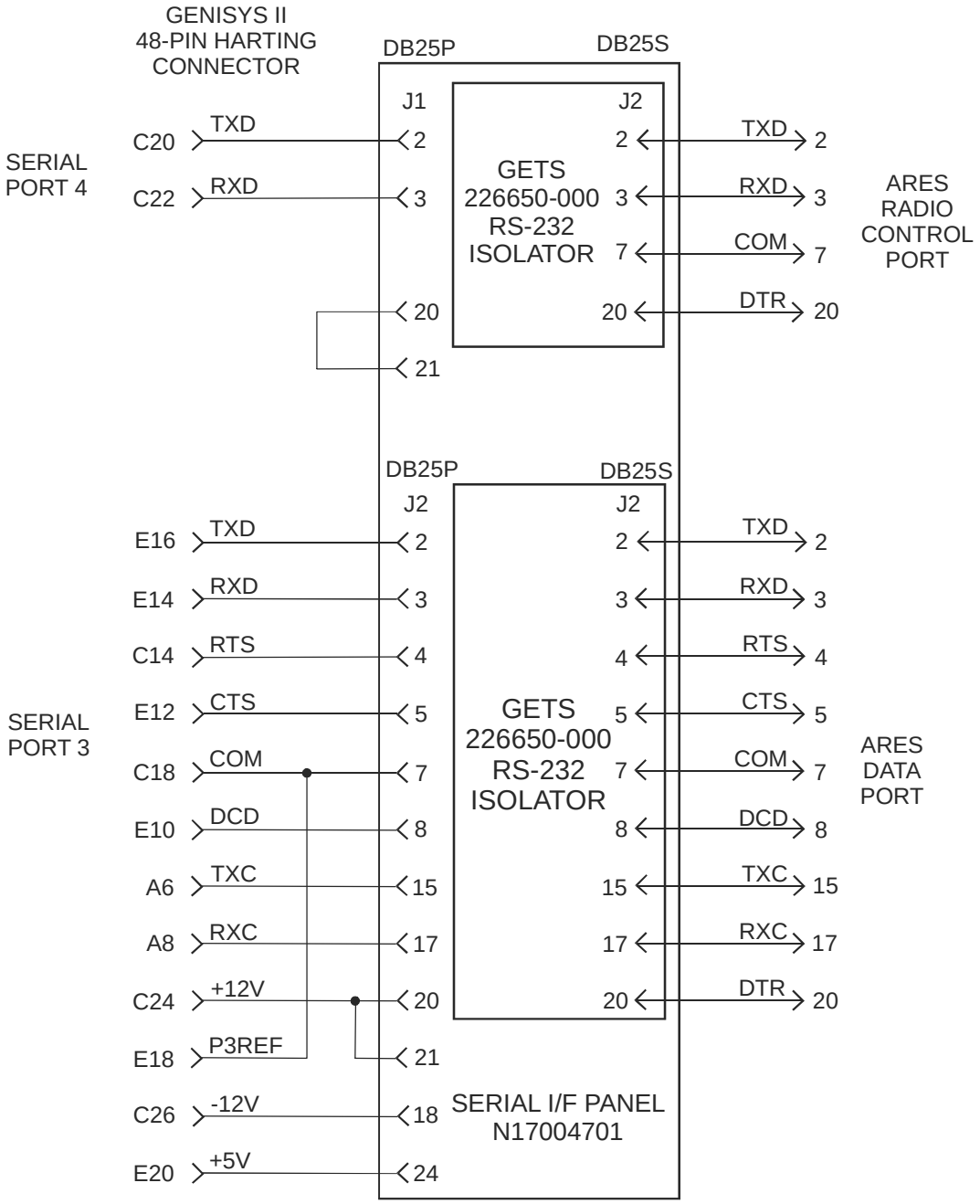
It is intended that connection to the ARES radio be implemented using two GETS serial isolators (P/N 226650-000) mounted on US&S serial interface panel (P/N 17004701). See Figure 7-1 for typical interconnections.

Table 7-1. Interface Connections for ARES WIU Protocol

Signal Name	Signal Designation	Port 3
Serial Data Output	TXD-	E16
Serial Data Input	RXD-	E14
Request to Send Output	RTS-	C14
Clear to Send Input	CTS-	E12
Data Carrier Detect	DCD-	E10
Transmitter Clock Input	TXC-	A6
Receiver Clock Input	RXC-	A8
Data Terminal Ready	DTR	C24
Receiver Reference Common	RXREF	E18
Signal Common	COM	C18

Table 7-2. Interface Connections for ARES WIU Radio Control Protocol

Signal Name	Signal Designation	Port 4
Serial Data Output	TXD	C20
Serial Data Input	RXD	C22
Signal Common	COM	C18



NOTES:

1 SET ALL JUMPERS ON N17004701 TO THE “IN” POSITION EXCEPT JP5 AND JP6.

2 SET JUMPER W1 ON BOTH GETS RS-232 ISOLATORS TO THE 2-3 POSITION.

Figure 7-1. Typical ARES WIU Protocol Radio Modem Connections

7.3. Genisys II CSIB Jumper Positions

The ARES protocol requires the standard CPU board jumper settings defined in Table 1-3 except as noted in Table 7-3.

Table 7-3. Exceptions to the Standard Jumper Configuration for the ARES WIU Protocol (Table 1-3)

Jumper	Function	Position	Effect
JMP13	Port 3 Synchronous Transmitter Clock	1-2	INPUT
JMP14	Port 3 Synchronous Transmitter Clock	2-3	INPUT
JMP16	Port 3 Synchronous Receive Clock	2-3	EXTERNAL

7.4. Front Panel Options

Communication activity for active ARES Protocol ports may be monitored using the communication status LEDs on the front panel of the CISB by selecting the desired ARES Protocol port using the front panel menu switches. Using the "UP-DOWN" menu switch, select DOWN once. Select "SERL PRTS" on the front panel alphanumeric display by selecting "LEFT" using the "LEFT-RIGHT" menu switch. Select "DOWN" once to enter the serial port display menu. "PORT pp n" is displayed where "pp" is the serial port protocol and "n" is the physical port number (1 to 4). For ARES Protocol ports the protocol identification "pp" is "RS". Scroll through the active ports using the "LEFT-RIGHT" menu switch until the desired port is found. Select "DOWN" using the "UP-DOWN" menu switch to display activity on the selected port. The serial communication display LED functions are described in Table 1-1. Select "UP" using the "UP-DOWN" menu switch until the executive ID is again scrolled on the top alphanumeric display to return to the default front panel display. Note that activity for the physical port assigned to the first serial link defined in the application program is displayed on LEDs "A" through "E" by default.

See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

7.5. Defining an ARES WIU Protocol Link in a Genisys II Application Program

A typical Genisys II application program that defines an ARES Protocol link is shown in Appendix F.

The basic structure of the ARES slave link definition is similar to that of a Genisys slave link.

7.6. ARES WIU Protocol Link Compiler Declarations and Configuration Commands

Compiler declarations and configuration commands can be declared adjustable unless otherwise noted. Table 7-4.

Table 7-4. ARES WIU Protocol Link Compiler Commands and Their Functions

Command	Function
LINK	Declares an ARES protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the ARES protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	"ARES.SLAVE" declares that this link will support the ARES slave protocol. No default. Not adjustable.
PORT	The physical port to which the ARES link will be attached. The ARES link must be attached to Port 3. There is no default.
BAUD	The data rate at which the link will operate. Available selections are 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits per second. The default rate is 2400. Note that the data rate for the ARES link is determined by the radio-modem connected to physical Port 3. This selection must match the operating data rate of the connected radio-modem.
KEY.ON.DELAY	The time (in bit times) between the assertion of CTS and the leading edge of the opening flag of the first byte of the transmitted ARES message. The allowable values are 0 and 8 to 280 bit times. The default value is 0 bit times.
KEY.OFF.DELAY	The time (in bit times) between the end of the closing flag of a transmitted ARES message and the de-assertion of RTS. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
WIU.LINK.ADDRESS	The HDLC layer address for messages addressed to ARES WIU's. Valid addresses are 0 to 0xFF. The default value is 1. The default should always be used.
GROUND.LINK.ADDRESS	The HDLC layer address for messages addressed to the ARES ground network. Valid addresses are 0 to 0xFF. The default value is 2. The default should always be used.
ARES.HOST.ADDRESS	The ARES address for the ground host to which all indication messages are addressed and from which all control messages are received. The ARES ground host address consists of 8 to 15 BCD digits formatted as defined in the ARES protocol specification. There is no default.
ARES.TIME.ADDRESS	The address of the ARES time server. The ARES time server address consists of 8 to 15 BCD digits formatted as defined in the ARES protocol specification. There is no default.
CTS.WAIT	The time that the ARES link will wait for CTS after RTS has been asserted. If CTS is not asserted in the specified time, a retry is initiated. Valid times are 100 to 10000 milliseconds. The default value is 2000 milliseconds.
ACK.TIMEOUT	The time that the ARES link will wait for the acknowledgement of a transmitted message that requires acknowledgement before initiating a retry. Valid times are 1 to 60 seconds. The default time is 10 seconds.
PROTOCOL.RESET.TIMEOUT	The time that the ARES link will wait for acknowledgement of a protocol reset request before retrying the request. Valid times are 10 to 120 seconds. The default time is 70 seconds.
TIME.REQUEST.TIMEOUT	The time that the ARES link will wait for completion of a time update sequence before reinitiating the request. Valid times are 10 to 120 seconds. The default time is 70 seconds.
XMIT.RETRY.LIMIT	The number of times a single message will be retried before it is discarded. Valid values are 1 to 10. The default value is 3.

Command	Function
STALE.DATA.TIMEOUT	The elapsed time after which a slave is declared failed during which no valid messages addressed to the slave have been received. The allowable range is 20 to 1810 seconds. The default time is 300 seconds.

7.7. ARES WIU Protocol Station Compiler Declarations

Table 7-5 presents the ARES Station Compiler declarations for the ARES WIU protocol.

Table 7-5. ARES WIU Protocol Link Compiler Declarations

Command	Function
ADDRESS	Declares a slave on an ARES link and assigns its address. An ARES link may include 1 to 6 slave declarations. The ARES slave address consists of 8 to 15 BCD digits formatted as defined in the ARES protocol specification. There is no default.
ENABLE	Specifies whether or not an ARES slave will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. There is no default.
STATION.NAME	A user-defined string that defines the name of an ARES slave. There is no default.
SET.CLOCK.ENABLE	Allows the slave to request time from the ARES time server and set the system real time clock. 0 = DISABLED; 1 = ENABLED. the default is ENABLED.
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially by a slave. The list may include 1 to 128 Boolean bits. Each ARES slave must have an NV.OUTPUT declaration. Not adjustable.
NV.INPUT	Defines a list of Boolean values (logic bits) to be received serially by a slave. The list may include 1 to 128 Boolean bits. The NV.INPUT declaration is optional. Not adjustable.

7.8. ARES WIU Protocol Link System Boolean Bits

Table 7-6 presents the System Boolean Bits available with the ARES protocol.

Table 7-6. ARES WIU Protocol Link System Boolean Bits

Expression	Function
<link_name>.ENABLED	A read-only Boolean bit that indicates to the application whether or not the ARES link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.DISABLE	This Boolean bit has no function.
<link_name>.STANDBY	This Boolean bit has no function.
<link_name>.<slave_name>.ENABLED	A read-only Boolean bit that indicates whether or not a slave is enabled. “nn” is the slave address. 0 = DISABLED; 1 = ENABLED.
<link_name>.<slave_name>.DISABLE	A read/write Boolean bit that allows the application program to disable a specific ARES slave.
<link_name>.slave_name>.STATUS	A read-only Boolean bit that indicates the current status of slave communication. “nn” is the slave address. 0 = FAILED; 1 = NORMAL.
<link_name>.<slave_name>. INPUTS.RECEIVED	A special Boolean bit that is used to trigger logic blocks when a slave receives serial input data. This bit cannot be directly accessed by the application program.

7.9. Maintenance Tool Support for the ARES WIU Protocol Link

This section describes the part of the Maintenance Tool that is applicable to the Genisys II ARES Protocol. For a complete description of the maintenance tool, please refer to Service Manual SM 6800C.

7.9.1. ARES WIU Protocol Link Configuration

In the main launch menu, click on the button labeled “System Configuration.” The user may either examine or modify the configuration database. Select the appropriate link button to modify or view the configuration elements. Figure 7-2 presents the configuration of the ARES Protocol Link. ARES Protocol link configuration parameters are described in Section 7.6 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

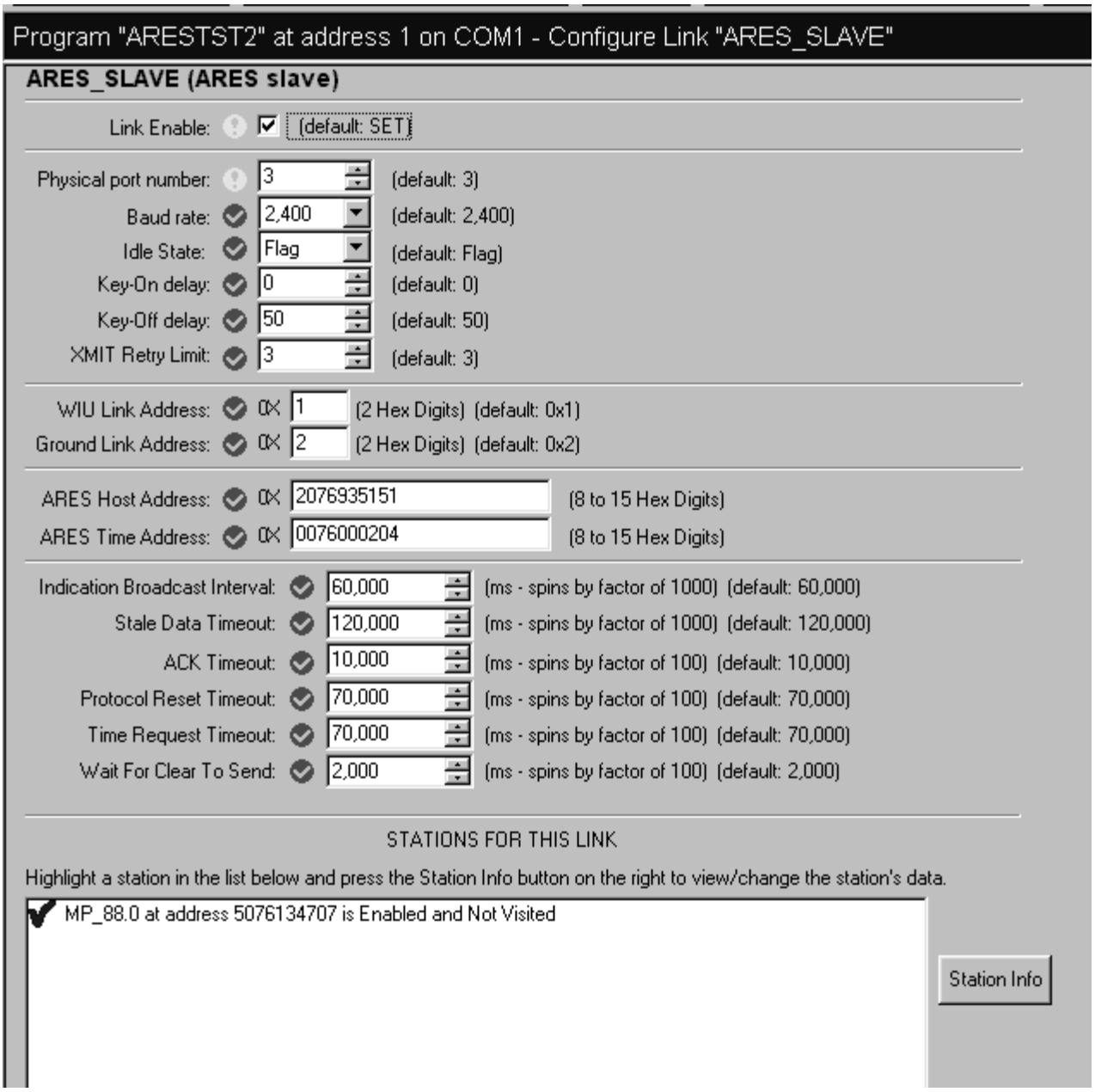


Figure 7-2. ARES WIU Protocol Link Configuration

7.9.2. ARES WIU Protocol Station Configuration

In the main launch menu, click on the button labeled “System Configuration.” The user may either examine or modify the configuration database. Select the appropriate link button to modify or view the configuration elements. Select the ARES protocol station to configure.

Figure 7-3 presents the ARES Protocol Station configuration. ARES Protocol station configuration parameters are described in Section 7.7 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

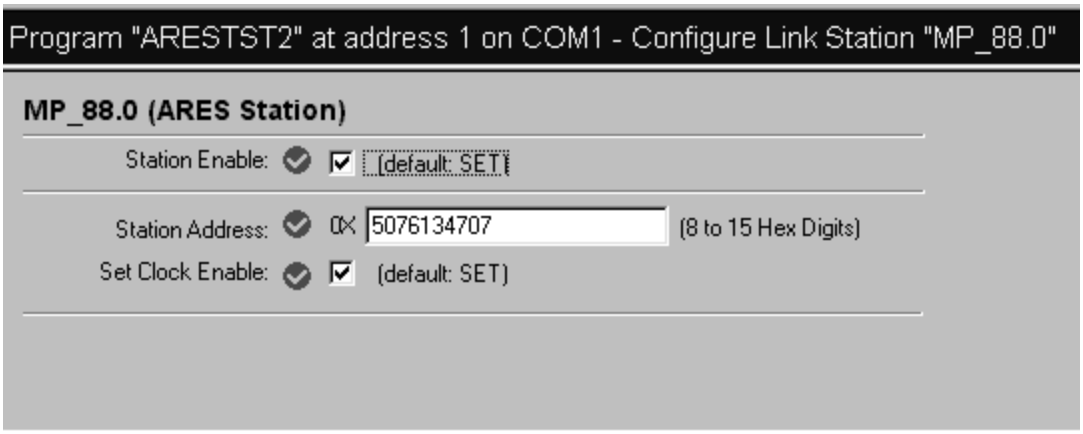


Figure 7-3. ARES WIU Protocol Station Configuration

7.9.3. ARES WIU Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and protocol links. To enter the Link Information view for a particular link, simply click on the appropriate button. Figure 7-4 presents the ARES Protocol Link Statistics Display.

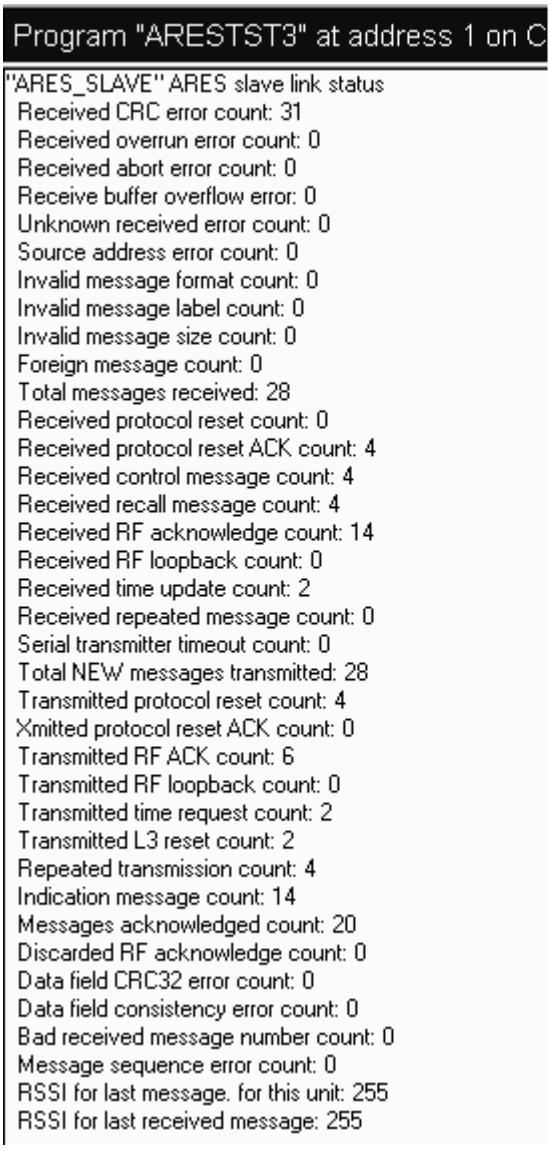


Figure 7-4. ARES WIU Protocol Link Statistics

7.9.4. ARES WIU Protocol Station Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and communication links. To enter the Link Information view for a particular link, simply click on the appropriate button. Scroll the display down to see the communication statistics for the desired station. Figure 7-5 presents the ARES Protocol Station Statistics Display.

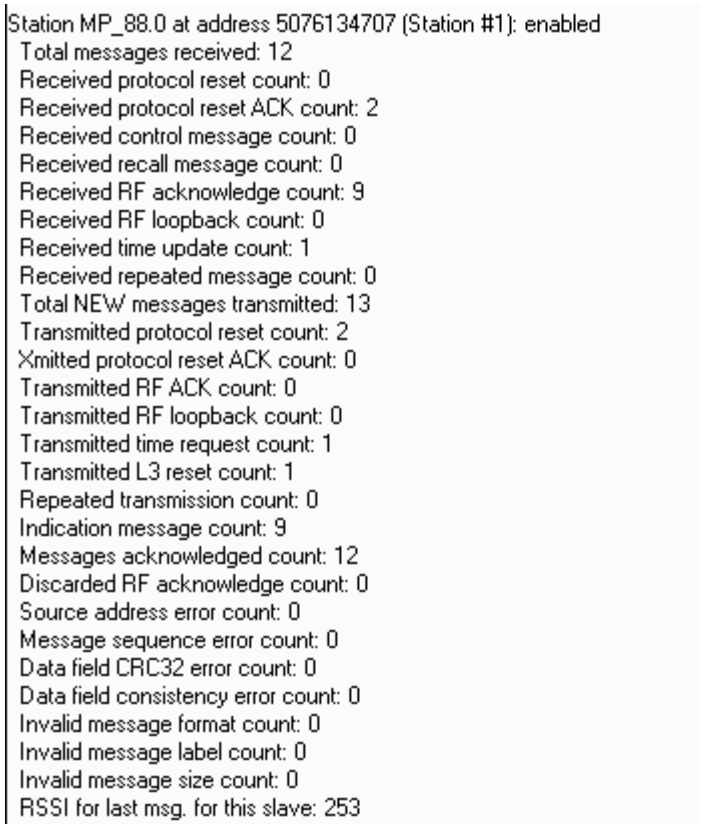


Figure 7-5. ARES WIU Protocol Station Statistics

7.9.5. ARES WIU Radio Control Protocol Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and communication links. To enter the Link Information view for a particular link, simply click on the appropriate button. Figure 7-6 presents the ARES Radio Control Protocol Link Statistics Display.

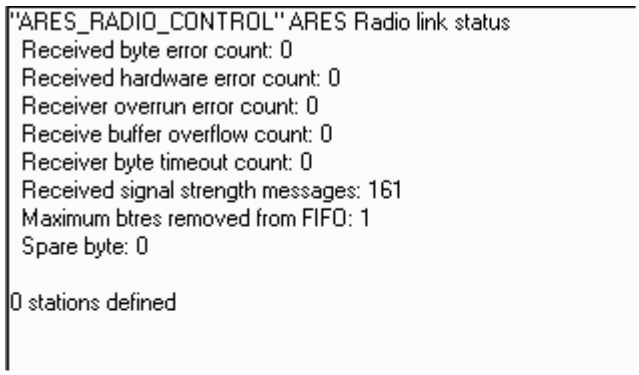


Figure 7-6. ARES WIU Radio Control Link Statistics

7.9.6. ARES WIU Protocol Link Protocol Monitor

In the main launch menu, click on the button labeled “Serial Message Monitor.” Select the appropriate link to monitor from the list on the left to monitor. Figure 7-7 presents a typical display for the ARES Protocol Monitor. The protocol monitor display for the ARES Protocol Link shows message time, message direction (transmitted or received), and message type followed by the full text of the transmitted or received message in hexadecimal bytes. Please refer to an appropriate ARES Protocol document for additional information on the ARES Protocol.

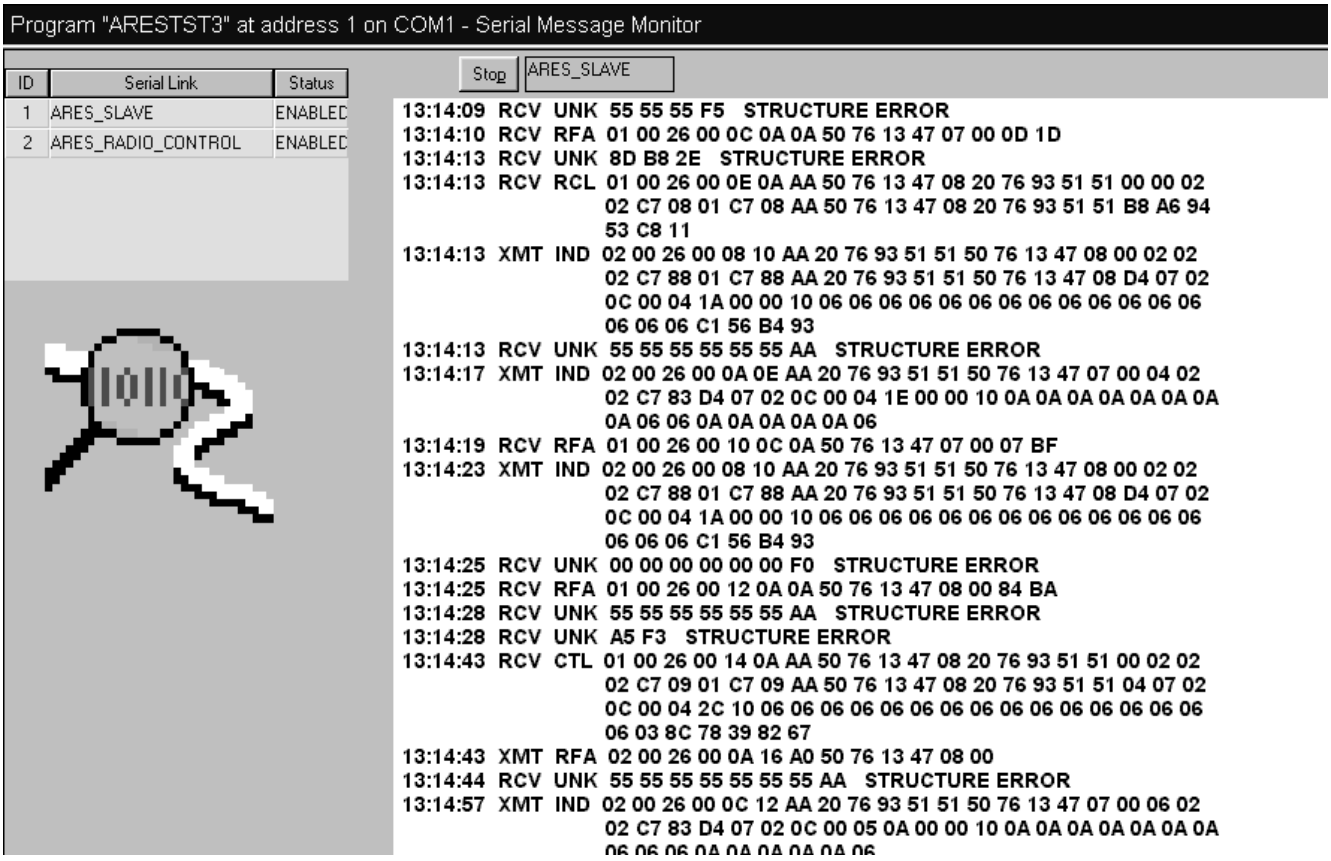


Figure 7-7. ARES WIU Protocol Link Protocol Monitor

8. ATCS WIU PROTOCOL LINK

8.1. Introduction

The Genisys II CSIB Executive supports communication using the ATCS protocol. Only one ATCS protocol link may be defined in a Genisys II application program and it must be assigned to Serial Port 3. A typical MicroLok II ATCS link test application is presented in Appendix G.

8.2. External Connections

Connections for the various serial interface signals supported by the ATCS protocol are shown for physical Port 3 in Table 8-1. Refer to Section 3.5 of Service Manual SM 6800B for additional information regarding the interconnection of Genisys II and other serial devices. A serial isolator is required between the Genisys II serial port and the ATCS MCP. See Figure 8-1 for typical interconnections.

Table 8-1. Port 3 Connections for the ATCS WIU Protocol

Signal Name	Signal Designation	Port 3
Serial Data Output	TXD-	E16
Serial Data Input	RXD-	E14
Transmitter Clock Output	TXC-	A6
Receiver Clock Input	RXC-	A8
Receiver Reference Common	RXREF	E18
Signal Common	COM	C18

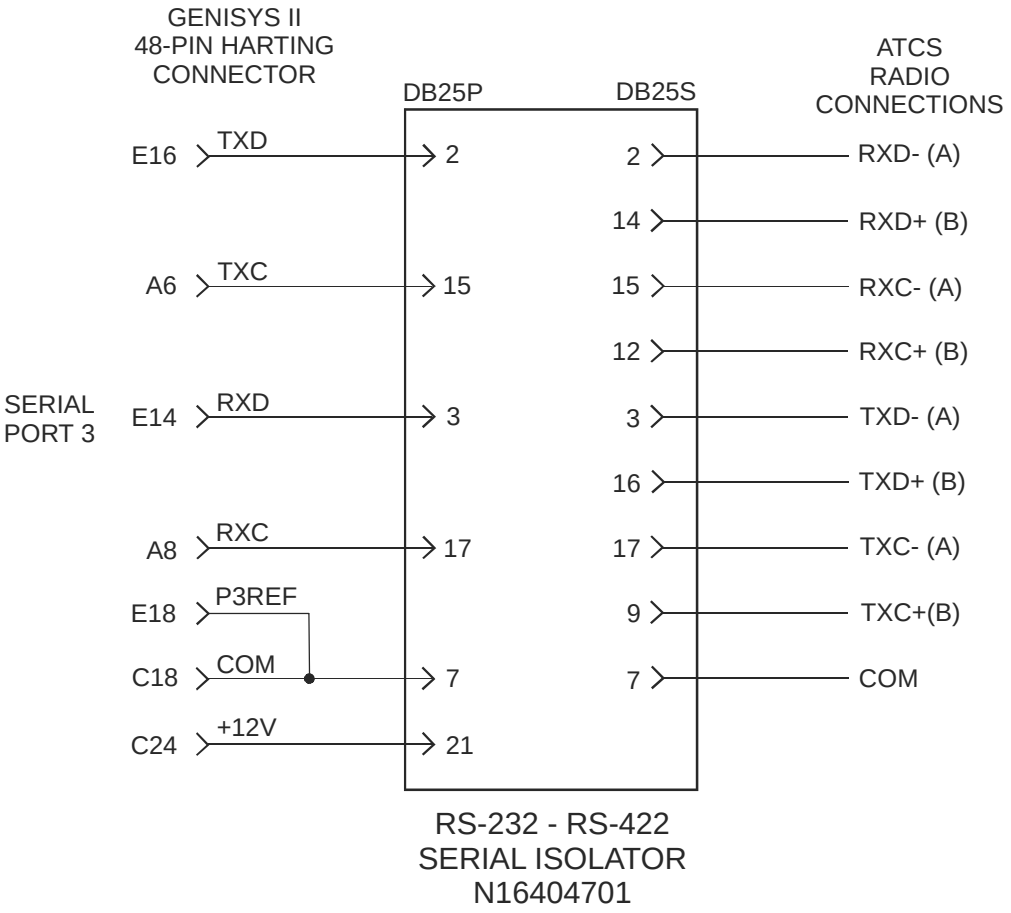


Figure 8-1. Typical ATCS WIU Protocol Radio Connection
(See Specific ATCS Radio Documentation for Connector and Pinouts)

8.3. Genisys II CSIB Jumper Positions

The ATCS protocol requires the standard CPU board jumper settings defined in Table 1-3.

8.4. Front Panel Options

Communication activity for active ATCS Protocol ports may be monitored using the communication status LEDs on the front panel of the CISB by selecting the desired ATCS Protocol port using the front panel menu switches. Using the "UP-DOWN" menu switch, select DOWN once. Select "SERL PRTS" on the front panel alphanumeric display by selecting "LEFT" using the "LEFT-RIGHT" menu switch. Select "DOWN" once to enter the serial port display menu. "PORT pp n" is displayed where "pp" is the serial port protocol and "n" is the physical port number (1 to 4). For ATCS Protocol ports the protocol identification "pp" is "AS". Scroll through the active ports using the "LEFT-RIGHT" menu switch until the desired port is found. Select "DOWN" using the "UP-DOWN" menu switch to display activity on the selected port. The serial communication display LED functions are described in Table 1-1. Select "UP" using the "UP-DOWN" menu switch until the executive ID is again scrolled on the top

alphanumeric display to return to the default front panel display. Note that activity for the physical port assigned to the first defined serial link defined in the application program is displayed on LEDs "A" through "E" by default.

See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

8.5. Defining an ATCS WIU Protocol Link in a Genisys II Application Program

A typical Genisys II application program that defines an ATCS Protocol link is shown in Appendix G.

The basic structure of the ATCS slave link definition is similar to that of a Genisys slave link.

8.6. ATCS WIU Protocol Link Compiler Declarations and Configuration Commands

Compiler declarations and configuration commands can be declared adjustable unless otherwise noted in Table 8-2.

Table 8-2. ATCS WIU Protocol Link Compiler Commands and Their Functions

Command	Function
LINK	Declares an ATCS protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the ATCS protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	"ATCS.SLAVE" declares that this link will support the ATCS slave protocol. No default. Not adjustable.
PORT	The physical port to which the ATCS link will be attached. The ATCS link must be attached to port 3. There is no default.
BAUD	The data rate at which the link will operate. Available selections are 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits per second. The default rate is 9600.
MCP.LINK.ADDRESS	The HDLC layer address for messages addressed to ATCS MCP. Valid addresses are 0 to 0xFF. The default value is 0x01. The default should always be used.
WIU.LINK.ADDRESS	The HDLC layer address for messages addressed to ATCS WIU's. Valid addresses are 0 to 0xFF. The default value is 0x03. The default should always be used.
GROUND.LINK.ADDRESS	The HDLC layer address for messages addressed to the ATCS ground network. Valid addresses are 0 to 0xFF. The default value is 0x23. The default should always be used.
CHANNEL.GROUP	The HDLC layer channel group for indication messages. Valid selections are 0 to 0xFF. The default value is 0x68. The default should always be used.
DEFAULT.ATCS.HOST. ADDRESS	The ATCS address for the ground host to which all indication messages are addressed and from which all control messages are received. The ATCS ground host address consists of 8 to 15 BCD digits formatted as defined in the ATCS protocol specification. There is no default.

Command	Function
MCP.ATCS.ADDRESS	The ATCS address for the MCP. The ATCS MCP address consists of 8 to 15 BCD digits formatted as defined in the ATCS protocol specification. There is no default.
XMIT.ACK.TIMEOUT	The time that the ATCS link will wait for the acknowledgement of a transmitted message that requires acknowledgement before initiating a retry. Valid times are 5 to 120 seconds. The default time is 70 seconds. The default value should always be used.
STALE.DATA.TIMEOUT	The elapsed time after which a slave is declared failed during which no valid messages addressed to the slave have been received. The allowable range is 10 to 600 seconds. The default time is 300 seconds.
POLLING.TIMEOUT	The elapsed time after transmission of an HDLC frame after which the ATCS link retries the transmission. The allowable range is 30 to 5000 ms. The default time is 1000 ms.
POLLING.INTERVAL	The interval at which HDLC polling requests are sent to the MCP when no data is being passed. The allowable range is 0 to 2000 ms. The default ineterval is 1000 ms.
HDLC.FAIL.TIMEOUT	The time interval after which the communication link to the MCP is declared failed if the MCP does not respond to an HDLC poll from the ATCS link handler. The allowable range is 10 to 60 seconds. The default time is 60 seconds.
INDICATION.BROADCAST. INTERVAL	The interval at which an indication message is sent to the ground host for each ATCS slave. The allowable range is 30 to 1800 seconds. The default interval is 60 seconds.
TRANSMITTER.IDLE.STATE	The state of the ATCS transmitter when it is idle. The valid selections are “MARK” and “FLAG”. The default is “MARK”.

8.7. ATCS WIU Protocol Station Compiler Declarations

Table 8-3 presents the ATCS Station Compiler declarations for the ARES slave protocol.

Table 8-3. ATCS WIU Protocol Link Compiler Declarations

Command	Function
ADDRESS	Declares a slave on an ATCS link and assigns its address. An ATCS link may include 1 to 6 slave declarations. The ATCS slave address consists of 8 to 15 BCD digits formatted as defined in the ATCS protocol specification. There is no default.
ENABLE	Specifies whether or not an ATCS slave will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. There is no default.
STATION.NAME	A user-defined string that sets the name of an ATCS slave. There is no default.
HOST.ADDRESS	If specified, this ATCS address will supercede the DEFAULT.ATCS.HOST.ADDRESS for this slave. The ATCS ground host address consists of 8 to 15 BCD digits formatted as defined in the ATCS protocol specification. There is no default.
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially by a slave. The list may include 1 to 128 Boolean bits. Each ATCS slave must have an NV.OUTPUT declaration. Not adjustable.
NV.INPUT	Defines a list of Boolean values (logic bits) to be received serially by a slave. The list may include 1 to 128 Boolean bits. The NV.INPUT declaration is optional. Not adjustable.

8.8. ATCS WIU Protocol Link System Boolean Bits

Table 8-4 presents the System Boolean Bits available with the ATCS protocol.

Table 8-4. ATCS WIU Protocol Link System Boolean Expressions

Expression	Function
<link_name>.ENABLED	A read-only Boolean bit that indicates to the application whether or not the ATCS link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.<slave_name>.ENABLED	A read-only Boolean bit that indicates whether or not a slave is enabled. 0 = DISABLED; 1 = ENABLED.
<link_name>.<slave_name>.DISABLE	A read/write Boolean bit that allows the application program to disable a specific ATCS slave.
<link_name>.<slave_name>.STATUS	A read-only Boolean bit that indicates the current status of slave communication. 0 = FAILED; 1 = NORMAL.
<link_name>.<slave_name>.INPUTS.RECEIVED	A special Boolean bit that is used to trigger logic blocks when a slave receives serial input data. This bit cannot be directly accessed by the application program.

8.9. Maintenance Tool Support for the ATCS WIU Protocol Link

This section describes the part of the Maintenance Tool that is applicable to the Genisys II ATCS Protocol. For a complete description of the maintenance tool, please refer to SM 6800C.

8.9.1. ATCS WIU Protocol Link Configuration

In the main launch menu, click on the button labeled “System Configuration”. The user may either examine or modify the configuration database. Select the appropriate ATCS WIU protocol link button to modify or view the configuration elements. Figure 8-2 presents the ATCS WIU Protocol Link configuration. ATCS WIU Protocol link configuration parameters are described in Section 8.6 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

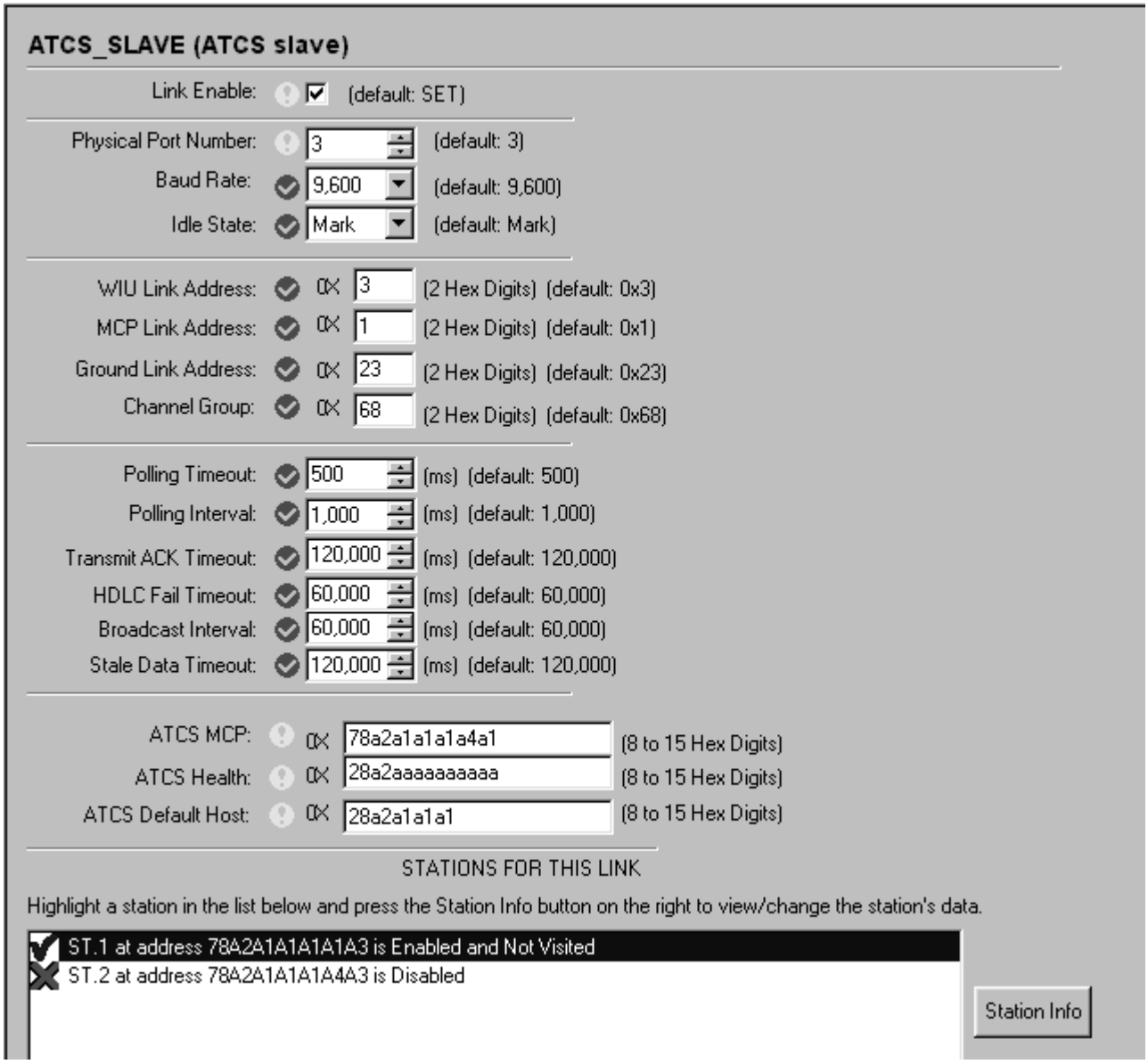


Figure 8-2. ATCS WIU Protocol Link Configuration

8.9.2. ATCS WIU Protocol Station Configuration

In the main launch menu, click on the button labeled “System Configuration”. Click on the desired ATCS WIU protocol link. Click on the desired station and then click on the “Station Info” button. The user may either examine or modify the selected station configuration data. Figure 8-3 presents the ATCS WIU Protocol Station Configuration. ATCS WIU Protocol station configuration parameters are described in Section 8.7 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

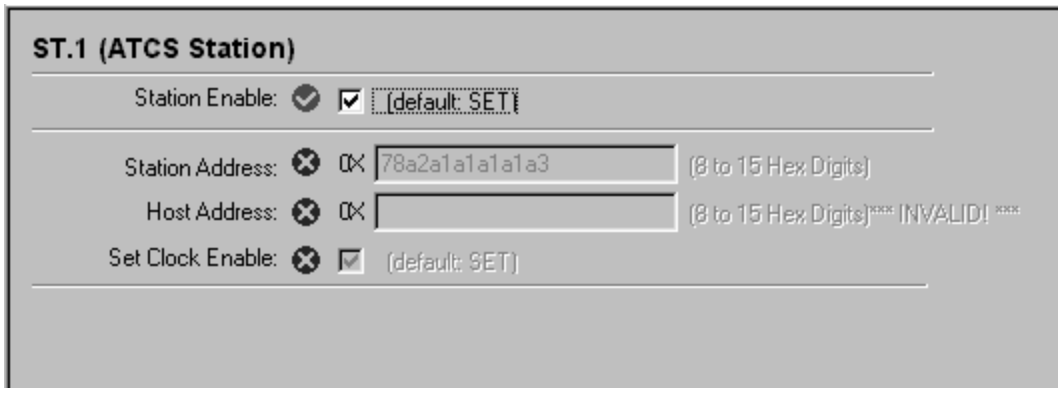


Figure 8-3. ATCS WIU Protocol Station Configuration

8.9.3. ATCS WIU Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and protocol links. To enter the Link Information view for a particular link, simply click on the appropriate button. Both general link and station-specific statistics can be viewed (Figure 8-4 and Figure 8-5).

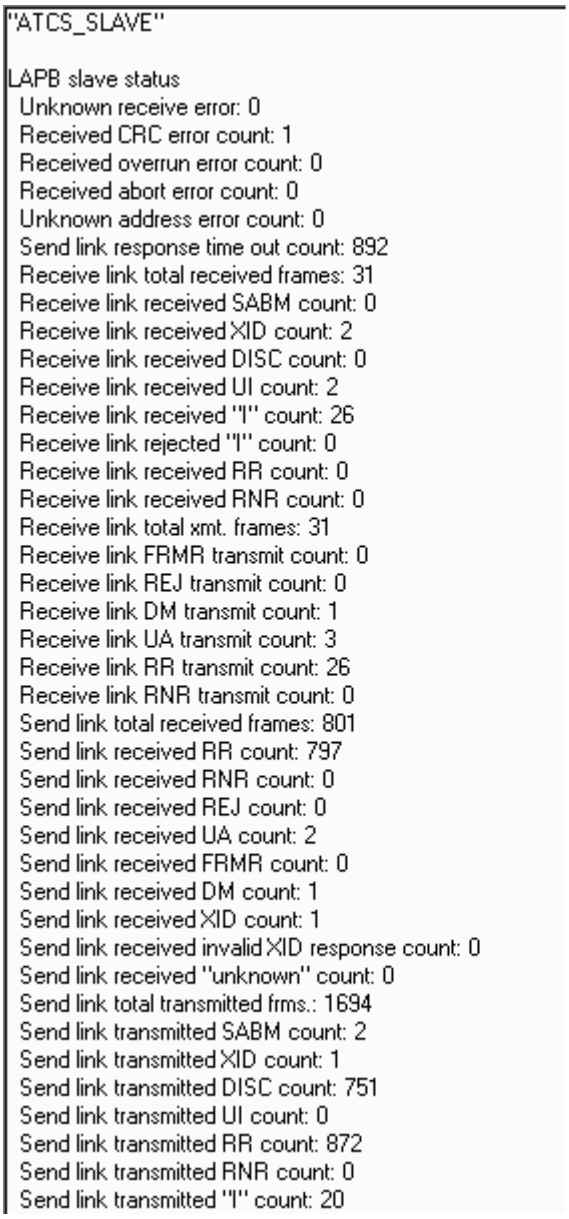


Figure 8-4. ATCS WIU Protocol Link Statistics

Error counts for the ATCS WIU Protocol Link LAPB layer should be very low as these error counts represent only errors that occur on the HDLC link between the Genisys II controller and

the MCP. The most likely reasons for elevated error counts are problems in the interconnection wiring and hardware problems either in the MCP or the Genisys II controller card.

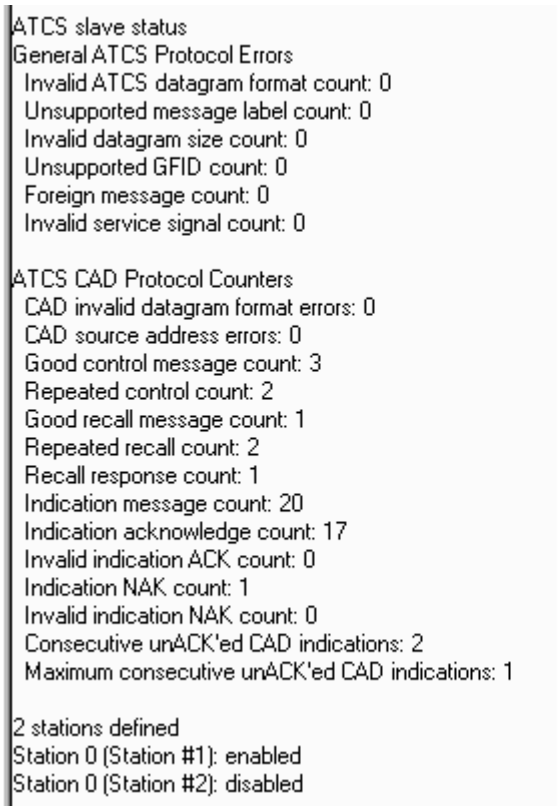


Figure 8-5. ATCS WIU Protocol Station Statistics

ATCS WIU Protocol station statistics reflect the quality of end-to-end communications between the Genisys II controller and the ATCS host (the control office). Unacknowledged indications and repeated control and recall messages indicate possible communication problems on the RF link. A moderate number of these events (up to 20% of the total sent or received message counts) is neither unusual nor detrimental to communication system performance. When unacknowledged indications and repeated control and recall messages exceed 30% of the total good message counts, the integrity of the communication link should be evaluated.

8.9.4. ATCS WIU Protocol Link Protocol Monitor

In the main launch menu, click on the button labeled “Serial Message Monitor.” Select the appropriate ATCS WIU protocol link to monitor from the list on the left to monitor.

In the main launch menu, click on the button labeled “Serial Message Monitor.” Select the appropriate link to monitor from the list on the left to monitor. Figure 8-6 presents a typical display for the ATCS Protocol Monitor. The protocol monitor display for the ATCS Protocol Link shows message time and message direction (transmitted or received) followed by the full text of the transmitted or received message in hexadecimal bytes. Please refer to ATCS Specification 200 or other appropriate ATCS Protocol document for additional information on the ATCS Protocol.

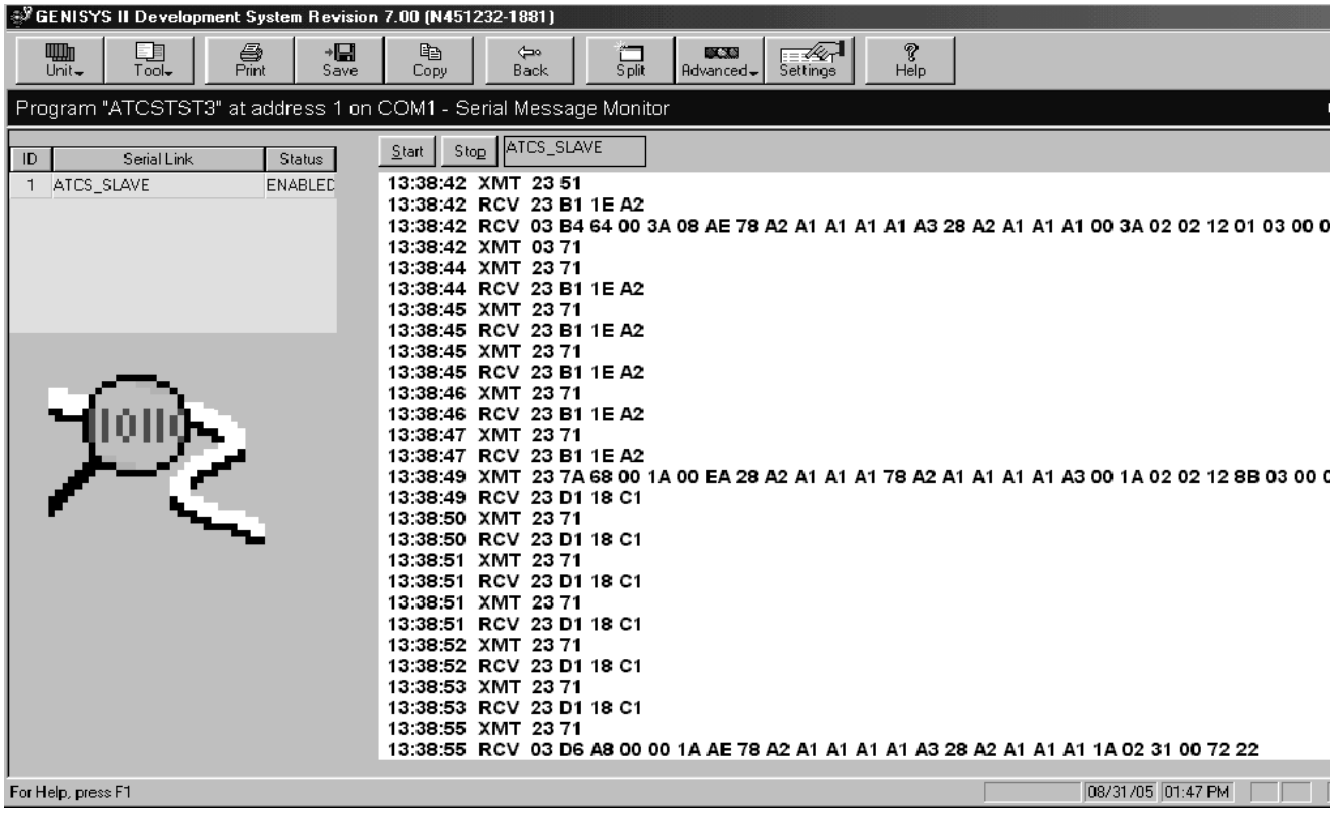


Figure 8-6. ATCS WIU Protocol Link Protocol Monitor

9. GETS SERIAL LOCAL CONTROL PANEL (SLCP) PROTOCOL LINK

9.1. Introduction

The Genisys II CSIB Executive supports communication with the GETS Serial Local Control Panel.

9.2. External Connections

Connections for the various serial interface signals supported by the serial local control panel protocol are shown for each physical serial port in Table 1-2. Refer to Section 3.5 of Service Manual SM 6800B for additional information regarding the interconnection of Genisys II and other serial devices. An example of a Genisys II SLCP program is presented in Appendix H.

It is intended that connection to the GETS serial local control panel driver be implemented using the GETS isolator/current loop adapter (P/N 226859-000) mounted on the US&S serial interface panel. Use serial interface panel P/N N17004701 when Port 3 or 4 is attached to the SLCP link or P/N N17004702 when Port 1 or 2 is attached to the SLCP link. See Figure 9-1 for typical interconnections.

9.3. Genisys II CSIB Jumper Positions

The SLCP protocol requires the standard CPU board jumper settings defined in Table 1-3.

9.4. Front Panel Options

Communication activity for active Local Control Panel Protocol ports may be monitored using the communication status LEDs on the front panel of the CISB by selecting the desired Local Control Panel Protocol port using the front panel menu switches. Using the “UP-DOWN” menu switch, select DOWN once. Select “SERL PRTS” on the front panel alphanumeric display by selecting “LEFT” using the “LEFT-RIGHT” menu switch. Select “DOWN” once to enter the serial port display menu. “PORT pp n” is displayed where “pp” is the serial port protocol and “n” is the physical port number (1 to 4). For Local Control Panel Protocol ports the protocol identification “pp” is “LC”. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired port is found. Select “DOWN” using the “UP-DOWN” menu switch to display activity on the selected port. The serial communication display LED functions are described in Table 1-1. Select “UP” using the “UP-DOWN” menu switch until the executive ID is again scrolled on the top alphanumeric display to return to the default front panel display. Note that activity for the physical port assigned to the first serial link defined in the application program is displayed on LEDs “A” through “E” by default.

See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

9.5. Defining an SLCP Link in a Genisys II Application Program

A typical Genisys II application program that defines an SLCP Protocol link is shown in Appendix H. The basic structure of the SLCP link definition is similar to that of a Genisys slave link. For a general description of the basic serial link declarations and configuration parameters, refer to Section 3.5.2 of Service Manual SM 6800B.

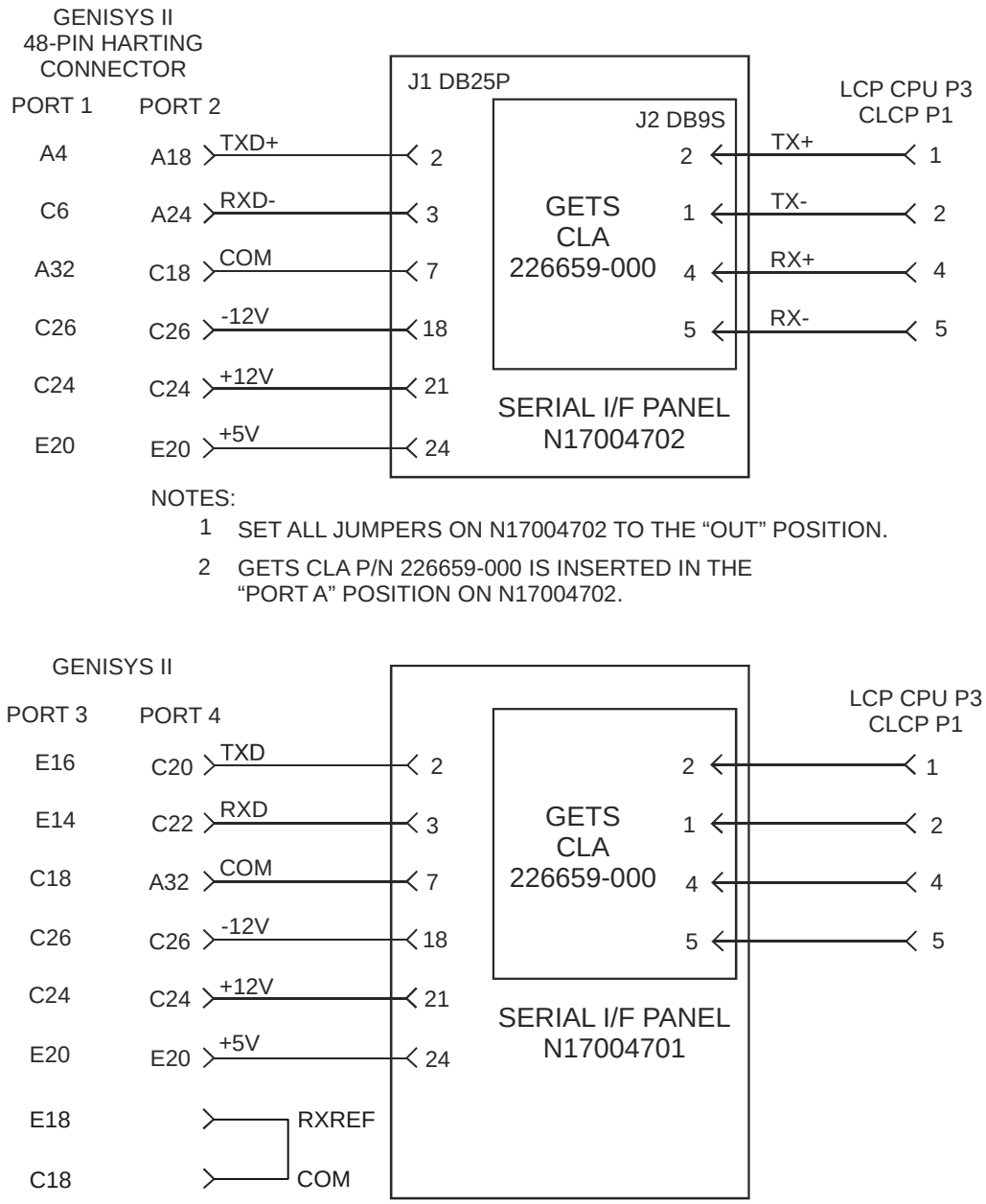


Figure 9-1. Typical Connection to the GETS Local Control Panel Controller

9.6. SLCP Protocol Link Compiler Declarations and Configuration Commands

Compiler declarations and configuration commands can be declared adjustable unless otherwise noted. Table 9-1 presents the Compiler declarations and functions.

Table 9-1. SLCP Protocol Link Compiler Commands and Their Functions

Command	Function
LINK	Declares a new SLCP protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the SLCP protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	"SLCP" declares that this link will support the SLCP protocol. No default. Not adjustable.
POINT.POINT	Not applicable for the SLCP protocol.
PORT	The physical port to which the SLCP link will be attached. Available ports are 1, 2, 3, and 4. There is no default.
BAUD	The data rate at which the link will operate. Available selections are 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits per second. The default rate is 1200.
STOPBITS	The number of stop bits (1 or 2) that will be attached to the end of each message byte as it is transmitted. The default value is "1".
PARITY	The type of parity calculation applied to each transmitted and received byte for the SLCP protocol. The available selections are NONE, EVEN, ODD, MARK, and SPACE. The default parity selection for the SLCP protocol is EVEN.
INTERBYTE.TIMEOUT	The time allowed between consecutive bytes of a received message. If the inter-byte timeout is exceeded, end of message processing is initiated. The default value of "0" allows the Genisys II executive to automatically calculate the inter-byte timeout value. Otherwise, values between 10 and 50 milliseconds may be selected. The default value is recommended most applications.
STALE.DATA.TIMEOUT	The elapsed time after which the link is declared failed during which no valid data messages have been received. The allowable range is 1 to 600 seconds. The default time is 300 seconds.
NORESPONSE.TIMEOUT	The time the link waits before sending a recall message when the link is down. The allowable range is 50 to 25000 ms. The default is 1000 ms.
POLLING.INTERVAL	The time the link waits before sending a recall message when the link is up. The allowable range is 0, 1 to 60 seconds. A value of 0 means that the link does not send recall messages based on this timer. The default is 15 seconds.
BROADCAST.INTERVAL	The time the link waits before sending a data message. The allowable range is 0, 1 to 60 seconds. A value of 0 means that the link does not send data messages based on this timer. The default is 60 seconds.

9.7. SLCP Protocol Link Compiler Declarations

The SLCP Compiler Declaration are listed in Table 9-2

Table 9-2. SLCP Protocol Link Compiler Declarations

Command	Function
ADDRESS	This address must be 0. No other addresses are valid. Not adjustable.
ENABLE	Specifies whether or not an SLCP slave will be enabled on unit initialization. 0 = Disabled; 1 = Enabled. There is no default.
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially by a slave. The list may include 1 to 128 Booleans. Each SLCP link must have an NV.OUTPUT declaration. Not adjustable.
NV.INPUT	Defines a list of Boolean values (logic bits) to be received serially by a slave. The list may include 1 to 128 Booleans. Each SLCP link must have an NV.INPUT declaration. Not adjustable.

9.8. SLCP Protocol Link System Boolean Bits

The SLCP System Boolean bits are listed in Table 9-3.

Table 9-3. SLCP Protocol Link System Boolean Bits

Expression	Function
<link_name>.ENABLED	A read-only logic bit that indicates to the application whether or not the SLCP link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.DISABLE	A read/write logic bit that allows the application program to disable the SLCP link. 0 = ENABLED; 1 = DISABLED.
<link_name>.0.ENABLED	A read-only logic bit that indicates whether or not a slave is enabled. 0 = DISABLED; 1 = ENABLED.
<link_name>.0.STATUS	A read-only logic bit that indicates the current status of slave communication. 0 = FAILED; 1 = NORMAL.
<link_name>.0.INPUTS.RECEIVED	A special logic bit that is used to trigger logic blocks when a slave receives serial input data. This bit cannot be directly accessed by the application program.

9.9. Maintenance Tool Support for the SLCP Protocol Link

This section describes the part of the Maintenance Tool that is applicable to the Genisys II SLCP Protocol. For a complete description of the maintenance tool, please refer to SM 6800C.

9.9.1. SLCP Protocol Link Configuration

In the main launch menu, click on the button labeled “System Configuration”. The user may either examine or modify the configuration database. Select the appropriate SLCP Protocol link button to modify or view the configuration elements. Figure 9-2 presents the SLCP Protocol link configuration. SLCP Protocol link configuration parameters are described in Section 9.6 of this

manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

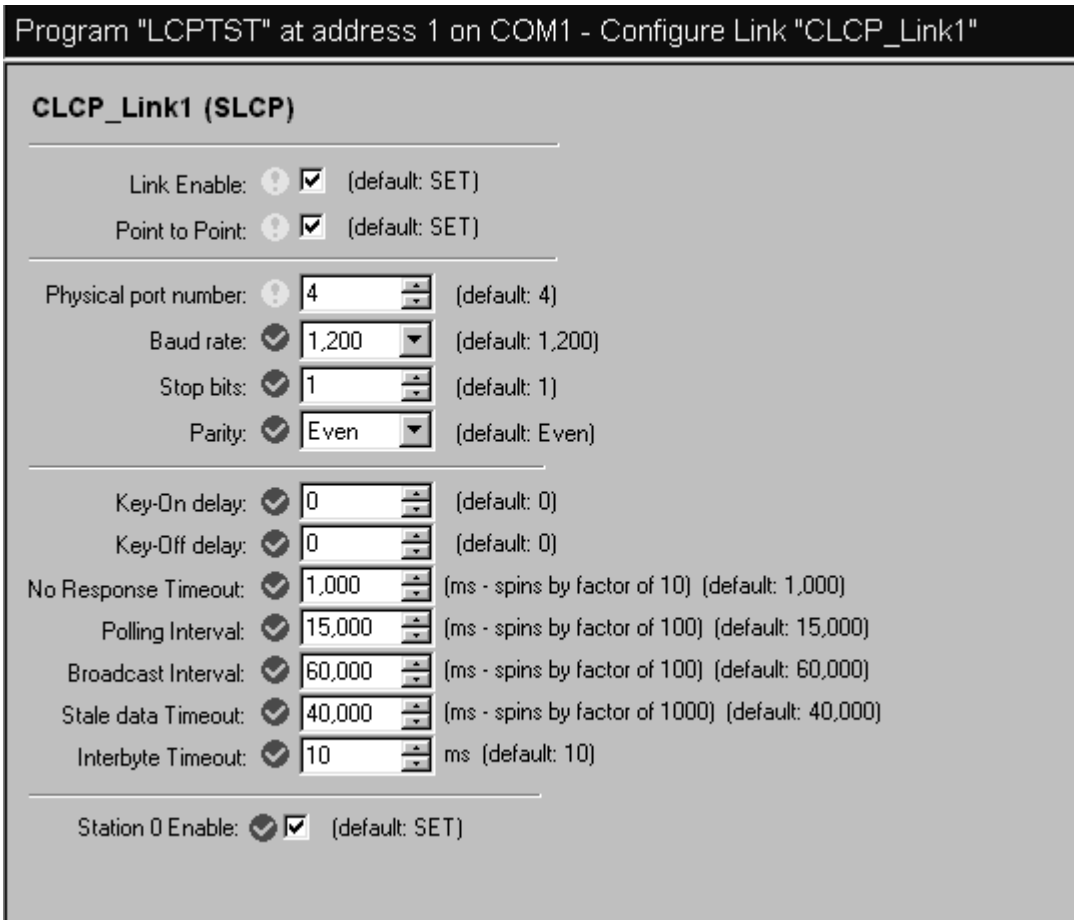


Figure 9-2. SLCP Protocol Link Configuration

9.9.2. SLCP Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information”. This will bring up a menu that will allow the user to view statistical information for both boards and protocol links (Figure 9-3). To enter the Link Information view for a particular link, simply click on the appropriate button.

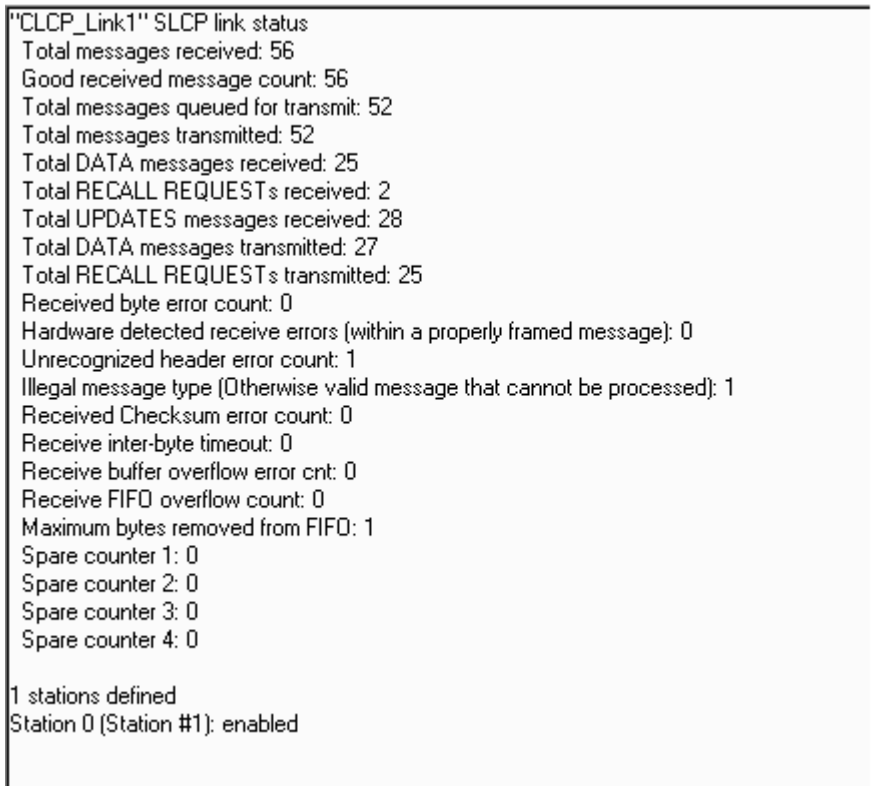


Figure 9-3. SLCP Protocol Link Statistics

9.9.3. SLCP Protocol Link Protocol Monitor

In the main launch menu, click on the button labeled “Serial Message Monitor”. Select the appropriate link to monitor from the list on the left to monitor. Figure 9-4 presents a typical SLCP Protocol monitor display. The display shows time and a message summary followed by the full transmitted or received message in hexadecimal bytes. See the appropriate SLCP protocol description for an explanation of message contents.

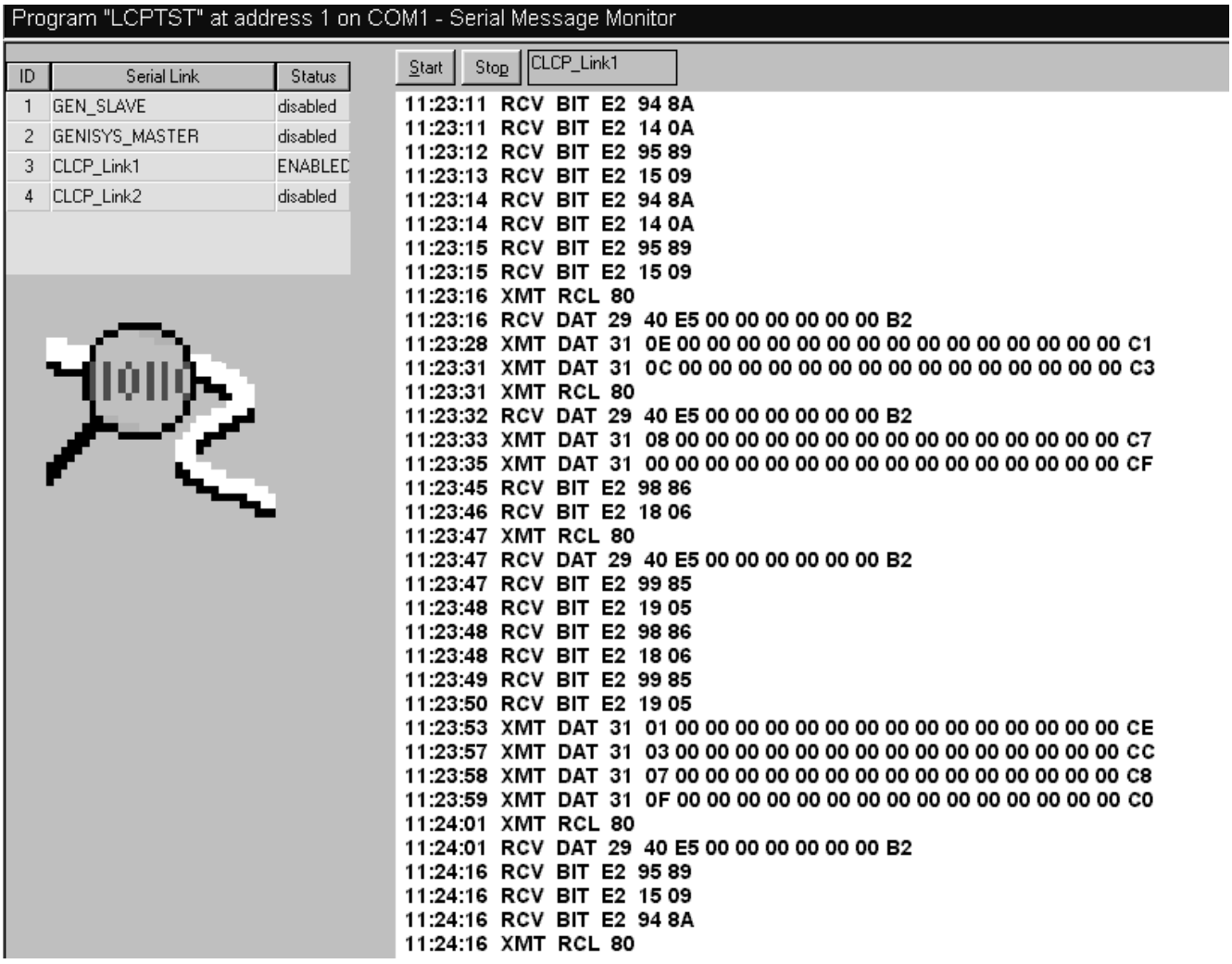


Figure 9-4. SLCP Protocol Link Protocol Monitor

10. S2 SLAVE PROTOCOL LINK

10.1. Introduction

The Genisys II CSIB Executive supports communication using the S2 protocol; however, it supports only the slave end of the S2 protocol; it cannot be an S2 master.

10.2. External Connections

Connections for the various serial interface signals supported by the S2 slave end protocol are shown for each physical serial port in Table 1-2. Refer to Section 3.5 of Service Manual SM 6800B for additional information regarding the interconnection of Genisys II and other serial devices. See Figure 10-1 for typical interconnections.

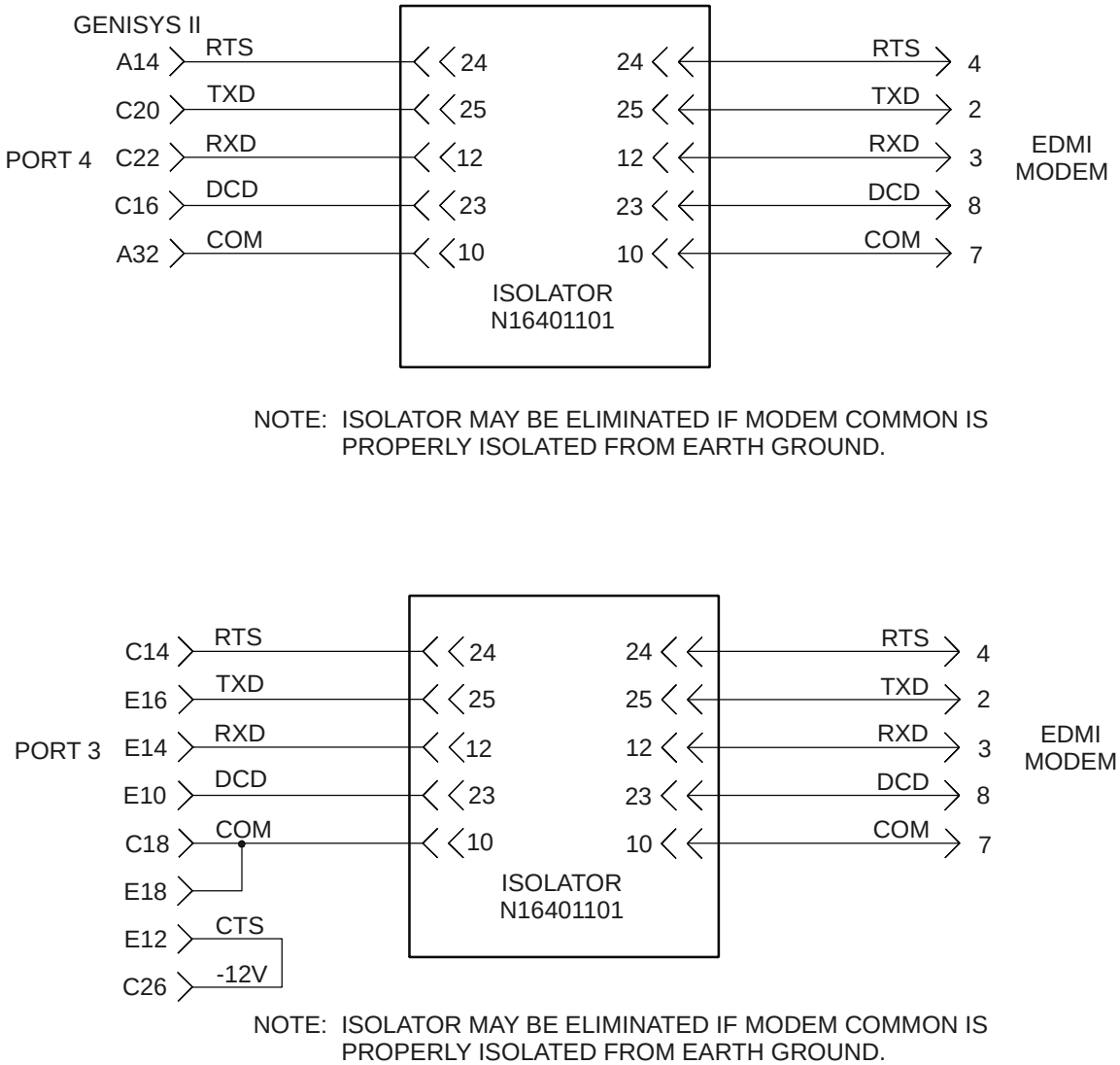


Figure 10-1. Typical Connection to an EDMI Modem

10.3. Genisys II CSIB Jumper Positions

The enhanced Genisys slave end protocol requires standard jumper settings as defined in Table 1-3.

10.4. Front Panel Options

Communication activity for active S2 Slave Protocol ports may be monitored using the communication status LEDs on the front panel of the CISB by selecting the desired S2 Slave Protocol port using the front panel menu switches. Using the "UP-DOWN" menu switch, select DOWN once. Select "SERL PRTS" on the front panel alphanumeric display by selecting "LEFT" using the "LEFT-RIGHT" menu switch. Select "DOWN" once to enter the serial port display menu. "PORT pp n" is displayed where "pp" is the serial port protocol and "n" is the physical port number (1 to 4). For S2 Slave Protocol ports the protocol identification "pp" is "2S". Scroll through the active ports using the "LEFT-RIGHT" menu switch until the desired port is found. Select "DOWN" using the "UP-DOWN" menu switch to display activity on the selected port. The serial communication display LED functions are described in Table 1-1. Select "UP" using the "UP-DOWN" menu switch until the executive ID is again scrolled on the top alphanumeric display to return to the default front panel display. Note that activity for the physical port assigned to the first serial link defined in the application program is displayed on LEDs "A" through "E" by default.

See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

10.5. Defining an S2 Slave Protocol Link in a Genisys II Application Program

A typical Genisys II application program that defines an S2 Slave Protocol link is shown in Appendix I.

The basic structure of the S2 slave link definition is similar to that of a Genisys slave link. Up to six S2 links may be defined in the same application program although only four may be enabled at the same time.

10.6. S2 Slave Protocol Link Compiler Declarations and Configuration Commands

Compiler declarations and configuration commands can be declared adjustable unless otherwise noted and are presented in Table 10-1.

Table 10-1. S2 Slave Protocol Link Compiler Commands and Their Functions

Command	Function
LINK	Declares a new S2 protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the S2 protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	"S2.SLAVE" declares that this link will support the S2 slave protocol. No default. Not adjustable.
POINT.POINT	For physical ports 1, 2, and 3, specifies whether or not the physical port hardware will operate in point-to-point (1) or multi-drop (0) mode. The default is multi-drop. Physical port 4 is point-to-point only regardless of the value assigned to POINT.POINT.
PORT	The physical port to which the S2 link will be attached. Available ports are 1, 2, 3, and 4. There is no default.
BAUD	The data rate at which the link will operate. Available selections are 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits per second. The default rate is 1200.
KEY.ON.DELAY	The time (in bit times) between the assertion of RTS and the leading edge of the opening flag of the transmitted S2 frame. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
KEY.OFF.DELAY	The time (in bit times) between the end of the closing flag of a transmitted S2 frame and the de-assertion of RTS. The allowable values are 0 and 8 to 272 bit times. The default value is 12 bit times.
STALE.DATA.TIMEOUT	The elapsed time after which a slave is declared failed during which no valid messages addressed to the S2 slave have been received. The allowable range is 1 to 600 seconds. The default value is 300 seconds.
FRAME.LENGTH	The valid transmitted and received frame length for all stations defined on the S2 link. This parameter overrides the bit count defined in the NV.INPUT and NV.OUTPUT sections of the S2 link definition. Valid values are 32, 48, 64, and 128. The default value is 32. If the NV.OUTPUT section defines fewer bits than FRAME.LENGTH requires, the end of the transmitted frame will be padded with 0's. If the NV.OUTPUT section defines more bits than frame length allows, outbound messages will be truncated to the bit count specified in FRAME.LENGTH. Only received messages containing the number of bits specified in FRAME.LENGTH will be accepted.

10.7. S2 Slave Protocol Link Compiler Declarations

Table 10-2 presents the S2 Slave Compiler declarations.

Table 10-2. S2 Slave Protocol Link Compiler Declarations

Command	Function
ADDRESS	Declares a slave on an S2 protocol link and assigns its address. An S2 link may include 1 to 32 slave declarations. The address of an S2 slave may be 1 to 63. There is no default. If an S2 slave address is declared as "0", the "configurable" address is used for that slave. Only one address declaration on an S2 link may use address 0. Not adjustable.
ENABLE	Specifies whether or not an S2 slave will be enabled on unit initialization. 0 = Disabled; 1 = Enabled. There is no default.
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially by a slave. The list may include 1 to 128 Booleans. Each S2 slave must have an NV.OUTPUT declaration. Not adjustable.
NV.INPUT	Defines a list of Boolean values (logic bits) to be received serially by a slave. The list may include 1 to 128 Booleans. The NV.INPUT declaration is optional. Not adjustable.

10.8. S2 Slave Protocol Link System Boolean Bits

Table 10-3 presents the System Boolean Bits available with the S2 protocol.

Table 10-3. S2 Slave Protocol Link System Boolean Bits

Expression	Function
<link_name>.ENABLED	A read-only Boolean bit that indicates to the application whether or not the S2 link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.DISABLE	A read/write Boolean bit that allows the application program to disable the S2 link. 0 = ENABLED; 1 = DISABLED.
<link_name>.nn.ENABLED	A read-only Boolean bit that indicates whether or not a slave is enabled. "nn" is the slave address. 0 = DISABLED; 1 = ENABLED.
<link_name>.nn.STATUS	A read-only Boolean bit that indicates the current status of slave communication. "nn" is the slave address. 0 = FAILED; 1 = NORMAL.
<link_name>.nn.INPUTS.RECEIVED	A special Boolean bit that is used to trigger logic blocks when a slave receives serial input data. This bit cannot be directly accessed by the application program.

10.9. Maintenance Tool Support for the S2 Slave Protocol Link

This section describes the part of the Maintenance Tool that is applicable to the Genisys II S2 Protocol. For a complete description of the maintenance tool, please refer to Service Manual SM 6800C.

10.9.1. S2 Slave Protocol Link Configuration

In the main launch menu, click on the button labeled "System Configuration." The user may either examine or modify the configuration database. Select the appropriate link button to modify or view the configuration elements. Figure 10-2 presents the S2 Slave Protocol Link Configuration. S2 Protocol link configuration parameters are described in Section 10.6 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

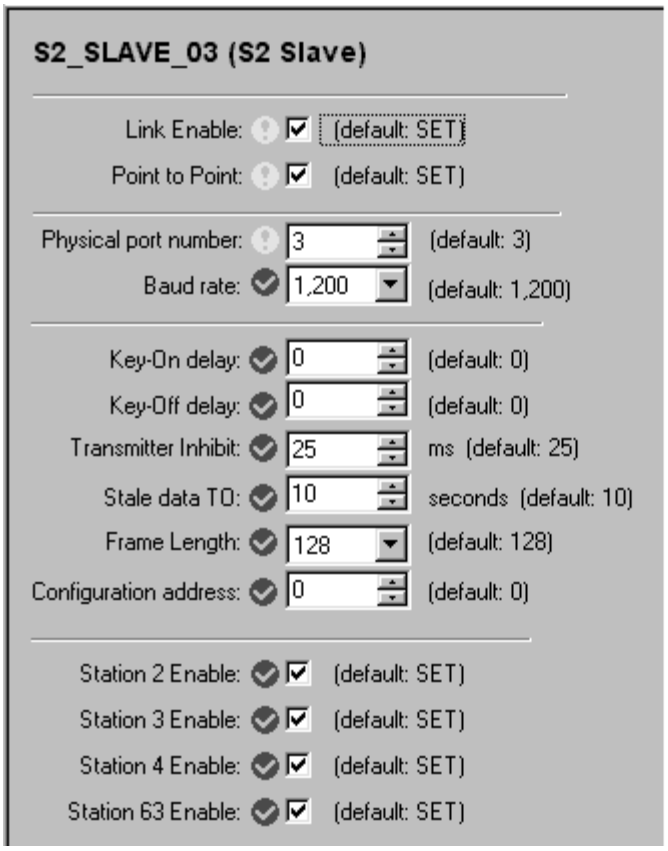


Figure 10-2. S2 Slave Protocol Link Configuration

10.9.2. S2 Slave Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information.” This will bring up a menu that will allow the user to view statistical information for both boards and protocol links. To enter the Link Information view for a particular link, simply click on the appropriate button. Figure 10-3 presents a typical S2 Slave Protocol link statistics display.

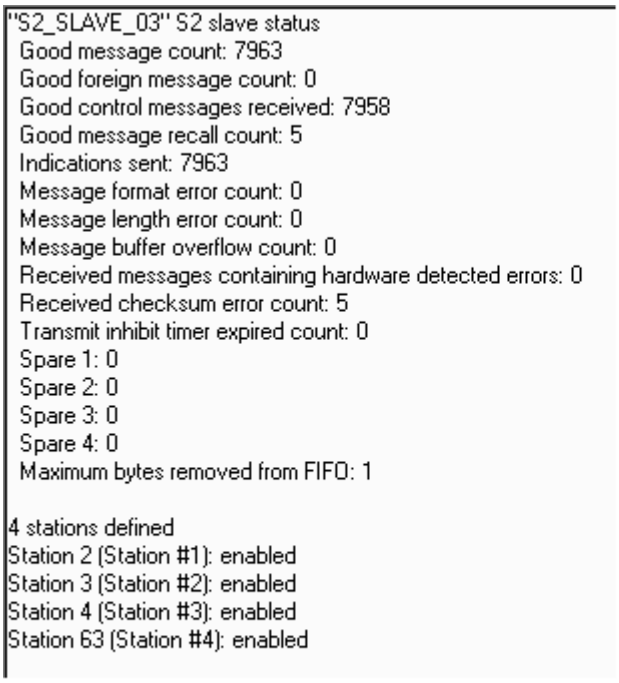


Figure 10-3. S2 Slave Protocol Link Statistics

An S2 protocol link that is functioning properly generally has receiver error counts that are substantially lower than (less than 5% of) the “Good message count”. Higher error counts indicated the need to test the integrity of the communication circuit. Elevated error counts will usually cause an apparent slowdown of data flow on the circuit. Loss of data may not be readily apparent until error counts become very high (30% or more of the “Good message count”).

The count of messages sent should roughly equal the count of messages received. An S2 protocol link that receives no messages can transmit no messages as a slave can only respond to received messages. High error counts often indicate a higher than normal level of noise on the communication circuit.

10.9.3. S2 Slave Protocol Link Protocol Monitor

In the main launch menu, click on the button labeled “Serial Message Monitor.” Select the appropriate link to monitor from the list on the left to monitor. Figure 10-4 presents a typical protocol monitor display for the S2 Protocol. The protocol monitor display for the S2 protocol shows time followed by a descriptive summary for each message transmitted or received message. The actual text of the message excluding opening and closing flag bytes follows in hexadecimal bytes. See Queensland Rail Dignal and Operational Systems drawing FTS-70 for an explanation of the S2 protocol message records.

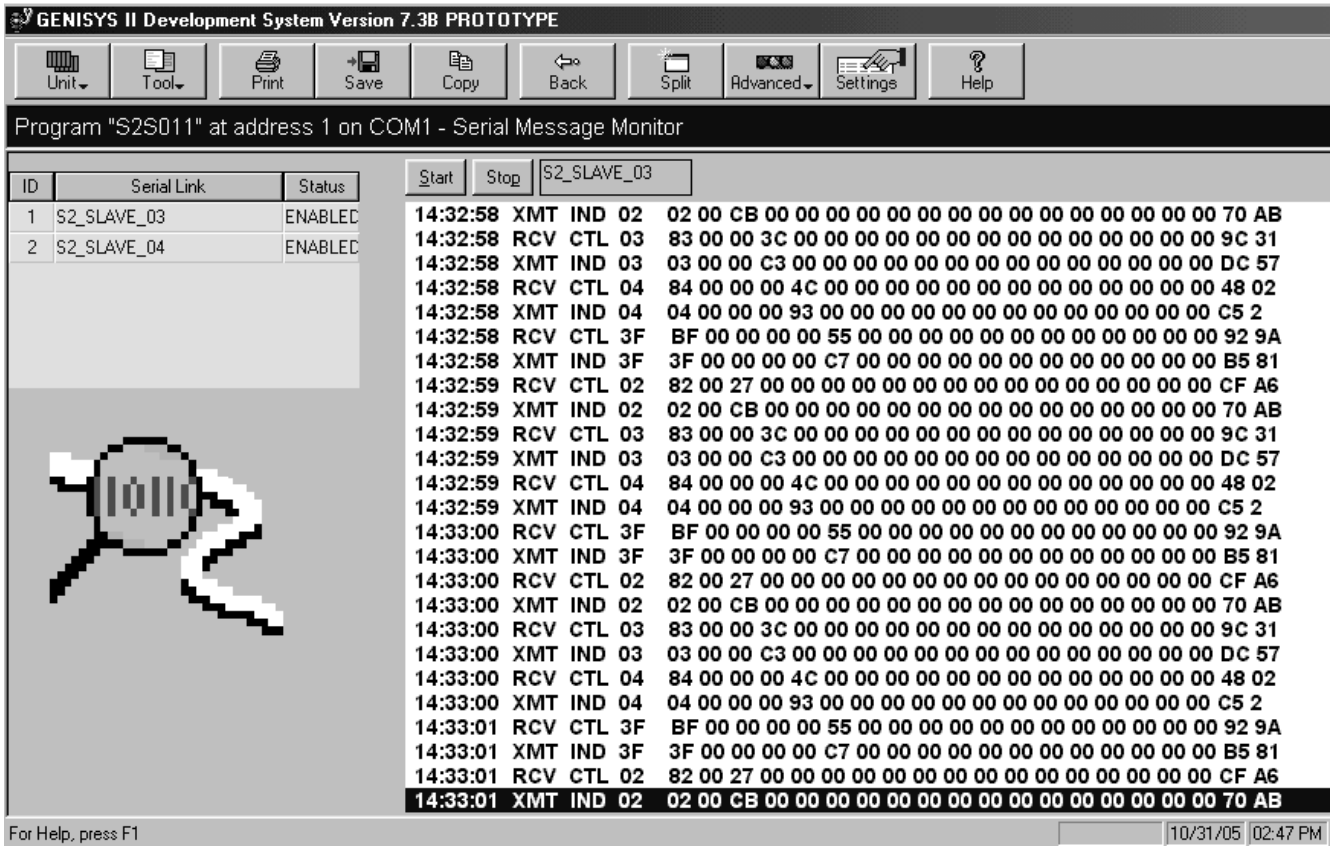


Figure 10-4. S2 Slave Protocol Link Protocol Monitor

11. DT-8 SLAVE PROTOCOL LINK

11.1. Introduction

The GENISYS II CSIB executive supports communication using the DATATRAIN VIII (DT-8) protocol. It supports only the slave end of the DT-8 protocol. It cannot be a DT-8 master.

The Genisys CSIB Executive supports the assignment of a STANDBY serial port to a DT8 communication link. The STANDBY port is enabled (and the NORMAL port is disabled) when the DCD input to the STANDBY port is asserted. The NORMAL port is enabled when the DCD input to the STANDBY port is de-asserted or when no good messages (addressed to a slave defined on the DT8 link) have been received for five minutes.

Half-duplex (keyed carrier) mode is disabled and CARRIER.MODE defaults to “CONSTANT” on any DT-8 Slave link that has a STANDBY port assigned.

11.2. External Connections

Connections for the various serial interface signals supported by the DT-8 slave protocol are shown for each physical serial port in Table 1-2. Refer to Section 3.5 of Service Manual SM 6800B, for additional information regarding the interconnection of Genisys II and other serial devices. See Figure 3-1 for typical interconnections when a STANDBY serial port is defined.

11.3. Genisys II CSIB Jumper Positions

The enhanced DT-8 slave end protocol requires standard jumper settings as defined in Table 1-3.

11.4. Front Panel Options

Communication activity for active DT-8 slave ports (NORMAL or STANDBY) may be monitored using the communication status LEDs on the front panel of the CISB. This is done by using the front panel menu switches to select the desired DT-8 slave port that is identified as the NORMAL port for a link. Proceed as follows:

1. Use the “UP-DOWN” menu switch and select DOWN once.

2. Use the "LEFT-RIGHT" menu switch and select "LEFT". “SERL PRTS” will appear on the front panel alphanumeric display.

3. Select “DOWN” once to enter the serial port display menu. “PORT pp n” will display. “pp” is the serial port protocol and “n” is the physical port number (1 to 4). The protocol identification for DT-8 Slave Protocol ports “pp” is “DS”.

4. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired port is displayed.

5. Select “DOWN” to display activity on the selected port. Communication activity on the currently active port (NORMAL or STANDBY) is displayed. The serial communication display LED functions are described in Table 1-1.

6. To return to the default front panel display, select “UP” until the executive ID scrolls on the top alphanumeric display.

NOTE

Activity for the physical port assigned to the first serial link (defined in the application program) is displayed on LEDs “A” through “E” by default.

The DT-8 Slave Protocol Link may be placed in link test mode by selecting the desired DT-8 slave port that is identified as the NORMAL port. Proceed as follows:

1. Use the “UP-DOWN” menu switch and select “DOWN” once.

2. Use the “LEFT-RIGHT” menu switch and select “LEFT” until “SERL TEST” is displayed on the alphanumeric display.

3. Select “DOWN” once to enter the serial port test menu. “PORT pp n” is displayed where “pp” is the serial port protocol and “n” is the physical port number (1 to 4). For DT-8 Slave Protocol ports the protocol identification “pp” is “DS”.

4. Scroll through the active ports using the “LEFT-RIGHT” menu switch until the desired NORMAL port is displayed.

5. Select “DOWN” to place the desired port in test mode. Scroll through the test modes using the “LEFT-RIGHT” menu switch. Available test modes include “steady MARK”, “steady SPACe”, and “50% duty CYCLe” at the configured data rate.

6. Select “DOWN” to enter the desired test mode. When the DT-8 slave link is placed in test mode, the selected test signal will be transmitted over the selected currently active port (NORMAL or STANDBY).

7. Return the port under test to normal operation by selecting “NORMal” using the “LEFT-RIGHT” menu switch then selecting “DOWN”.

See Section 3.4 of Service Manual SM 6800C for a complete explanation of the Genisys II CPU front panel menus.

11.5. Defining an DT-8 Slave Protocol Link in a Genisys II Application Program

A typical Genisys II application program that defines an enhanced DT-8 slave end link is shown in Appendix J.

The basic structure of the DT-8 slave link definition is similar to that of a Genisys slave link. Up to six DT-8 links may be defined in the same application program although only four may be enabled at the same time.

11.6. DT-8 Slave Protocol Link Compiler Declarations and Configuration Commands

DT-8 slave protocol compiler declarations and configuration commands are listed in Table 11-1. Configuration commands can be declared adjustable unless otherwise noted.

Table 11-1. DT-8 Slave Protocol Link Compiler Commands and Their Functions

Command	Function
LINK	Declares a new DT-8 slave protocol serial link and defines the link name. The link name is a user-selectable text string. No default. Not adjustable.
ENABLE	Specifies whether or not the DT-8 slave protocol link will be enabled on unit initialization. 0 = DISABLED; 1 = ENABLED. No default.
PROTOCOL	"DT8.SLAVE" declares that this link will support the DT-8 slave protocol. No default. Not adjustable.
POINT.POINT	For physical ports 1, 2, and 3, specifies whether or not the physical port hardware will operate in point-to-point (1) or multi-drop (0) mode. The default is multi-drop. Physical port 4 is point-to-point only regardless of the value assigned to POINT.POINT.
PORT	The NORMAL physical port to which the DT-8 slave link will be attached. Available ports are 1, 2, 3, and 4. There is no default.
STANDBY.PORT	The STANDBY physical port to which the DT-8 slave link will be attached. Available ports are 0 (No STANDBY port), 1, 2, 3, and 4. The default port is 0.
BAUD	The data rate at which the link will operate. Available selections are 150, 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, and 19200 bits per second. The default rate is 300.
STOPBITS	The number of stop bits (1 or 2) that will be attached to the end of each message byte as it is transmitted. The default number is "1".
PARITY	The type of parity calculation applied to each transmitted and received byte for the DT-8 slave protocol. The available selections are NONE, EVEN, ODD, MARK, and SPACE. The default parity selection for the DT-8 slave protocol is NONE.
KEY.ON.DELAY	The time (in bit times) between the assertion of RTS and the leading edge of the start bit of the first byte of the transmitted Genisys message. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.

Command	Function
KEY.OFF.DELAY	The time (in bit times) between the end of the last stop bit of the last byte of a transmitted DT-8 message and the de-assertion of RTS. The allowable values are 0 and 8 to 280 bit times. The default value is 12 bit times.
CARRIER.MODE	Specifies whether or not the master end of the link will have carrier keyed on continuously. The “CONSTANT” carrier option requires a full duplex communication circuit. The “KEYED” carrier option is used only when carrier outbound from the master might interfere with slave transmissions. In all other cases (including direct wire), CONSTANT carrier operation should be specified. The default carrier mode is CONSTANT.
STALE.DATA.TIMEOUT	The elapsed time after which a slave is declared failed during which no valid messages addressed to the slave have been received. The allowable range is 10 to 600 seconds. The default value is 300 seconds.

11.7. DT-8 Slave Protocol Station Compiler Declarations and Configuration Commands

The DT-8 Slave protocol Compiler declarations and configuration commands are given in Table 11-2. Configuration commands can be declared adjustable unless otherwise noted.

Table 11-2. DT-8 Slave Protocol Station Compiler Declarations and Configuration Commands

Command	Function
ADDRESS	Declares a slave station on a DT-8 slave protocol link and assigns its address. An DT-8 slave link may include 1 to 32 slave station declarations. The address of a DT-8 slave may be 1 to 251, 64512 to 64767, 16646144 to 16711679, or 4278190080 to 4294967295. There is no default.
ENABLE	Specifies whether or not an DT-8 slave station will be enabled on unit initialization. 0 = Disabled; 1 = Enabled. There is no default.
NV.OUTPUT	Defines a list of Boolean values (logic bits) to be sent serially by a slave station. The list may include 1 to 128 Booleans. Each DT-8 slave must have an NV.OUTPUT declaration. Not adjustable.
NV.INPUT	Defines a list of Boolean values (logic bits) to be received serially by a slave station. The list may include 1 to 128 Booleans. The NV.INPUT declaration is optional. Not adjustable.

11.8. DT-8 Slave Protocol Link System Boolean Bits

The System Boolean Bits available with the DT-8 Slave protocol are given Table 11-3.

Table 11-3. DT-8 Slave Protocol Link and Slave Station System Boolean Bits

Expression	Function
<link_name>.ENABLED	A read-only Boolean bit that indicates to the application whether or not the DT-8 slave protocol link is enabled in the link configuration. 0 = DISABLED; 1 = ENABLED.
<link_name>.DISABLE	A read/write Boolean bit that allows the application program to disable the DT-8 slave protocol link. 0 = ENABLED; 1 = DISABLED.
<link_name>.STANDBY	A read-only Boolean bit that indicates whether or not the DT-8 slave link STANDBY port is active. 0 = INACTIVE; 1 = ACTIVE.
<link_name>.nn.ENABLED	A read-only Boolean bit that indicates whether or not a slave is enabled. "nn" is the slave address. 0 = DISABLED; 1 = ENABLED.
<link_name>.nn.STATUS	A read-only Boolean bit that indicates the current status of slave communication. "nn" is the slave address. 0 = FAILED; 1 = NORMAL.
<link_name>.nn.INPUTS.RECEIVED	A special Boolean bit that is used to trigger logic blocks when a slave receives serial input data. This bit cannot be directly accessed by the application program.

11.9. Maintenance Tool Support for the DT-8 Slave Protocol Link

This section describes the part of the Maintenance Tool that is applicable to the Genisys II DT-8 Slave Protocol. For a complete description of the maintenance tool, refer to Service Manual SM 6800C.

11.10. DT-8 Slave Protocol Link Configuration

In the main launch menu, click on the button labeled "System Configuration." The user may either examine or modify the configuration database. Select the appropriate link button to modify or view the configuration elements. Figure 11-1 shows the DT-8 Slave Protocol Link Configuration. DT-8 Protocol link configuration parameters are described in Section 10.6 of this manual. See SM 6800C, Section 6.2.17 for additional general information regarding link configuration using the Genisys II Maintenance Tool.

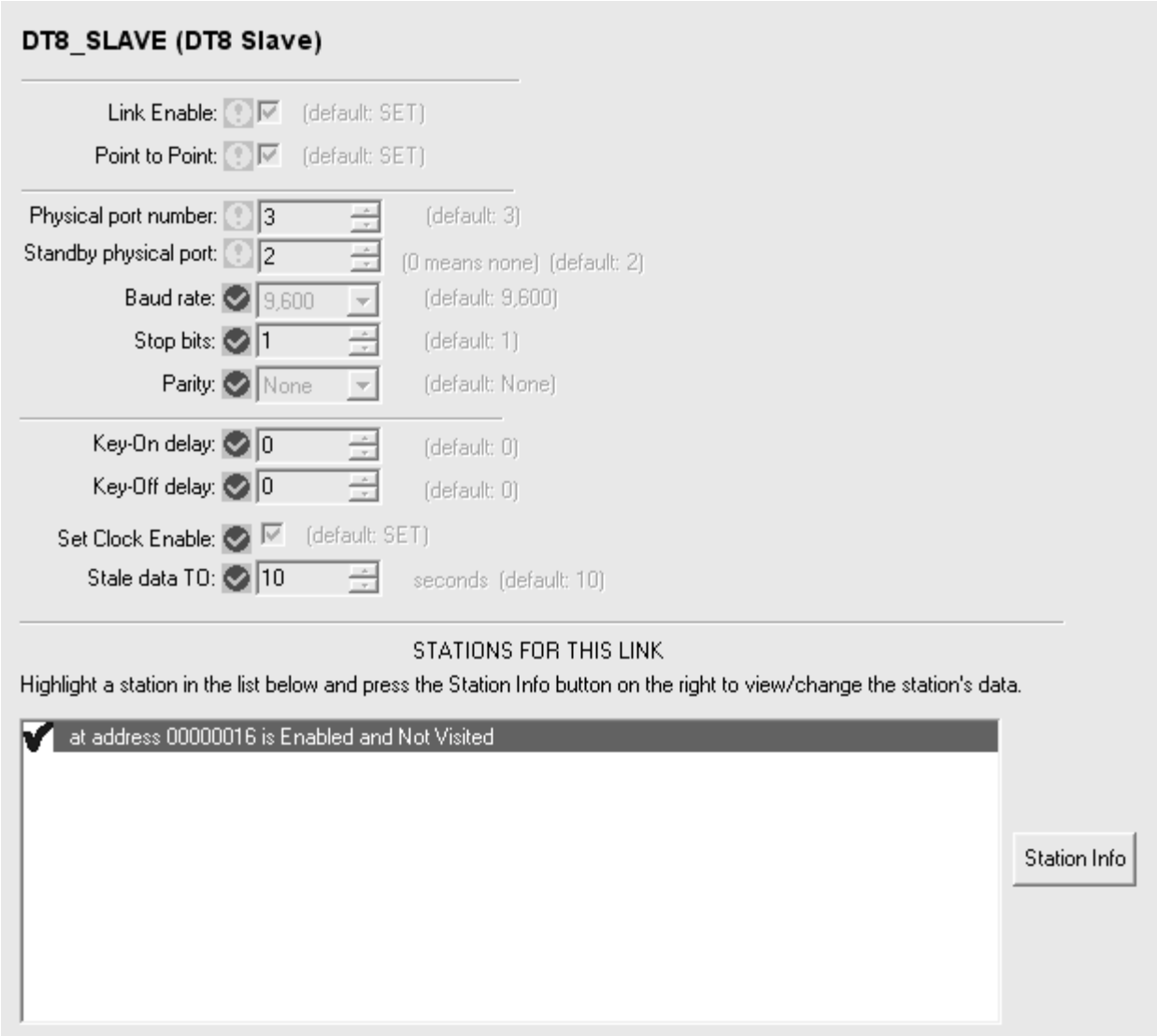


Figure 11-1. DT-8 Slave Protocol Link Configuration

11.10.1. DT-8 Slave Protocol Link Statistics

In the main launch menu, click on the button labeled “Board Information.” This brings up a menu that displays statistical information for both boards and protocol links. To enter the Link Information view for a particular link, click on the appropriate button. Figure 11-2 shows a typical DT-8 Slave Protocol link statistics display.

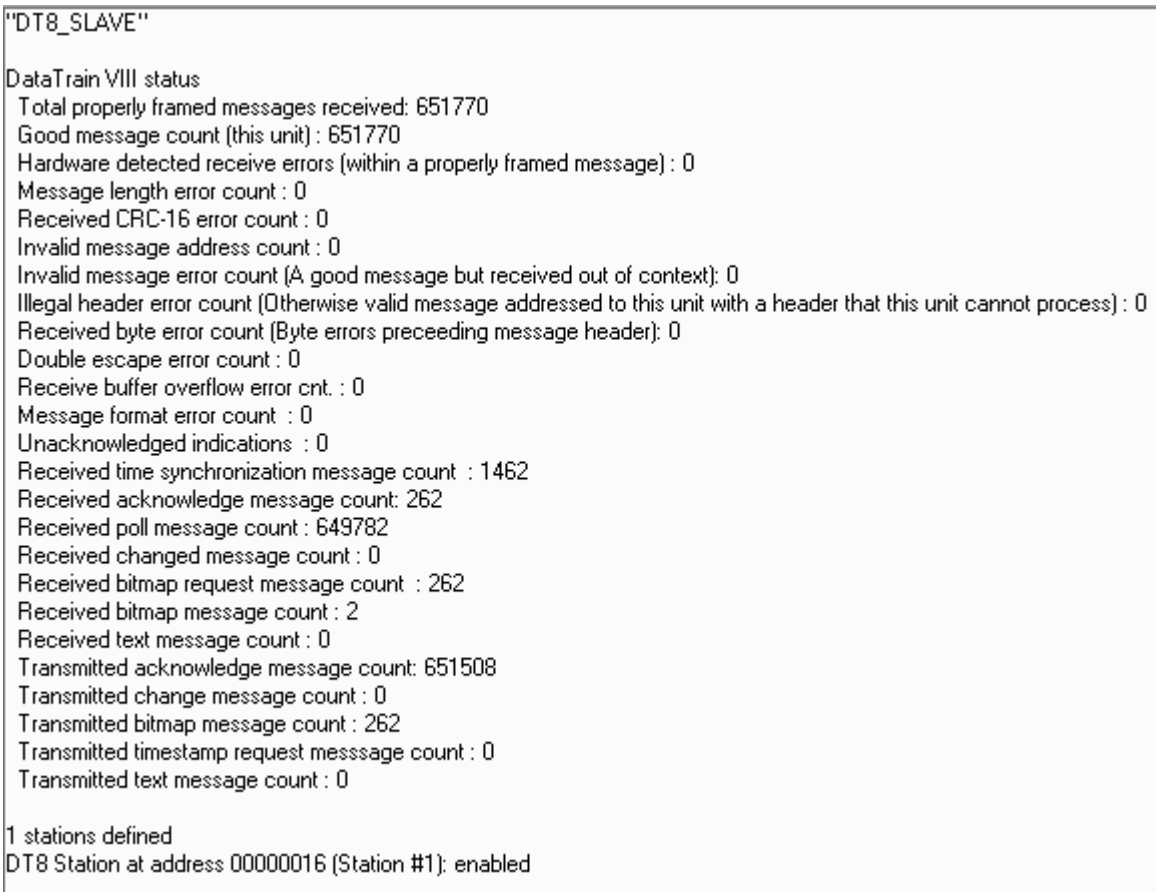


Figure 11-2. Typical DT-8 Slave Protocol Link Statistics Display

A DT-8 protocol link that is functioning properly generally has receiver error counts that are substantially lower than the "Good message count" (5% or less). Higher error counts indicate the need to test the integrity of the communication circuit. Elevated error counts will usually cause an apparent slowdown of data flow on the circuit. Loss of data may not be readily apparent until error counts become very high (30% or more of the "Good message count").

The messages sent count should roughly equal the messages received count. A DT-8 Slave protocol link that doesn't receive any messages cannot transmit any messages (a slave can only respond to received messages). High error counts often indicate a higher than normal level of noise on the communication circuit.

11.10.2. DT-8 Slave Protocol Link Protocol Monitor

Proceed as follows to display the protocol monitor screen:

1. In the main launch menu, click on the button labeled "Serial Message Monitor."

2. Select the appropriate link to monitor from the list on the left to monitor.

3. Figure 11-3 shows a typical protocol monitor display for the DT-8 Protocol. The display shows time followed by a descriptive summary for each message transmitted or received. The actual text of the message excluding opening and closing flag bytes follows in hexadecimal bytes.

See the GRS Reference Guide: CenTraCode® II-s and II-v Communication Systems Emulation Manual for an explanation of the DT-8 Slave protocol messages.

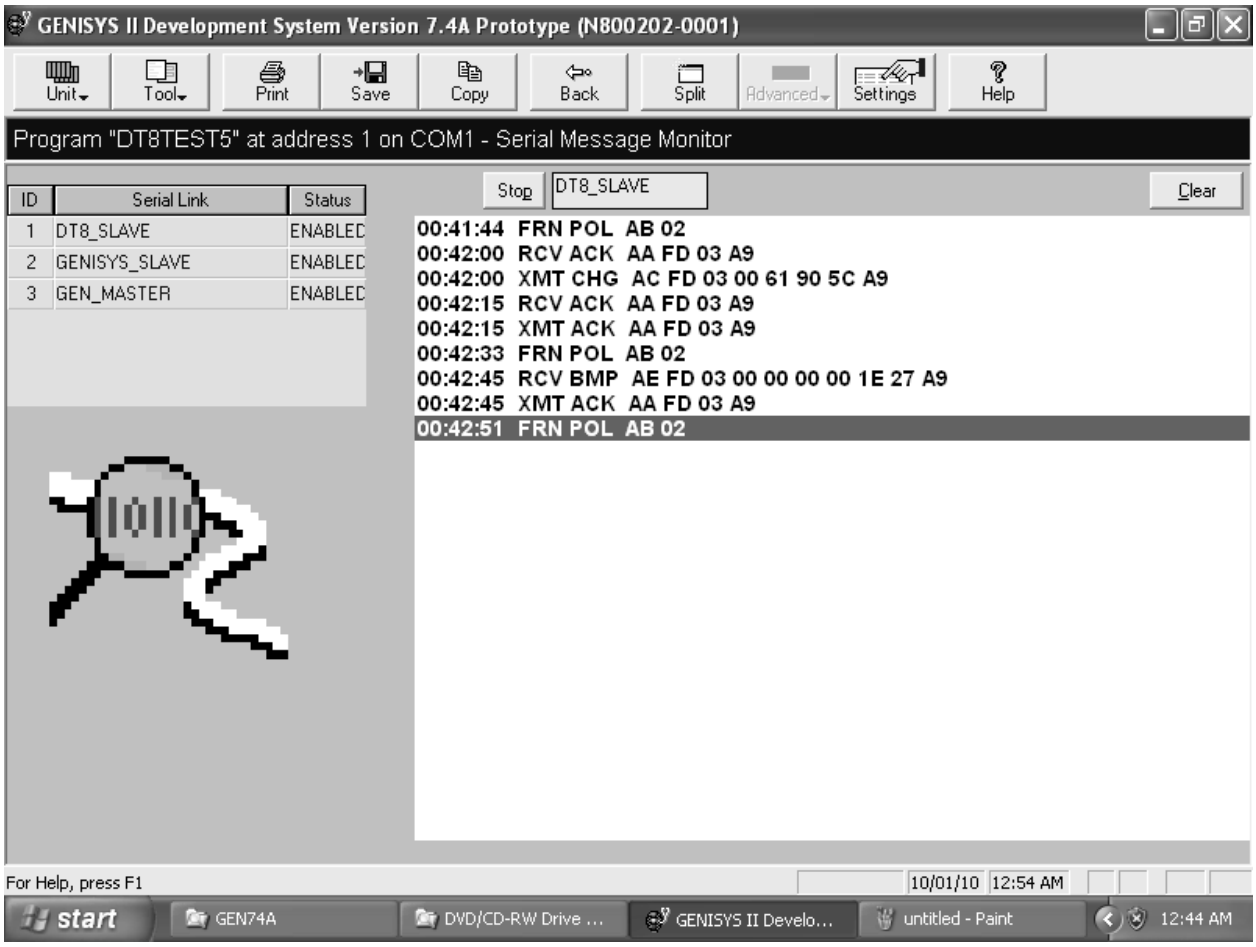


Figure 11-3. Typical DT-8 Protocol Monitor Display

12. RAIL TEAM AND TECHNICAL SUPPORT

The Rapid Action Information Link Team (RAIL Team) is a group of experienced product and application engineers ready to assist you to resolve any technical issues concerning this product. Contact the RAIL Team in the United States at 1-800-652-7276 or by e-mail at railteam@ansaldo-sts.us.

Appendix A
Typical Genisys II
Genisys Master Protocol Application

```
/*
        Genisys II Genisys Master Protocol Test Application
*/

Genisys_II PROGRAM GENMSTR;

INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:

                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:

                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;

    COMM

        LINK: GEN_MASTER
        ADJUSTABLE ENABLE: 1
        PROTOCOL: Genisys.MASTER
        ADJUSTABLE PORT: 3;
        ADJUSTABLE BAUD: 1200;
        ADJUSTABLE STOPBITS: 1;
        ADJUSTABLE PARITY: NONE;
        ADJUSTABLE KEY.ON.DELAY:  50;
        ADJUSTABLE KEY.OFF.DELAY: 50;

        ADJUSTABLE STALE.DATA.TIMEOUT: 300:SEC;
        ADJUSTABLE POINT.POINT:   1;
        ADJUSTABLE MASTER.TIMEOUT: 1000:MSEC;
        ADJUSTABLE POLLING.INTERVAL: 0:MSEC;
        ADJUSTABLE CARRIER.MODE: CONSTANT;
        ADJUSTABLE SECURE.MODE: ON;
        ADJUSTABLE MASTER.CHECKBACK: ON;
```

```
        ADJUSTABLE CRC.SIZE: 16;

        ADDRESS: 1

            ADJUSTABLE ENABLE: 1

            NV.OUTPUT:

                SO.00, SO.01, SO.02, SO.03,
                SO.04, SO.05, SO.06, SO.07,

                SO.10, SO.11, SO.12, SO.13,
                SO.14, SO.15, SO.16, SO.17;

            NV.INPUT:

                SI.00, SI.01, SI.02, SI.03,
                SI.04, SI.05, SI.06, SI.07,

                SI.10, SI.11, SI.12, SI.13,
                SI.14, SI.15, SI.16, SI.17;

        ADDRESS: 2

            ADJUSTABLE ENABLE: 1

            NV.OUTPUT:

                SO.80, SO.81, SO.82, SO.83,
                SO.84, SO.85, SO.86, SO.87,

                SO.90, SO.91, SO.92, SO.93,
                SO.94, SO.95, SO.96, SO.97;

            NV.INPUT:

                SI.80, SI.81, SI.82, SI.83,
                SI.84, SI.85, SI.86, SI.87,

                SI.90, SI.91, SI.92, SI.93,
                SI.94, SI.95, SI.96, SI.97;


CONFIGURATION

    SYSTEM

        ADJUSTABLE DEBUG_PORT_ADDRESS:      1;
        ADJUSTABLE DEBUG_PORT_BAUDRATE:     9600;
        LOGIC_TIMEOUT:                      500:MSEC;


LOGIC BEGIN
```

```
NV.ASSIGN       SI.00                   TO      NVO0.000;
NV.ASSIGN       SI.01                   TO      NVO0.001;
NV.ASSIGN       SI.02                   TO      NVO0.002;
NV.ASSIGN       SI.03                   TO      NVO0.003;
NV.ASSIGN       SI.04                   TO      NVO0.004;
NV.ASSIGN       SI.05                   TO      NVO0.005;
NV.ASSIGN       SI.06                   TO      NVO0.006;
NV.ASSIGN       SI.07                   TO      NVO0.007;

NV.ASSIGN       SI.10                   TO      NVO0.010;
NV.ASSIGN       SI.11                   TO      NVO0.011;
NV.ASSIGN       SI.12                   TO      NVO0.012;
NV.ASSIGN       SI.13                   TO      NVO0.013;
NV.ASSIGN       SI.14                   TO      NVO0.014;
NV.ASSIGN       SI.15                   TO      NVO0.015;
NV.ASSIGN       SI.16                   TO      NVO0.016;
NV.ASSIGN       SI.17                   TO      NVO0.017;

NV.ASSIGN       SI.80                   TO      NVO0.020;
NV.ASSIGN       SI.81                   TO      NVO0.021;
NV.ASSIGN       SI.82                   TO      NVO0.022;
NV.ASSIGN       SI.83                   TO      NVO0.023;
NV.ASSIGN       SI.84                   TO      NVO0.024;
NV.ASSIGN       SI.85                   TO      NVO0.025;
NV.ASSIGN       SI.86                   TO      NVO0.026;
NV.ASSIGN       SI.87                   TO      NVO0.027;

NV.ASSIGN       SI.90                   TO      NVO0.030;
NV.ASSIGN       SI.91                   TO      NVO0.031;
NV.ASSIGN       SI.92                   TO      NVO0.032;
NV.ASSIGN       SI.93                   TO      NVO0.033;
NV.ASSIGN       SI.94                   TO      NVO0.034;
NV.ASSIGN       SI.95                   TO      NVO0.035;
NV.ASSIGN       SI.96                   TO      NVO0.036;
NV.ASSIGN       SI.97                   TO      NVO0.037;

NV.ASSIGN       NVI0.000                TO      SO.00;
NV.ASSIGN       NVI0.001                TO      SO.01;
NV.ASSIGN       NVI0.002                TO      SO.02;
NV.ASSIGN       NVI0.003                TO      SO.03;
NV.ASSIGN       NVI0.004                TO      SO.04;
NV.ASSIGN       NVI0.005                TO      SO.05;
NV.ASSIGN       NVI0.006                TO      SO.06;
NV.ASSIGN       NVI0.007                TO      SO.07;

NV.ASSIGN       NVI0.010                TO      SO.10;
NV.ASSIGN       NVI0.011                TO      SO.11;
NV.ASSIGN       NVI0.012                TO      SO.12;
NV.ASSIGN       NVI0.013                TO      SO.13;
NV.ASSIGN       NVI0.014                TO      SO.14;
NV.ASSIGN       NVI0.015                TO      SO.15;
NV.ASSIGN       NVI0.016                TO      SO.16;
NV.ASSIGN       NVI0.017                TO      SO.17;

NV.ASSIGN       NVI0.020                TO      SO.80;
```

```
        NV.ASSIGN       NVI0.021                        TO      SO.81;
        NV.ASSIGN       NVI0.022                        TO      SO.82;
        NV.ASSIGN       NVI0.023                        TO      SO.83;
        NV.ASSIGN       NVI0.024                        TO      SO.84;
        NV.ASSIGN       NVI0.025                        TO      SO.85;
        NV.ASSIGN       NVI0.026                        TO      SO.86;
        NV.ASSIGN       NVI0.027                        TO      SO.87;

        NV.ASSIGN       NVI0.030                        TO      SO.90;
        NV.ASSIGN       NVI0.031                        TO      SO.91;
        NV.ASSIGN       NVI0.032                        TO      SO.92;
        NV.ASSIGN       NVI0.033                        TO      SO.93;
NV.ASSIGN       NVI0.034                        TO      SO.94;
NV.ASSIGN       NVI0.035                        TO      SO.95;
NV.ASSIGN       NVI0.036                        TO      SO.96;
NV.ASSIGN       NVI0.037                        TO      SO.97;

END LOGIC

END PROGRAM
```

Appendix B

Typical Genisys II
Genisys Slave Protocol Application

```
/*
        Typical Genisys II Genisys Slave Protocol Application
*/

Genisys_II PROGRAM Genisys_EXAMPLE;

INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:

                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:

                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;

    COMM

        LINK: Genisys_SLAVE
        ADJUSTABLE ENABLE: 1
        PROTOCOL: Genisys.SLAVE
        ADJUSTABLE PORT: 4;
        ADJUSTABLE STANDBY.PORT: 3;
        ADJUSTABLE BAUD: 300;
        ADJUSTABLE STOPBITS: 1;
        ADJUSTABLE PARITY: NONE;
        ADJUSTABLE KEY.ON.DELAY:  12;
        ADJUSTABLE KEY.OFF.DELAY: 12;

        ADJUSTABLE STALE.DATA.TIMEOUT: 300:SEC;
        ADJUSTABLE POINT.POINT:   1;

        ADDRESS: 1

            ADJUSTABLE ENABLE: 1
```

```
            NV.OUTPUT:

                SO.00, SO.01, SO.02, SO.03,
                SO.04, SO.05, SO.06, SO.07,

                SO.10, SO.11, SO.12, SO.13,
                SO.14, SO.15, SO.16, SO.17,

                SO.20, SO.21, SO.22, SO.23,
                SO.24, SO.25, SO.26, SO.27,

                SO.30, SO.31, SO.32, SO.33,
                SO.34, SO.35, SO.36, SO.37;

            NV.INPUT:

                SI.00, SI.01, SI.02, SI.03,
                SI.04, SI.05, SI.06, SI.07,

                SI.10, SI.11, SI.12, SI.13,
                SI.14, SI.15, SI.16, SI.17,

                SI.20, SI.21, SI.22, SI.23,
                SI.24, SI.25, SI.26, SI.27,

                SI.30, SI.31, SI.32, SI.33,
                SI.34, SI.35, SI.36, SI.37;


CONFIGURATION

    SYSTEM

        ADJUSTABLE DEBUG_PORT_ADDRESS:      1;
        ADJUSTABLE DEBUG_PORT_BAUDRATE:     9600;
        LOGIC_TIMEOUT:                      500:MSEC;


LOGIC BEGIN

        NV.ASSIGN       NVI0.000                        TO      SO.00;
        NV.ASSIGN       NVI0.001                        TO      SO.01;
        NV.ASSIGN       NVI0.002                        TO      SO.02;
        NV.ASSIGN       NVI0.003                        TO      SO.03;
        NV.ASSIGN       NVI0.004                        TO      SO.04;
        NV.ASSIGN       NVI0.005                        TO      SO.05;
        NV.ASSIGN       NVI0.006                        TO      SO.06;
        NV.ASSIGN       NVI0.007                        TO      SO.07;

        NV.ASSIGN       NVI0.010                        TO      SO.10;
        NV.ASSIGN       NVI0.011                        TO      SO.11;
        NV.ASSIGN       NVI0.012                        TO      SO.12;
        NV.ASSIGN       NVI0.013                        TO      SO.13;
```

```
NV.ASSIGN       NVI0.014                TO      SO.14;
NV.ASSIGN       NVI0.015                TO      SO.15;
NV.ASSIGN       NVI0.016                TO      SO.16;
NV.ASSIGN       NVI0.017                TO      SO.17;

NV.ASSIGN       NVI0.020                TO      SO.20;
NV.ASSIGN       NVI0.021                TO      SO.21;
NV.ASSIGN       NVI0.022                TO      SO.22;
NV.ASSIGN       NVI0.023                TO      SO.23;
NV.ASSIGN       NVI0.024                TO      SO.24;
NV.ASSIGN       NVI0.025                TO      SO.25;
NV.ASSIGN       NVI0.026                TO      SO.26;
NV.ASSIGN       NVI0.027                TO      SO.27;

NV.ASSIGN       NVI0.030                TO      SO.30;
NV.ASSIGN       NVI0.031                TO      SO.31;
NV.ASSIGN       NVI0.032                TO      SO.32;
NV.ASSIGN       NVI0.033                TO      SO.33;
NV.ASSIGN       NVI0.034                TO      SO.34;
NV.ASSIGN       NVI0.035                TO      SO.35;
NV.ASSIGN       NVI0.036                TO      SO.36;
NV.ASSIGN       NVI0.037                TO      SO.37;

NV.ASSIGN       SI.00                   TO      NVO0.000;
NV.ASSIGN       SI.01                   TO      NVO0.001;
NV.ASSIGN       SI.02                   TO      NVO0.002;
NV.ASSIGN       SI.03                   TO      NVO0.003;
NV.ASSIGN       SI.04                   TO      NVO0.004;
NV.ASSIGN       SI.05                   TO      NVO0.005;
NV.ASSIGN       SI.06                   TO      NVO0.006;
NV.ASSIGN       SI.07                   TO      NVO0.007;

NV.ASSIGN       SI.10                   TO      NVO0.010;
NV.ASSIGN       SI.11                   TO      NVO0.011;
NV.ASSIGN       SI.12                   TO      NVO0.012;
NV.ASSIGN       SI.13                   TO      NVO0.013;
NV.ASSIGN       SI.14                   TO      NVO0.014;
NV.ASSIGN       SI.15                   TO      NVO0.015;
NV.ASSIGN       SI.16                   TO      NVO0.016;
NV.ASSIGN       SI.17                   TO      NVO0.017;

NV.ASSIGN       SI.20                   TO      NVO0.020;
NV.ASSIGN       SI.21                   TO      NVO0.021;
NV.ASSIGN       SI.22                   TO      NVO0.022;
NV.ASSIGN       SI.23                   TO      NVO0.023;
NV.ASSIGN       SI.24                   TO      NVO0.024;
NV.ASSIGN       SI.25                   TO      NVO0.025;
NV.ASSIGN       SI.26                   TO      NVO0.026;
NV.ASSIGN       SI.27                   TO      NVO0.027;

NV.ASSIGN       SI.30                   TO      NVO0.030;
NV.ASSIGN       SI.31                   TO      NVO0.031;
NV.ASSIGN       SI.32                   TO      NVO0.032;
NV.ASSIGN       SI.33                   TO      NVO0.033;
NV.ASSIGN       SI.34                   TO      NVO0.034;
```

```
        NV.ASSIGN       SI.35                           TO      NVO0.035;
        NV.ASSIGN       SI.36                           TO      NVO0.036;
        NV.ASSIGN       SI.37                           TO      NVO0.037;

END LOGIC

END PROGRAM
```

Appendix C

Typical Genisys II
MicroLok II Peer Protocol Application

```
/*
        MicroLok II MII.PEER Protocol Verification Test Application
*/

Genisys_II PROGRAM 2LINKB;

SITE.ID.STRING: "PITTSBURGH";
DATE.STAMP: "SEPTEMBER 11, 2003";


INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:

                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:

                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;

    COMM

            LINK: MII_PEER

        ADJUSTABLE ENABLE: 1
        PROTOCOL: MII.PEER
        ADJUSTABLE PORT: 1;
        ADJUSTABLE BAUD: 38400;
        ADJUSTABLE STOPBITS: 1;
        ADJUSTABLE PARITY: NONE;
        ADJUSTABLE KEY.ON.DELAY: 12;
        ADJUSTABLE KEY.OFF.DELAY: 12;
        ADJUSTABLE GRANT.DELAY: 10:MSEC;
        ADJUSTABLE POINT.POINT: 1;
```

```
ADJUSTABLE ATCS.NV.ADDRESS: 78A2AAAAAAAAA1

    ADJUSTABLE ENABLE: 1
    STATION.NAME: MP_88.0;
    ADJUSTABLE PEER.ADDRESS: 78A2AAAAAAAAA2;
    ADJUSTABLE TIME.STAMP: 1;

    ADJUSTABLE ACK.TIMEOUT: 1000:MSEC;
    ADJUSTABLE HEARTBEAT.INTERVAL: 5:SEC;
    ADJUSTABLE INDICATION.UPDATE.CYCLE: 1;
    ADJUSTABLE STALE.DATA.TIMEOUT: 60:SEC;

    NV.OUTPUT:

        MII.NVO1.000, MII.NVO1.001, MII.NVO1.002, MII.NVO1.003,
        MII.NVO1.004, MII.NVO1.005, MII.NVO1.006, MII.NVO1.007;

    NV.INPUT:

        MII.NVI1.000, MII.NVI1.001, MII.NVI1.002, MII.NVI1.003,
        MII.NVI1.004, MII.NVI1.005, MII.NVI1.006, MII.NVI1.007;

    NV.NUMERIC.OUTPUT.8:

        MII.NVNMO1.000;

    NV.NUMERIC.OUTPUT.16:

        MII.NVNMO1.001;

    NV.NUMERIC.OUTPUT.32:

        MII.NVNMO1.002;

    NV.NUMERIC.INPUT.8:

        MII.NVNMI1.000;

    NV.NUMERIC.INPUT.16:

        MII.NVNMI1.001;

    NV.NUMERIC.INPUT.32:

        MII.NVNMI1.002;


LINK: MII_PEER_2

ADJUSTABLE ENABLE: 1
PROTOCOL: MII.PEER
ADJUSTABLE PORT: 2;
ADJUSTABLE BAUD: 38400;
```

```
ADJUSTABLE STOPBITS: 1;
ADJUSTABLE PARITY: NONE;
ADJUSTABLE KEY.ON.DELAY: 12;
ADJUSTABLE KEY.OFF.DELAY: 12;
ADJUSTABLE GRANT.DELAY: 10:MSEC;
ADJUSTABLE POINT.POINT: 1;


ADJUSTABLE ATCS.NV.ADDRESS: 78A2AAAAAAAAA2

    ADJUSTABLE ENABLE: 1
    STATION.NAME: MP_88.2;
    ADJUSTABLE PEER.ADDRESS: 78A2AAAAAAAAA1;
    ADJUSTABLE TIME.STAMP: 1;

    ADJUSTABLE ACK.TIMEOUT: 1000:MSEC;
    ADJUSTABLE HEARTBEAT.INTERVAL: 5:SEC;
    ADJUSTABLE INDICATION.UPDATE.CYCLE: 1;
    ADJUSTABLE STALE.DATA.TIMEOUT: 60:SEC;


    NV.INPUT:

        MII.NVI2.000, MII.NVI2.001, MII.NVI2.002, MII.NVI2.003,
        MII.NVI2.004, MII.NVI2.005, MII.NVI2.006, MII.NVI2.007;

    NV.OUTPUT:

        MII.NVO2.000, MII.NVO2.001, MII.NVO2.002, MII.NVO2.003,
        MII.NVO2.004, MII.NVO2.005, MII.NVO2.006, MII.NVO2.007;

    NV.NUMERIC.OUTPUT.8:

        MII.NVNMO2.000;

    NV.NUMERIC.OUTPUT.16:

        MII.NVNMO2.001;

    NV.NUMERIC.OUTPUT.32:

        MII.NVNMO2.002;

    NV.NUMERIC.INPUT.8:

        MII.NVNMI2.000;

    NV.NUMERIC.INPUT.16:

        MII.NVNMI2.001;

    NV.NUMERIC.INPUT.32:

        MII.NVNMI2.002;
```

```
CONFIGURATION

    SYSTEM

        ADJUSTABLE DEBUG_PORT_ADDRESS:      1;
        ADJUSTABLE DEBUG_PORT_BAUDRATE:     9600;
        LOGIC_TIMEOUT:                      500:MSEC;
      APPLICATION.VERSION:                1;


LOGIC BEGIN

        NV.ASSIGN       NVI0.000                        TO      MII.NVO1.000;
        NV.ASSIGN       NVI0.001                        TO      MII.NVO1.001;
        NV.ASSIGN       NVI0.002                        TO      MII.NVO1.002;
        NV.ASSIGN       NVI0.003                        TO      MII.NVO1.003;
        NV.ASSIGN       NVI0.004                        TO      MII.NVO1.004;
        NV.ASSIGN       NVI0.005                        TO      MII.NVO1.005;
        NV.ASSIGN       NVI0.006                        TO      MII.NVO1.006;
        NV.ASSIGN       NVI0.007                        TO      MII.NVO1.007;

        NV.ASSIGN       MII.NVI1.000                    TO      NVO0.000;
        NV.ASSIGN       MII.NVI1.001                    TO      NVO0.001;
        NV.ASSIGN       MII.NVI1.002                    TO      NVO0.002;
        NV.ASSIGN       MII.NVI1.003                    TO      NVO0.003;
        NV.ASSIGN       MII.NVI1.004                    TO      NVO0.004;
        NV.ASSIGN       MII.NVI1.005                    TO      NVO0.005;
        NV.ASSIGN       MII.NVI1.006                    TO      NVO0.006;
        NV.ASSIGN       MII.NVI1.007                    TO      NVO0.007;

        NV.ASSIGN       NVI0.020                        TO      MII.NVO2.000;
        NV.ASSIGN       NVI0.021                        TO      MII.NVO2.001;
        NV.ASSIGN       NVI0.022                        TO      MII.NVO2.002;
        NV.ASSIGN       NVI0.023                        TO      MII.NVO2.003;
        NV.ASSIGN       NVI0.024                        TO      MII.NVO2.004;
        NV.ASSIGN       NVI0.025                        TO      MII.NVO2.005;
        NV.ASSIGN       NVI0.026                        TO      MII.NVO2.006;
        NV.ASSIGN       NVI0.027                        TO      MII.NVO2.007;

        NV.ASSIGN       MII.NVI2.000                    TO      NVO0.020;
        NV.ASSIGN       MII.NVI2.001                    TO      NVO0.021;
        NV.ASSIGN       MII.NVI2.002                    TO      NVO0.022;
        NV.ASSIGN       MII.NVI2.003                    TO      NVO0.023;
        NV.ASSIGN       MII.NVI2.004                    TO      NVO0.024;
        NV.ASSIGN       MII.NVI2.005                    TO      NVO0.025;
        NV.ASSIGN       MII.NVI2.006                    TO      NVO0.026;
        NV.ASSIGN       MII.NVI2.007                    TO      NVO0.027;

END LOGIC

END PROGRAM
```

Appendix D

Typical Genisys II
SCS-128 Slave Protocol Application

```
/*
        Typical Genisys II SCS-128 Slave Protocol Application
*/

Genisys_II PROGRAM SCS128_EXAMPLE;

INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:

                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:

                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;

    COMM

        LINK: LINK_NAME
        ADJUSTABLE ENABLE: 1
        PROTOCOL: SCS.SLAVE
        ADJUSTABLE PORT: 4;
        ADJUSTABLE STANDBY.PORT: 3;
        ADJUSTABLE BAUD: 300;
        ADJUSTABLE ALTERNATE.BAUD: 75;
        ADJUSTABLE STOPBITS: 1;
        ADJUSTABLE PARITY: EVEN;
        ADJUSTABLE KEY.ON.DELAY:  12;
        ADJUSTABLE KEY.OFF.DELAY: 12;

        ADJUSTABLE STALE.DATA.TIMEOUT: 300:SEC;
        ADJUSTABLE POINT.POINT:   1;
        ADJUSTABLE INTERBYTE.TIMEOUT: 0:MSEC;
        ADJUSTABLE INDICATION.ACK: ENABLED;
```

```
        ADDRESS: 1

            ADJUSTABLE ENABLE: 1

            NV.OUTPUT:

                SO.00, SO.01, SO.02, SO.03,
                SO.04, SO.05, SO.06, SO.07,

                SO.10, SO.11, SO.12, SO.13,
                SO.14, SO.15, SO.16, SO.17,

                SO.20, SO.21, SO.22, SO.23,
                SO.24, SO.25, SO.26, SO.27,

                SO.30, SO.31, SO.32, SO.33,
                SO.34, SO.35, SO.36, SO.37;

            NV.INPUT:

                SI.00, SI.01, SI.02, SI.03,
                SI.04, SI.05, SI.06, SI.07,

                SI.10, SI.11, SI.12, SI.13,
                SI.14, SI.15, SI.16, SI.17,

                SI.20, SI.21, SI.22, SI.23,
                SI.24, SI.25, SI.26, SI.27,

                SI.30, SI.31, SI.32, SI.33,
                SI.34, SI.35, SI.36, SI.37;


CONFIGURATION

    SYSTEM

        ADJUSTABLE DEBUG_PORT_ADDRESS:      1;
        ADJUSTABLE DEBUG_PORT_BAUDRATE:     9600;
        LOGIC_TIMEOUT:                      500:MSEC;


LOGIC BEGIN

        NV.ASSIGN       NVI0.000                        TO      SO.00;
        NV.ASSIGN       NVI0.001                        TO      SO.01;
        NV.ASSIGN       NVI0.002                        TO      SO.02;
        NV.ASSIGN       NVI0.003                        TO      SO.03;
        NV.ASSIGN       NVI0.004                        TO      SO.04;
        NV.ASSIGN       NVI0.005                        TO      SO.05;
        NV.ASSIGN       NVI0.006                        TO      SO.06;
        NV.ASSIGN       NVI0.007                        TO      SO.07;

        NV.ASSIGN       NVI0.010                        TO      SO.10;
```

```
NV.ASSIGN       NVI0.011                TO      SO.11;
NV.ASSIGN       NVI0.012                TO      SO.12;
NV.ASSIGN       NVI0.013                TO      SO.13;
NV.ASSIGN       NVI0.014                TO      SO.14;
NV.ASSIGN       NVI0.015                TO      SO.15;
NV.ASSIGN       NVI0.016                TO      SO.16;
NV.ASSIGN       NVI0.017                TO      SO.17;

NV.ASSIGN       NVI0.020                TO      SO.20;
NV.ASSIGN       NVI0.021                TO      SO.21;
NV.ASSIGN       NVI0.022                TO      SO.22;
NV.ASSIGN       NVI0.023                TO      SO.23;
NV.ASSIGN       NVI0.024                TO      SO.24;
NV.ASSIGN       NVI0.025                TO      SO.25;
NV.ASSIGN       NVI0.026                TO      SO.26;
NV.ASSIGN       NVI0.027                TO      SO.27;

NV.ASSIGN       NVI0.030                TO      SO.30;
NV.ASSIGN       NVI0.031                TO      SO.31;
NV.ASSIGN       NVI0.032                TO      SO.32;
NV.ASSIGN       NVI0.033                TO      SO.33;
NV.ASSIGN       NVI0.034                TO      SO.34;
NV.ASSIGN       NVI0.035                TO      SO.35;
NV.ASSIGN       NVI0.036                TO      SO.36;
NV.ASSIGN       NVI0.037                TO      SO.37;

NV.ASSIGN       SI.00                   TO      NVO0.000;
NV.ASSIGN       SI.01                   TO      NVO0.001;
NV.ASSIGN       SI.02                   TO      NVO0.002;
NV.ASSIGN       SI.03                   TO      NVO0.003;
NV.ASSIGN       SI.04                   TO      NVO0.004;
NV.ASSIGN       SI.05                   TO      NVO0.005;
NV.ASSIGN       SI.06                   TO      NVO0.006;
NV.ASSIGN       SI.07                   TO      NVO0.007;

NV.ASSIGN       SI.10                   TO      NVO0.010;
NV.ASSIGN       SI.11                   TO      NVO0.011;
NV.ASSIGN       SI.12                   TO      NVO0.012;
NV.ASSIGN       SI.13                   TO      NVO0.013;
NV.ASSIGN       SI.14                   TO      NVO0.014;
NV.ASSIGN       SI.15                   TO      NVO0.015;
NV.ASSIGN       SI.16                   TO      NVO0.016;
NV.ASSIGN       SI.17                   TO      NVO0.017;

NV.ASSIGN       SI.20                   TO      NVO0.020;
NV.ASSIGN       SI.21                   TO      NVO0.021;
NV.ASSIGN       SI.22                   TO      NVO0.022;
NV.ASSIGN       SI.23                   TO      NVO0.023;
NV.ASSIGN       SI.24                   TO      NVO0.024;
NV.ASSIGN       SI.25                   TO      NVO0.025;
NV.ASSIGN       SI.26                   TO      NVO0.026;
NV.ASSIGN       SI.27                   TO      NVO0.027;

NV.ASSIGN       SI.30                   TO      NVO0.030;
NV.ASSIGN       SI.31                   TO      NVO0.031;
```

```
        NV.ASSIGN       SI.32                           TO      NVO0.032;
        NV.ASSIGN       SI.33                           TO      NVO0.033;
        NV.ASSIGN       SI.34                           TO      NVO0.034;
        NV.ASSIGN       SI.35                           TO      NVO0.035;
        NV.ASSIGN       SI.36                           TO      NVO0.036;
        NV.ASSIGN       SI.37                           TO      NVO0.037;

END LOGIC

END PROGRAM
```

Appendix E

Typical Genisys II
MCS-1 Slave Protocol Application

```
/*
        Typical Genisys II MCS-1 Slave Protocol Application
*/

Genisys_II PROGRAM MCS1_EXAMPLE;

INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:

                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:

                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;

    COMM

        LINK: LINK_NAME
        ADJUSTABLE ENABLE: 1
        PROTOCOL: MCS.SLAVE
        ADJUSTABLE PORT: 3;
        ADJUSTABLE STANDBY.PORT: 4;
        ADJUSTABLE BAUD: 2400;
        ADJUSTABLE ALTERNATE.BAUD: 75;
        ADJUSTABLE STOPBITS: 1;
        ADJUSTABLE PARITY: EVEN;
        ADJUSTABLE KEY.ON.DELAY:  12;
        ADJUSTABLE KEY.OFF.DELAY: 12;

        ADJUSTABLE STALE.DATA.TIMEOUT: 300:SEC;
        ADJUSTABLE POINT.POINT:   1;
        ADJUSTABLE INTERBYTE.TIMEOUT: 0:MSEC;

        ADDRESS: 1
```

```
            ADJUSTABLE ENABLE: 1

            NV.OUTPUT:

                SO.00, SO.01, SO.02, SO.03,
                SO.04, SO.05, SO.06, SO.07,

                SO.10, SO.11, SO.12, SO.13,
                SO.14, SO.15, SO.16, SO.17,

                SO.20, SO.21, SO.22, SO.23,
                SO.24, SO.25, SO.26, SO.27;

            NV.INPUT:

                SI.00, SI.01, SI.02, SI.03,
                SI.04, SI.05, SI.06, SI.07,

                SI.10, SI.11, SI.12, SI.13,
                SI.14, SI.15, SI.16, SI.17,

                SI.20, SI.21, SI.22, SI.23,
                SI.24, SI.25, SI.26, SI.27;


CONFIGURATION

    SYSTEM

        ADJUSTABLE DEBUG_PORT_ADDRESS:      1;
        ADJUSTABLE DEBUG_PORT_BAUDRATE:     9600;
        LOGIC_TIMEOUT:                      500:MSEC;


LOGIC BEGIN

        NV.ASSIGN       NVI0.000                        TO      SO.00;
        NV.ASSIGN       NVI0.001                        TO      SO.01;
        NV.ASSIGN       NVI0.002                        TO      SO.02;
        NV.ASSIGN       NVI0.003                        TO      SO.03;
        NV.ASSIGN       NVI0.004                        TO      SO.04;
        NV.ASSIGN       NVI0.005                        TO      SO.05;
        NV.ASSIGN       NVI0.006                        TO      SO.06;
        NV.ASSIGN       NVI0.007                        TO      SO.07;

        NV.ASSIGN       NVI0.010                        TO      SO.10;
        NV.ASSIGN       NVI0.011                        TO      SO.11;
        NV.ASSIGN       NVI0.012                        TO      SO.12;
        NV.ASSIGN       NVI0.013                        TO      SO.13;
        NV.ASSIGN       NVI0.014                        TO      SO.14;
        NV.ASSIGN       NVI0.015                        TO      SO.15;
        NV.ASSIGN       NVI0.016                        TO      SO.16;
        NV.ASSIGN       NVI0.017                        TO      SO.17;
```

```
        NV.ASSIGN       NVI0.020                        TO      SO.20;
        NV.ASSIGN       NVI0.021                        TO      SO.21;
        NV.ASSIGN       NVI0.022                        TO      SO.22;
        NV.ASSIGN       NVI0.023                        TO      SO.23;
        NV.ASSIGN       NVI0.024                        TO      SO.24;
        NV.ASSIGN       NVI0.025                        TO      SO.25;
        NV.ASSIGN       NVI0.026                        TO      SO.26;
        NV.ASSIGN       NVI0.027                        TO      SO.27;

        NV.ASSIGN       SI.00                           TO      NVO0.000;
        NV.ASSIGN       SI.01                           TO      NVO0.001;
        NV.ASSIGN       SI.02                           TO      NVO0.002;
        NV.ASSIGN       SI.03                           TO      NVO0.003;
        NV.ASSIGN       SI.04                           TO      NVO0.004;
        NV.ASSIGN       SI.05                           TO      NVO0.005;
        NV.ASSIGN       SI.06                           TO      NVO0.006;
        NV.ASSIGN       SI.07                           TO      NVO0.007;

        NV.ASSIGN       SI.10                           TO      NVO0.010;
        NV.ASSIGN       SI.11                           TO      NVO0.011;
        NV.ASSIGN       SI.12                           TO      NVO0.012;
        NV.ASSIGN       SI.13                           TO      NVO0.013;
        NV.ASSIGN       SI.14                           TO      NVO0.014;
        NV.ASSIGN       SI.15                           TO      NVO0.015;
        NV.ASSIGN       SI.16                           TO      NVO0.016;
        NV.ASSIGN       SI.17                           TO      NVO0.017;

        NV.ASSIGN       SI.20                           TO      NVO0.020;
        NV.ASSIGN       SI.21                           TO      NVO0.021;
        NV.ASSIGN       SI.22                           TO      NVO0.022;
        NV.ASSIGN       SI.23                           TO      NVO0.023;
        NV.ASSIGN       SI.24                           TO      NVO0.024;
        NV.ASSIGN       SI.25                           TO      NVO0.025;
        NV.ASSIGN       SI.26                           TO      NVO0.026;
        NV.ASSIGN       SI.27                           TO      NVO0.027;

END LOGIC

END PROGRAM
```

Appendix F

Typical Genisys II
ARES Protocol Application

```
/*
        Typical Genisys II ARES Protocol Application
*/

Genisys_II PROGRAM ARES_EXAMPLE;

INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:

                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:

                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;

    COMM


        LINK: LINK_NAME

        ADJUSTABLE ENABLE: 1
        PROTOCOL: ARES.SLAVE
        ADJUSTABLE PORT: 3;
        ADJUSTABLE KEY.ON.DELAY: 0;
        ADJUSTABLE KEY.OFF.DELAY: 12;
        ADJUSTABLE CTS.WAIT: 2000:MSEC;
        ADJUSTABLE INDICATION.BROADCAST.INTERVAL: 60:SEC;
        ADJUSTABLE STALE.DATA.TIMEOUT: 120:SEC;
        ADJUSTABLE ACK.TIMEOUT: 10:SEC;
        ADJUSTABLE PROTOCOL.RESET.TIMEOUT: 70:SEC;
        ADJUSTABLE TIME.REQUEST.TIMEOUT: 70:SEC;
        ADJUSTABLE XMIT.RETRY.LIMIT: 3;
        ADJUSTABLE ARES.HOST.ADDRESS: "2076935151";
        ADJUSTABLE ARES.TIME.ADDRESS: "0076000204";
```

```
        ADJUSTABLE ADDRESS: "5076134707"

            ADJUSTABLE ENABLE: 1
            STATION.NAME: MP_88.0;
            ADJUSTABLE SET.CLOCK.ENABLE: 1;

            NV.OUTPUT:

                ARO1.000, ARO1.001, ARO1.002, ARO1.003,
                ARO1.004, ARO1.005, ARO1.006, ARO1.007,

                ARO1.010, ARO1.011, ARO1.012, ARO1.013,
                ARO1.014, ARO1.015, ARO1.016, ARO1.017;

            NV.INPUT:

                ARI1.000, ARI1.001, ARI1.002, ARI1.003,
                ARI1.004, ARI1.005, ARI1.006, ARI1.007,

                ARI1.010, ARI1.011, ARI1.012, ARI1.013,
                ARI1.014, ARI1.015, ARI1.016, ARI1.017;


        LINK: ARES_RADIO_CONTROL

        ADJUSTABLE ENABLE: 1
        PROTOCOL: ARES.RADIO
        ADJUSTABLE PORT: 4;
        ADJUSTABLE BAUD: 9600;
        ADJUSTABLE RADIO.FREQUENCY: 161.0100;
        ADJUSTABLE INTERBYTE.TIMEOUT: 0:MSEC;
        ADJUSTABLE NO.RESPONSE.TIMEOUT: 100:MSEC;


CONFIGURATION

    SYSTEM

        ADJUSTABLE DEBUG_PORT_ADDRESS:  1;
        ADJUSTABLE DEBUG_PORT_BAUDRATE: 9600;
        ADJUSTABLE LOGIC_TIMEOUT:       500:MSEC;
        APPLICATION.VERSION:            1;


LOGIC BEGIN

        NV.ASSIGN       NVI0.000                        TO      ARO1.000;
        NV.ASSIGN       NVI0.001                        TO      ARO1.001;
        NV.ASSIGN       NVI0.002                        TO      ARO1.002;
        NV.ASSIGN       NVI0.003                        TO      ARO1.003;
        NV.ASSIGN       NVI0.004                        TO      ARO1.004;
        NV.ASSIGN       NVI0.005                        TO      ARO1.005;
        NV.ASSIGN       NVI0.006                        TO      ARO1.006;
```

```
        NV.ASSIGN       NVI0.007                        TO      ARO1.007;

        NV.ASSIGN       NVI0.010                        TO      ARO1.010;
        NV.ASSIGN       NVI0.011                        TO      ARO1.011;
        NV.ASSIGN       NVI0.012                        TO      ARO1.012;
        NV.ASSIGN       NVI0.013                        TO      ARO1.013;
        NV.ASSIGN       NVI0.014                        TO      ARO1.014;
        NV.ASSIGN       NVI0.015                        TO      ARO1.015;
        NV.ASSIGN       NVI0.016                        TO      ARO1.016;
        NV.ASSIGN       NVI0.017                        TO      ARO1.017;

        NV.ASSIGN       ARI1.000                        TO      NVO0.000;
        NV.ASSIGN       ARI1.001                        TO      NVO0.001;
        NV.ASSIGN       ARI1.002                        TO      NVO0.002;
        NV.ASSIGN       ARI1.003                        TO      NVO0.003;
        NV.ASSIGN       ARI1.004                        TO      NVO0.004;
        NV.ASSIGN       ARI1.005                        TO      NVO0.005;
        NV.ASSIGN       ARI1.006                        TO      NVO0.006;
        NV.ASSIGN       ARI1.007                        TO      NVO0.007;

        NV.ASSIGN       ARI1.010                        TO      NVO0.010;
        NV.ASSIGN       ARI1.011                        TO      NVO0.011;
        NV.ASSIGN       ARI1.012                        TO      NVO0.012;
        NV.ASSIGN       ARI1.013                        TO      NVO0.013;
        NV.ASSIGN       ARI1.014                        TO      NVO0.014;
        NV.ASSIGN       ARI1.015                        TO      NVO0.015;
        NV.ASSIGN       ARI1.016                        TO      NVO0.016;
        NV.ASSIGN       ARI1.017                        TO      NVO0.017;

END LOGIC

END PROGRAM
```

Appendix G

Typical MicroLok II
ATCS Link Test Application

```
/*
        MicroLok II ATCS Link Test Application
*/

Genisys_II PROGRAM ATCS_Example;

INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:

                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:

                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;


    COMM

        LINK: ATCS_SLAVE
        ADJUSTABLE ENABLE: 1
        PROTOCOL: ATCS.SLAVE

        ADJUSTABLE PORT: 3;
        ADJUSTABLE BAUD: 9600;

        ADJUSTABLE POLLING.TIMEOUT:  500:MSEC;
        ADJUSTABLE POLLING.INTERVAL: 1000:MSEC;
        ADJUSTABLE HDLC.FAIL.TIMEOUT: 60:SEC;

        ADJUSTABLE STALE.DATA.TIMEOUT: 120:SEC;
        ADJUSTABLE XMIT.ACK.TIMEOUT:   120:SEC;

        ADJUSTABLE INDICATION.BROADCAST.INTERVAL: 60:SEC;
        ADJUSTABLE TRANSMITTER.IDLE.STATE: MARK;
```

```
        ADJUSTABLE MCP.LINK.ADDRESS: 0x01;
        ADJUSTABLE GROUND.LINK.ADDRESS: 0x23;
        ADJUSTABLE WIU.LINK.ADDRESS: 0x03;
        ADJUSTABLE CHANNEL.GROUP: 0x68;

        ADJUSTABLE MCP.ATCS.ADDRESS: "78A2A1A1A1A4A1";
        ADJUSTABLE DEFAULT.ATCS.HOST.ADDRESS: "28A2A1A1A1";
        ADJUSTABLE HEALTH.ATCS.ADDRESS: "28A2AAAAAAAAAA";


        ADDRESS: "78A2A1A1A1A1A3"

            ADJUSTABLE ENABLE: 1
            STATION.NAME: ST.1;

            NV.OUTPUT:

                ATSO.000, ATSO.001, ATSO.002, ATSO.003,
                ATSO.004, ATSO.005, ATSO.006, ATSO.007,

                ATSO.010, ATSO.011, ATSO.012, ATSO.013,
                ATSO.014, ATSO.015, ATSO.016, ATSO.017;

            NV.INPUT:

                ATSI.000, ATSI.001, ATSI.002, ATSI.003,
                ATSI.004, ATSI.005, ATSI.006, ATSI.007,

                ATSI.010, ATSI.011, ATSI.012, ATSI.013,
                ATSI.014, ATSI.015, ATSI.016, ATSI.017;

        ADDRESS: "78A2A1A1A1A4A3"

            ADJUSTABLE ENABLE: 0
            STATION.NAME: ST.2;

            NV.OUTPUT:

                ATSO.020, ATSO.021, ATSO.022, ATSO.023,
                ATSO.024, ATSO.025, ATSO.026, ATSO.027;

            NV.INPUT:

                ATSI.020, ATSI.021, ATSI.022, ATSI.023,
                ATSI.024, ATSI.025, ATSI.026, ATSI.027;




CONFIGURATION

    SYSTEM
```

```
        FIXED DEBUG_PORT_ADDRESS:       1;
        ADJUSTABLE DEBUG_PORT_BAUDRATE: 9600;
        LOGIC_TIMEOUT:                  500:MSEC;
        APPLICATION.VERSION:            2;


LOGIC BEGIN

        NV.ASSIGN       ATSI.000                        TO      NVO0.000;
        NV.ASSIGN       ATSI.001                        TO      NVO0.001;
        NV.ASSIGN       ATSI.002                        TO      NVO0.002;
        NV.ASSIGN       ATSI.003                        TO      NVO0.003;
        NV.ASSIGN       ATSI.004                        TO      NVO0.004;
        NV.ASSIGN       ATSI.005                        TO      NVO0.005;
        NV.ASSIGN       ATSI.006                        TO      NVO0.006;
        NV.ASSIGN       ATSI.007                        TO      NVO0.007;

        NV.ASSIGN       ATSI.010                        TO      NVO0.010;
        NV.ASSIGN       ATSI.011                        TO      NVO0.011;
        NV.ASSIGN       ATSI.012                        TO      NVO0.012;
        NV.ASSIGN       ATSI.013                        TO      NVO0.013;
        NV.ASSIGN       ATSI.014                        TO      NVO0.014;
        NV.ASSIGN       ATSI.015                        TO      NVO0.015;
        NV.ASSIGN       ATSI.016                        TO      NVO0.016;
        NV.ASSIGN       ATSI.017                        TO      NVO0.017;

        NV.ASSIGN       ATSI.020                        TO      NVO0.020;
        NV.ASSIGN       ATSI.021                        TO      NVO0.021;
        NV.ASSIGN       ATSI.022                        TO      NVO0.022;
        NV.ASSIGN       ATSI.023                        TO      NVO0.023;
        NV.ASSIGN       ATSI.024                        TO      NVO0.024;
        NV.ASSIGN       ATSI.025                        TO      NVO0.025;
        NV.ASSIGN       ATSI.026                        TO      NVO0.026;
        NV.ASSIGN       ATSI.027                        TO      NVO0.027;

        NV.ASSIGN       NVI0.000                        TO      ATSO.000;
        NV.ASSIGN       NVI0.001                        TO      ATSO.001;
        NV.ASSIGN       NVI0.002                        TO      ATSO.002;
        NV.ASSIGN       NVI0.003                        TO      ATSO.003;
        NV.ASSIGN       NVI0.004                        TO      ATSO.004;
        NV.ASSIGN       NVI0.005                        TO      ATSO.005;
        NV.ASSIGN       NVI0.006                        TO      ATSO.006;
        NV.ASSIGN       NVI0.007                        TO      ATSO.007;

        NV.ASSIGN       NVI0.010                        TO      ATSO.010;
        NV.ASSIGN       NVI0.011                        TO      ATSO.011;
        NV.ASSIGN       NVI0.012                        TO      ATSO.012;
        NV.ASSIGN       NVI0.013                        TO      ATSO.013;
        NV.ASSIGN       NVI0.014                        TO      ATSO.014;
        NV.ASSIGN       NVI0.015                        TO      ATSO.015;
        NV.ASSIGN       NVI0.016                        TO      ATSO.016;
        NV.ASSIGN       NVI0.017                        TO      ATSO.017;

        NV.ASSIGN       NVI0.020                        TO      ATSO.020;
```

```
        NV.ASSIGN       NVI0.021                        TO      ATSO.021;
        NV.ASSIGN       NVI0.022                        TO      ATSO.022;
        NV.ASSIGN       NVI0.023                        TO      ATSO.023;
        NV.ASSIGN       NVI0.024                        TO      ATSO.024;
        NV.ASSIGN       NVI0.025                        TO      ATSO.025;
        NV.ASSIGN       NVI0.026                        TO      ATSO.026;
        NV.ASSIGN       NVI0.027                        TO      ATSO.027;

        NV.ASSIGN       NVI0.036                        TO
ATCS_SLAVE.ST.1.Disable;
        NV.ASSIGN       NVI0.037                        TO
ATCS_SLAVE.ST.2.Disable;
END LOGIC

END PROGRAM
```

Appendix H

Typical Genisys II SLCP Example

```
Genisys_II PROGRAM SLCP_Example;

INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:
                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:
                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;


COMM

  LINK: CLCP_Link
  ADJUSTABLE ENABLE: 1
  PROTOCOL: SLCP
       ADJUSTABLE PORT:                3;
       ADJUSTABLE BAUD:             1200;
       ADJUSTABLE PARITY:           EVEN;
       ADJUSTABLE STOPBITS:            1;
       ADJUSTABLE POINT.POINT:         1;
       ADJUSTABLE KEY.ON.DELAY:        0;
       ADJUSTABLE KEY.OFF.DELAY:       0;
       ADJUSTABLE STALE.DATA.TIMEOUT:  80:SEC;
       ADJUSTABLE NORESPONSE.TIMEOUT:   2:SEC;
       ADJUSTABLE POLLING.INTERVAL:    30:SEC;
       ADJUSTABLE BROADCAST.INTERVAL:  60:SEC;
       ADJUSTABLE INTERBYTE.TIMEOUT:   10:MSEC;


  ADDRESS: 0
  ADJUSTABLE ENABLE: 1


  NV.OUTPUT:
```

```
   SPARE,    SPARE,   SPARE,    SPARE,    SPARE,    SPARE,    SPARE,  SPARE,
   SPARE,    SPARE,   SPARE,    SPARE,    SPARE,    SPARE,    SPARE,  SPARE,
   1ANWK_PK, 1RWK_PK, 1BNWK_PK, 2ANWK_PK, 2RWK_PK,  2BNWK_PK, 1WG_PK, 1WR_PK,
   1EG_PK,   1ER_PK,  2WG_PK,   2WR_PK,   2EG_PK,   2ER_PK,   1TK_PK, 2TK_PK,
   1WBK_PK,  1EBK_PK, 2WBK_PK,  2EBK_PK,  TK1LK_PK, TK2LK_PK, 1TE_PK, 2TE_PK,
   SMK_PK,   MCK_PK,  MOK_PK,   LOK_PK,   POK_PK;


  NV.INPUT:
   TEST_PZ,   SPARE,     SPARE,     SPARE,     SPARE,     SPARE,
LOCAL_PZ,  REMOT_PZ,
   CLCP.DIP1, CLCP.DIP2, CLCP.DIP3, CLCP.DIP4, CLCP.DIP5, CLCP.DIP6,
CLCP.DIP7, CLCP.HEALTH,
   1NWZ_PZ,   1RWZ_PZ,   2NWZ_PZ,   2RWZ_PZ,   1WGC_PZ,   1WGS_PZ,   1EGC_PZ,
1EGS_PZ,
   2WGC_PZ,   2WGS_PZ,   2EGC_PZ,   2EGS_PZ,   SMZON_PZ,  SMZOF_PZ;


CONFIGURATION

  SYSTEM
   FIXED DEBUG_PORT_BAUDRATE:9600;


LOGIC BEGIN

// LCP TO GEN

  NV.ASSIGN TEST_PZ     TO NVO0.000;
  NV.ASSIGN LOCAL_PZ    TO NVO0.006;
  NV.ASSIGN REMOT_PZ    TO NVO0.007;

  NV.ASSIGN CLCP.DIP1   TO NVO0.010;
  NV.ASSIGN CLCP.DIP2   TO NVO0.011;
  NV.ASSIGN CLCP.DIP3   TO NVO0.012;
  NV.ASSIGN CLCP.DIP4   TO NVO0.013;
  NV.ASSIGN CLCP.DIP5   TO NVO0.014;
  NV.ASSIGN CLCP.DIP6   TO NVO0.015;
  NV.ASSIGN CLCP.DIP7   TO NVO0.016;
  NV.ASSIGN CLCP.HEALTH TO NVO0.017;

  NV.ASSIGN 1NWZ_PZ     TO NVO0.020;
  NV.ASSIGN 1RWZ_PZ     TO NVO0.021;
  NV.ASSIGN 2NWZ_PZ     TO NVO0.022;
  NV.ASSIGN 2RWZ_PZ     TO NVO0.023;
  NV.ASSIGN 1WGC_PZ     TO NVO0.024;
  NV.ASSIGN 1WGS_PZ     TO NVO0.025;
  NV.ASSIGN 1EGC_PZ     TO NVO0.026;
  NV.ASSIGN 1EGS_PZ     TO NVO0.027;

  NV.ASSIGN 2WGC_PZ     TO NVO0.030;
  NV.ASSIGN 2WGS_PZ     TO NVO0.031;
  NV.ASSIGN 2EGC_PZ     TO NVO0.032;
  NV.ASSIGN 2EGS_PZ     TO NVO0.033;
```

```
  NV.ASSIGN SMZON_PZ    TO NVO0.034;
  NV.ASSIGN SMZOF_PZ    TO NVO0.035;

// GEN TO LCP

  NV.ASSIGN NVI0.000 TO 1ANWK_PK;
  NV.ASSIGN NVI0.001 TO 1RWK_PK;
  NV.ASSIGN NVI0.002 TO 1BNWK_PK;
  NV.ASSIGN NVI0.003 TO 2ANWK_PK;
  NV.ASSIGN NVI0.004 TO 2RWK_PK;
  NV.ASSIGN NVI0.005 TO 2BNWK_PK;
  NV.ASSIGN NVI0.006 TO 1WG_PK;
  NV.ASSIGN NVI0.007 TO 1WR_PK;

  NV.ASSIGN NVI0.010 TO 1EG_PK;
  NV.ASSIGN NVI0.011 TO 1ER_PK;
  NV.ASSIGN NVI0.012 TO 2WG_PK;
  NV.ASSIGN NVI0.013 TO 2WR_PK;
  NV.ASSIGN NVI0.014 TO 2EG_PK;
  NV.ASSIGN NVI0.015 TO 2ER_PK;
  NV.ASSIGN NVI0.016 TO 1TK_PK;
  NV.ASSIGN NVI0.017 TO 2TK_PK;

  NV.ASSIGN NVI0.020 TO 1WBK_PK;
  NV.ASSIGN NVI0.021 TO 1EBK_PK;
  NV.ASSIGN NVI0.022 TO 2WBK_PK;
  NV.ASSIGN NVI0.023 TO 2EBK_PK;
  NV.ASSIGN NVI0.024 TO TK1LK_PK;
  NV.ASSIGN NVI0.025 TO TK2LK_PK;
  NV.ASSIGN NVI0.026 TO 1TE_PK;
  NV.ASSIGN NVI0.027 TO 2TE_PK;

  NV.ASSIGN NVI0.030 TO SMK_PK;
  NV.ASSIGN NVI0.031 TO MCK_PK;
  NV.ASSIGN NVI0.032 TO MOK_PK;
  NV.ASSIGN NVI0.033 TO LOK_PK;
  NV.ASSIGN NVI0.034 TO POK_PK;

  NV.ASSIGN NVI0.037 TO CLCP_Link.Disable;

END LOGIC

END PROGRAM
```

Appendix I

Typical Genisys II
S2 Slave Protocol Application

```
/*
        Genisys II S2 Slave Protocol Test Application
*/

Genisys_II PROGRAM S2TEST;

INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:

                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:

                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;

    COMM

        LINK: S2_SLAVE
        ADJUSTABLE ENABLE: 1                    /* 0, 1
*/
        PROTOCOL: S2.SLAVE
        ADJUSTABLE PORT: 4;                     /* 1, 2, 3, 4
*/
        ADJUSTABLE BAUD: 1200;                  /* 150, 300, 600, 1200,
1800,*/
                                                /* 2400, 3600, 4800, 7200,
*/
                                                /* 9600, 19200
*/
        ADJUSTABLE KEY.ON.DELAY:  12;           /* 0 to 280 BIT TIMES
*/
        ADJUSTABLE KEY.OFF.DELAY: 12;           /* 0 to 280 BIT TIMES
*/
```

```
        ADJUSTABLE STALE.DATA.TIMEOUT: 300:SEC; /* 1 to 600 SEC
*/
        ADJUSTABLE POINT.POINT:   1;            /* 0, 1
*/
        ADJUSTABLE TRANSMITTER.INHIBIT: 25:MSEC;/* 5 to 50 MSEC
*/
        ADJUSTABLE FRAME.LENGTH: 32;            /* 32, 48, 64, 128
*/

        ADDRESS: 2

            ADJUSTABLE ENABLE: 1

            NV.OUTPUT:

                SO.00, SO.01, SO.02, SO.03,
                SO.04, SO.05, SO.06, SO.07,

                SO.10, SO.11, SO.12, SO.13,
                SO.14, SO.15, SO.16, SO.17,

                SO.20, SO.21, SO.22, SO.23,
                SO.24, SO.25, SO.26, SO.27,

                SO.30, SO.31, SO.32, SO.33,
                SO.34, SO.35, SO.36, SO.37;

            NV.INPUT:

                SI.00, SI.01, SI.02, SI.03,
                SI.04, SI.05, SI.06, SI.07,

                SI.10, SI.11, SI.12, SI.13,
                SI.14, SI.15, SI.16, SI.17,

                SI.20, SI.21, SI.22, SI.23,
                SI.24, SI.25, SI.26, SI.27,

                SI.30, SI.31, SI.32, SI.33,
                SI.34, SI.35, SI.36, SI.37;

        ADDRESS: 1

            ADJUSTABLE ENABLE: 1

            NV.OUTPUT:

                SO.40, SO.41, SO.42, SO.43,
                SO.44, SO.45, SO.46, SO.47,

                SO.50, SO.51, SO.52, SO.53,
                SO.54, SO.55, SO.56, SO.57,

                SO.60, SO.61, SO.62, SO.63,
```

```
                SO.64, SO.65, SO.66, SO.67,

                SO.70, SO.71, SO.72, SO.73,
                SO.74, SO.75, SO.76, SO.77;

            NV.INPUT:

                SI.40, SI.41, SI.42, SI.43,
                SI.44, SI.45, SI.46, SI.47,

                SI.50, SI.51, SI.52, SI.53,
                SI.54, SI.55, SI.56, SI.57,

                SI.60, SI.61, SI.62, SI.63,
                SI.64, SI.65, SI.66, SI.67,

                SI.70, SI.71, SI.72, SI.73,
                SI.74, SI.75, SI.76, SI.77;



CONFIGURATION

    SYSTEM

        ADJUSTABLE DEBUG_PORT_ADDRESS:      1;
        ADJUSTABLE DEBUG_PORT_BAUDRATE:     9600;
        LOGIC_TIMEOUT:                      500:MSEC;


LOGIC BEGIN

        NV.ASSIGN       NVI0.000                        TO      SO.00;
        NV.ASSIGN       NVI0.001                        TO      SO.01;
        NV.ASSIGN       NVI0.002                        TO      SO.02;
        NV.ASSIGN       NVI0.003                        TO      SO.03;
        NV.ASSIGN       NVI0.004                        TO      SO.04;
        NV.ASSIGN       NVI0.005                        TO      SO.05;
        NV.ASSIGN       NVI0.006                        TO      SO.06;
        NV.ASSIGN       NVI0.007                        TO      SO.07;

        NV.ASSIGN       NVI0.010                        TO      SO.10;
        NV.ASSIGN       NVI0.011                        TO      SO.11;
        NV.ASSIGN       NVI0.012                        TO      SO.12;
        NV.ASSIGN       NVI0.013                        TO      SO.13;
        NV.ASSIGN       NVI0.014                        TO      SO.14;
        NV.ASSIGN       NVI0.015                        TO      SO.15;
        NV.ASSIGN       NVI0.016                        TO      SO.16;
        NV.ASSIGN       NVI0.017                        TO      SO.17;

        NV.ASSIGN       NVI0.020                        TO      SO.20;
        NV.ASSIGN       NVI0.021                        TO      SO.21;
        NV.ASSIGN       NVI0.022                        TO      SO.22;
        NV.ASSIGN       NVI0.023                        TO      SO.23;
        NV.ASSIGN       NVI0.024                        TO      SO.24;
```

```
        NV.ASSIGN       NVI0.025                        TO      SO.25;
        NV.ASSIGN       NVI0.026                        TO      SO.26;
        NV.ASSIGN       NVI0.027                        TO      SO.27;

        NV.ASSIGN       NVI0.030                        TO      SO.30;
        NV.ASSIGN       NVI0.031                        TO      SO.31;
        NV.ASSIGN       NVI0.032                        TO      SO.32;
        NV.ASSIGN       NVI0.033                        TO      SO.33;
        NV.ASSIGN       NVI0.034                        TO      SO.34;
        NV.ASSIGN       NVI0.035                        TO      SO.35;
        NV.ASSIGN       NVI0.036                        TO      SO.36;
        NV.ASSIGN       NVI0.037                TO      S2_SLAVE.DISABLE;

        NV.ASSIGN       SI.00                           TO      NVO0.000;
        NV.ASSIGN       SI.01                           TO      NVO0.001;
        NV.ASSIGN       SI.02                           TO      NVO0.002;
        NV.ASSIGN       SI.03                           TO      NVO0.003;
        NV.ASSIGN       SI.04                           TO      NVO0.004;
        NV.ASSIGN       SI.05                           TO      NVO0.005;
        NV.ASSIGN       SI.06                           TO      NVO0.006;
        NV.ASSIGN       SI.07                           TO      NVO0.007;

        NV.ASSIGN       SI.10                           TO      NVO0.010;
        NV.ASSIGN       SI.11                           TO      NVO0.011;
        NV.ASSIGN       SI.12                           TO      NVO0.012;
        NV.ASSIGN       SI.13                           TO      NVO0.013;
        NV.ASSIGN       SI.14                           TO      NVO0.014;
        NV.ASSIGN       SI.15                           TO      NVO0.015;
        NV.ASSIGN       SI.16                           TO      NVO0.016;
        NV.ASSIGN       SI.17                           TO      NVO0.017;

        NV.ASSIGN       SI.20                           TO      NVO0.020;
        NV.ASSIGN       SI.21                           TO      NVO0.021;
        NV.ASSIGN       SI.22                           TO      NVO0.022;
        NV.ASSIGN       SI.23                           TO      NVO0.023;
        NV.ASSIGN       SI.24                           TO      NVO0.024;
        NV.ASSIGN       SI.25                           TO      NVO0.025;
        NV.ASSIGN       SI.26                           TO      NVO0.026;
        NV.ASSIGN       SI.27                           TO      NVO0.027;

        NV.ASSIGN       SI.30                           TO      NVO0.030;
        NV.ASSIGN       SI.31                           TO      NVO0.031;
        NV.ASSIGN       SI.32                           TO      NVO0.032;
        NV.ASSIGN       SI.33                           TO      NVO0.033;
        NV.ASSIGN       SI.34                           TO      NVO0.034;
        NV.ASSIGN       SI.35                           TO      NVO0.035;
        NV.ASSIGN       SI.36                           TO      NVO0.036;
        NV.ASSIGN       SI.37                           TO      NVO0.037;

END LOGIC

END PROGRAM
```

Appendix J

Typical Genisys II
DT-8 Slave Protocol Application

```
/*
        Genisys II DT-8 Slave Protocol Test Application
*/

Genisys_II PROGRAM DT8TEST;

INTERFACE

    LOCAL

        BOARD: NV_IN32_OUT32
        ADJUSTABLE ENABLE: 1
        TYPE: NV.IN32.OUT32

            NV.OUTPUT:

                NVO0.000, NVO0.001, NVO0.002, NVO0.003,
                NVO0.004, NVO0.005, NVO0.006, NVO0.007,
                NVO0.010, NVO0.011, NVO0.012, NVO0.013,
                NVO0.014, NVO0.015, NVO0.016, NVO0.017,
                NVO0.020, NVO0.021, NVO0.022, NVO0.023,
                NVO0.024, NVO0.025, NVO0.026, NVO0.027,
                NVO0.030, NVO0.031, NVO0.032, NVO0.033,
                NVO0.034, NVO0.035, NVO0.036, NVO0.037;

            NV.INPUT:

                NVI0.000, NVI0.001, NVI0.002, NVI0.003,
                NVI0.004, NVI0.005, NVI0.006, NVI0.007,
                NVI0.010, NVI0.011, NVI0.012, NVI0.013,
                NVI0.014, NVI0.015, NVI0.016, NVI0.017,
                NVI0.020, NVI0.021, NVI0.022, NVI0.023,
                NVI0.024, NVI0.025, NVI0.026, NVI0.027,
                NVI0.030, NVI0.031, NVI0.032, NVI0.033,
                NVI0.034, NVI0.035, NVI0.036, NVI0.037;

    COMM

        LINK: DT8_SLAVE
        ADJUSTABLE ENABLE: 1                    /* 0, 1                      */
        PROTOCOL: DT8.SLAVE
        ADJUSTABLE PORT: 3;                     /* 1, 2, 3, 4                */
        ADJUSTABLE STANDBY.PORT: 2;             /* 1, 2, 3, 4                */
        ADJUSTABLE BAUD: 9600;                  /* 150, 300, 600, 1200, 1800,*/
                                                /* 2400, 3600, 4800, 7200,   */
                                                /* 9600, 19200               */
        ADJUSTABLE STOPBITS: 1;                 /* 1, 2                      */
        ADJUSTABLE PARITY: NONE;                /* EVENT, ODD, NONE          */
        ADJUSTABLE KEY.ON.DELAY:  12;           /* 0 to 280 BIT TIMES        */
        ADJUSTABLE KEY.OFF.DELAY: 12;           /* 0 to 280 BIT TIMES        */
        ADJUSTABLE CARRIER.MODE: CONSTANT;      /* 0, 1                      */
        ADJUSTABLE SET.CLOCK.ENABLE: 1;         /* 0, 1                      */
        ADJUSTABLE STALE.DATA.TIMEOUT: 300:SEC; /* 1 to 600 SEC              */
        ADJUSTABLE POINT.POINT:   1;            /* 0, 1                      */
```

```
ADDRESS: 15

    ADJUSTABLE ENABLE: 1

    NV.OUTPUT:

        DT8O.00, DT8O.01, DT8O.02, DT8O.03,
        DT8O.04, DT8O.05, DT8O.06, DT8O.07,

        DT8O.10, DT8O.11, DT8O.12, DT8O.13,
        DT8O.14, DT8O.15, DT8O.16, DT8O.17,

        DT8O.20, DT8O.21, DT8O.22, DT8O.23,
        DT8O.24, DT8O.25, DT8O.26, DT8O.27,

        DT8O.30, DT8O.31, DT8O.32, DT8O.33,
        DT8O.34, DT8O.35, DT8O.36, DT8O.37;

    NV.INPUT:

        DT8I.00, DT8I.01, DT8I.02, DT8I.03,
        DT8I.04, DT8I.05, DT8I.06, DT8I.07,

        DT8I.10, DT8I.11, DT8I.12, DT8I.13,
        DT8I.14, DT8I.15, DT8I.16, DT8I.17,

        DT8I.20, DT8I.21, DT8I.22, DT8I.23,
        DT8I.24, DT8I.25, DT8I.26, DT8I.27,

        DT8I.30, DT8I.31, DT8I.32, DT8I.33,
        DT8I.34, DT8I.35, DT8I.36, DT8I.37;

ADDRESS: 18

    ADJUSTABLE ENABLE: 1

    NV.OUTPUT:

        DT8O.40, DT8O.41, DT8O.42, DT8O.43,
        DT8O.44, DT8O.45, DT8O.46, DT8O.47,

        DT8O.50, DT8O.51, DT8O.52, DT8O.53,
        DT8O.54, DT8O.55, DT8O.56, DT8O.57,

        DT8O.60, DT8O.61, DT8O.62, DT8O.63,
        DT8O.64, DT8O.65, DT8O.66, DT8O.67,

        DT8O.70, DT8O.71, DT8O.72, DT8O.73,
        DT8O.74, DT8O.75, DT8O.76, DT8O.77;

    NV.INPUT:

        DT8I.40, DT8I.41, DT8I.42, DT8I.43,
        DT8I.44, DT8I.45, DT8I.46, DT8I.47,
```

```
                DT8I.50, DT8I.51, DT8I.52, DT8I.53,
                DT8I.54, DT8I.55, DT8I.56, DT8I.57,

                DT8I.60, DT8I.61, DT8I.62, DT8I.63,
                DT8I.64, DT8I.65, DT8I.66, DT8I.67,

                DT8I.70, DT8I.71, DT8I.72, DT8I.73,
                DT8I.74, DT8I.75, DT8I.76, DT8I.77;


CONFIGURATION

    SYSTEM

        ADJUSTABLE DEBUG_PORT_ADDRESS:      1;
        ADJUSTABLE DEBUG_PORT_BAUDRATE:     9600;
        LOGIC_TIMEOUT:                      500: MSEC;


LOGIC BEGIN

        NV.ASSIGN       NVI0.000                        TO      DT8O.00;
        NV.ASSIGN       NVI0.001                        TO      DT8O.01;
        NV.ASSIGN       NVI0.002                        TO      DT8O.02;
        NV.ASSIGN       NVI0.003                        TO      DT8O.03;
        NV.ASSIGN       NVI0.004                        TO      DT8O.04;
        NV.ASSIGN       NVI0.005                        TO      DT8O.05;
        NV.ASSIGN       NVI0.006                        TO      DT8O.06;
        NV.ASSIGN       NVI0.007                        TO      DT8O.07;

        NV.ASSIGN       NVI0.010                        TO      DT8O.10;
        NV.ASSIGN       NVI0.011                        TO      DT8O.11;
        NV.ASSIGN       NVI0.012                        TO      DT8O.12;
        NV.ASSIGN       NVI0.013                        TO      DT8O.13;
        NV.ASSIGN       NVI0.014                        TO      DT8O.14;
        NV.ASSIGN       NVI0.015                        TO      DT8O.15;
        NV.ASSIGN       NVI0.016                        TO      DT8O.16;
        NV.ASSIGN       NVI0.017                        TO      DT8O.17;

        NV.ASSIGN       NVI0.020                        TO      DT8O.20;
        NV.ASSIGN       NVI0.021                        TO      DT8O.21;
        NV.ASSIGN       NVI0.022                        TO      DT8O.22;
        NV.ASSIGN       NVI0.023                        TO      DT8O.23;
        NV.ASSIGN       NVI0.024                        TO      DT8O.24;
        NV.ASSIGN       NVI0.025                        TO      DT8O.25;
        NV.ASSIGN       NVI0.026                        TO      DT8O.26;
        NV.ASSIGN       NVI0.027                        TO      DT8O.27;

        NV.ASSIGN       NVI0.030                        TO      DT8O.30;
        NV.ASSIGN       NVI0.031                        TO      DT8O.31;
        NV.ASSIGN       NVI0.032                        TO      DT8O.32;
        NV.ASSIGN       NVI0.033                        TO      DT8O.33;
        NV.ASSIGN       NVI0.034                        TO      DT8O.34;
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        NV.ASSIGN       NVI0.035                        TO      DT8O.35;
        NV.ASSIGN       NVI0.036                        TO      DT8O.36;
        NV.ASSIGN       NVI0.037                        TO      TSTAMP.REQ;

        NV.ASSIGN       DT8I.00                         TO      NVO0.000;
        NV.ASSIGN       DT8I.01                         TO      NVO0.001;
        NV.ASSIGN       DT8I.02                         TO      NVO0.002;
        NV.ASSIGN       DT8I.03                         TO      NVO0.003;
        NV.ASSIGN       DT8I.04                         TO      NVO0.004;
        NV.ASSIGN       DT8I.05                         TO      NVO0.005;
        NV.ASSIGN       DT8I.06                         TO      NVO0.006;
        NV.ASSIGN       DT8I.07                         TO      NVO0.007;

        NV.ASSIGN       DT8I.10                         TO      NVO0.010;
        NV.ASSIGN       DT8I.11                         TO      NVO0.011;
        NV.ASSIGN       DT8I.12                         TO      NVO0.012;
        NV.ASSIGN       DT8I.13                         TO      NVO0.013;
        NV.ASSIGN       DT8I.14                         TO      NVO0.014;
        NV.ASSIGN       DT8I.15                         TO      NVO0.015;
        NV.ASSIGN       DT8I.16                         TO      NVO0.016;
        NV.ASSIGN       DT8I.17                         TO      NVO0.017;

        NV.ASSIGN       DT8I.20                         TO      NVO0.020;
        NV.ASSIGN       DT8I.21                         TO      NVO0.021;
        NV.ASSIGN       DT8I.22                         TO      NVO0.022;
        NV.ASSIGN       DT8I.23                         TO      NVO0.023;
        NV.ASSIGN       DT8I.24                         TO      NVO0.024;
        NV.ASSIGN       DT8I.25                         TO      NVO0.025;
        NV.ASSIGN       DT8I.26                         TO      NVO0.026;
        NV.ASSIGN       DT8I.27                         TO      NVO0.027;

        NV.ASSIGN       DT8I.30                         TO      NVO0.030;
        NV.ASSIGN       DT8I.31                         TO      NVO0.031;
        NV.ASSIGN       DT8I.32                         TO      NVO0.032;
        NV.ASSIGN       DT8I.33                         TO      NVO0.033;
        NV.ASSIGN       DT8I.34                         TO      NVO0.034;
        NV.ASSIGN       DT8I.35                         TO      NVO0.035;
        NV.ASSIGN       DT8I.36                         TO      NVO0.036;
        NV.ASSIGN       DT8I.37                         TO      NVO0.037;

END LOGIC

END PROGRAM
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AnsaldoSTS

End of Manual