

Technical Bulletin # 970519

Date: June 1, 1999

Product: Message Centers

Product Category: Allen-Bradley® SLC-5/03 Connectivity

Subject: How to display text messages from an A-B SLC-5/03 PLC

This technical bulletin will show a way to connect your message center to an Allen-Bradley® SLC-5/03 PLC. This method uses A-B's RS-Logix 500® revision 2.10.12.0 to generate the ladder logic and employs text commands from the message center protocol. The message center will be sent a text string from an output file of the PLC using the AWT command. This text string will contain certain commands leading the actual message displayed and other commands lagging the message. These commands are from the message center communications protocol and control the message parameters.

SECTION I: Hardware Connections

Connect your SLC-5/03 PLC to the Message Center using the Channel 0 RS-232C jack on the face of the processor card. Use an adapter and straight through RS-232 cable as shown in diagram 1. You can also use RS-485 connectivity by employing the converter box as shown in diagram 2.

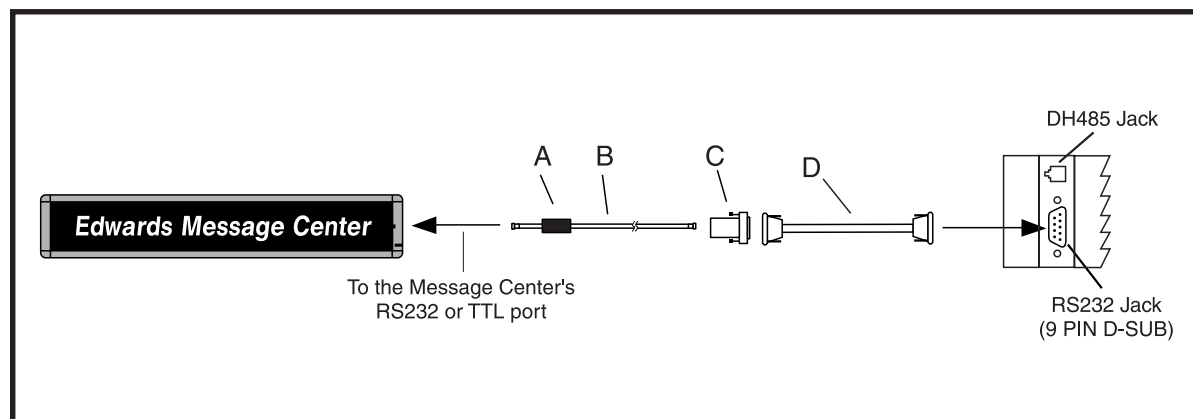


Diagram 1

Item	Cat. No.	Description
A	—	Ferrite (ferrite end towards sign)
B	MCN232-RJ11-25	25 foot, 6-conductor RS-232 cable
	MCN232-RJ11-50	50 foot, 6-conductor RS-232 cable
C	MCN2329FRJ11	9 Pin D-Sub/to 6 pos RJ11 adapter
D	MCN485CB232A9	10 foot 9 pin-to-9pin type A9 RS232 cable
NOTE: Set internal message center jumper to RS232		

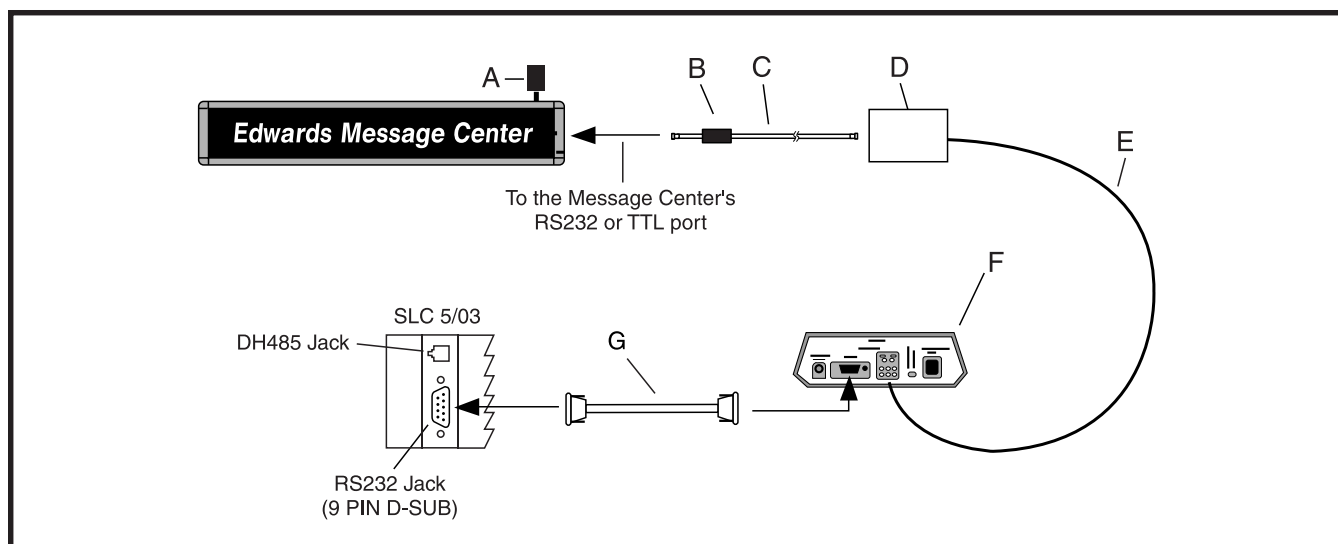


Diagram 2

Item	Cat. No.	Description
A	MCN485EOLTCB	EOL Termination
B	—	Ferrite (ferrite end towards sign)
C	MCN232-RJ11-8	8 foot, 4-conductor RS-485 cable
	MCN485-RJ11-1	1 foot, 4-conductor RS-485 cable
D	MCNMNARJ11485	Modular network adapter
E	MCN485-1000	1000 foot spool of RS485 cable
F	MCN485CB2EOLT	Converter box w/2 EOL terminators
G	MCN485CB232A9	10 foot 9 pin-to-9 pin type A9 RS232 cable

NOTE: Set internal message center jumper to RS485

SECTION II: Software Configuration

To configure the RS-Logix 500 software for communications with the Message Center, set the following under Project/Controller/Channel Configuration/Channel 0 User:

Mode: ASCII
 Baud: 9600
 Parity: None
 Stop Bits: 1
 Start Bits: 8

In addition, under Project/Controller/Channel Configuration/General, set the Channel 0 mode to User.

SECTION III: Message Center Setup

There are only a few things needed to set up the Message Center to receive text strings from the PLC. Set up the Message Center for the appropriate communications method RS-232 or RS-485 as shown in the installation manual for the message center. (Set the internal jumper to RS-232 or RS-485 position as needed). Next, Clear the sign's memory (See Section VI) and setup the desired serial address using the remote control.

SECTION IV: Format for the AWT Command:

Use the AWT instruction to write characters from a source string file to an external device. Example of Instruction (Parameters shown are examples only, your data will vary) follows:

Entering Parameters

Channel - is the number of the RS-232 port (must be 0)

Source - is the string element you want to write.

Control - is the area that stores the control register required to operate the instruction.

String Length - (.LEN) is the number of characters you want to write from the source string (0-82). If you enter a 0, the entire string will be written. This is Word 1 in the control block.

Characters Sent - (.POS) are the number of characters that the processor sent to the display area (0-82). This field is continuously updated during the execution of the instruction. This value can be greater than the string length if appended characters or inserted values are used. If the string length is greater than 82 the string written to the destination will be truncated to 82 characters. This is Word 2 in the control block.

Error - the hexadecimal error code that indicates why the ER bit was set in the control data file. Refer to ASCII Error Codes in RsLogix's help manual for an explanation of any displayed error code.

Command Operation

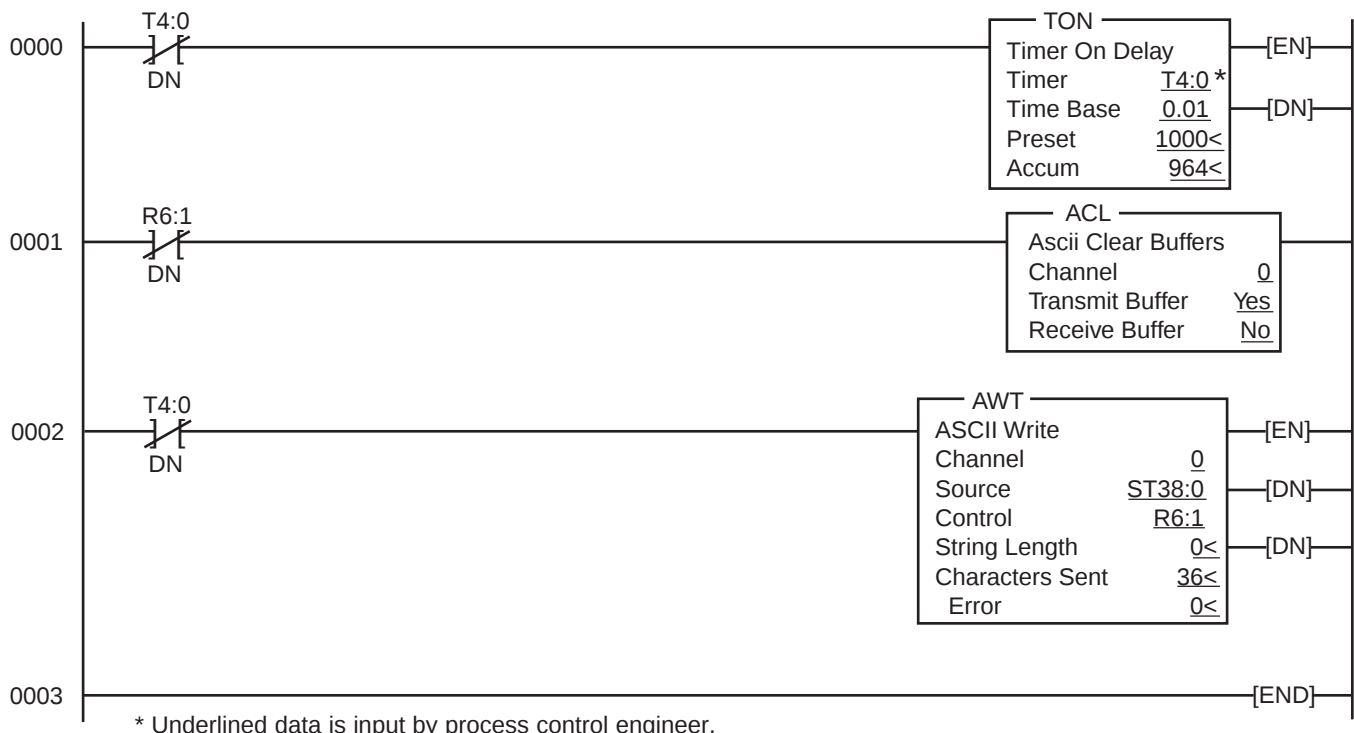
1. The AWT rung goes from false-to-true, setting the EN (Enable) bit.
2. The instruction is put in the ASCII queue, setting the EU (Queue) bit.
3. The instruction executes and the RN (Run) bit is set.
4. Forty characters are sent from the source string through channel 0.
5. The DN (Done) bit is set and a value of 40 is present in .POS word of the ASCII control block.
6. When the program scan finds the DN bit set, the processor sets the EM (Synchronous Done) bit.

Execution Errors

The ER (Error) bit is set during the execution of the instruction if the modem is disconnected (control line selection is other than NO HANDSHAKING), or the port is in System mode and is configured for DH485, or the UL (Unload) bit is set.

Sample Ladder Program

Below is a simple ladder program that sends a single text message to a Message Center. The timer T4, in this example, is used to repeat the transmission every 10 seconds. This would normally be replaced with an "examine input or bit" type command. For this example, the source string location is ST38 in element 0 (ST38:0). This is the location where the single text message is stored. Other source string locations can be used simultaneously for multiple message transmissions. For example, a ladder program may consist of multiple rungs, with each rung having its own "examine input" and "AWT" command. If any one of the rungs go true, the rung's AWT command would execute sending out the appropriate source string. For simplicity, the example shown here uses only one source string.



SECTION V: Text String Format Hardware Connections

An ASCII text message can be placed in a source file by going into the RSLogix 500 Data Files Folder and double clicking on the associated source file called out in the AWT command. A message can easily be constructed by typing directly in ASCII to the appropriate data source file. Listed below is a sample string that tells an Edward's Message Center to display the following text and format: **"Electrician and Supervisor please report to cell #3"** with Fill text, Red text color, normal font, in hold text mode. The sign's serial address in this example is 01.

Note - every message will have special preamble and trailing characters to denote the start and stop of a text message to the message center. Each message string should begin with five NUL (0h) characters for auto-baud detect of serial data sent to the message center. Messages should follow the text format outlined below:

<NUL><NUL><NUL><NUL><NUL><SOH>[Type Code][Serial Addr]<STX>[CMD Code][File Label][Control Characters][Data Field]<EOT>

Message example 1:

\00\00\00\00\00^AZ01^BAA\1B0b\1C1Electrician and Supervisor please report to cell #3^D

Where:

\00\00\00\00\00	Five consecutive <NUL> for sync & auto-baud detect of the message.
^A	<SOH> "Start of Header" character, 01h
Z	ASCII Type Code for All Message Centers in network
01	2 Byte ASCII-Hex Message Centers Address (see note 1)
^B	<STX> "Start of Text" character, 02h
A	Command code A, Write a TEXT File to the Message Centers
A	File Label A name
\1B	The <ESC> sequence character that denotes start of Special Modes
0	Display position. An ASCII Zero (30h) will fill all available lines, centering the lines vertically. (see note 2)
b	A control character that denotes holding the text in place
\1C1	A control character that tells the Message Centers to use Red text. (see note 3)
Electrician and Supervisor please report to cell #3	The text that will appear on the Message Centers
^D	The <EOT> end of transmission character, 04h. Must follow the end of every message string.

Notes:

- (1) This is a two byte ASCII to hexadecimal representation of serial address (00 to FF is the hex range) or 0 to 256 decimal. If 00 is used for serial address, then all signs on the network will respond to the string.
- (2) On one-line Message Centers, the display Position is irrelevant, but still must be included. The following ASCII characters can be used for display position:
 - 0 Fill the Message Center with all available lines centered vertically.
 - " " Start text in the middle of the Message Center.
 - " Start text on the top line.
 - & Start text on the bottom line
- (3) For Message Centers that support colors the following control characters can be used for text color: for red only message centers this code can be omitted.

\1C1	Red	\1C7	Orange
\1C2	Green	\1C8	Yellow
\1C3	Amber	\1C9	Rainbow 1
\1C4	Dim Red	\1CA	Rainbow 2
\1C5	Dim Green	\1CB	Color Mix
\1C6	Brown	\1CC	Auto-color
- (4) Other codes are available to change font size and are message center model dependent. See section VII.

SECTION VI: Sample Strings

Message Action	String Required
Flash Red Message	\00\00\00\00\00^AZ01^BAA\1B0c\1C1HARD HATS REQUIRED^D
Flash Green Message	\00\00\00\00\00^AZ01^BAA\1B0c\1C2HARD HATS REQUIRED^D
Steady Red Message	\00\00\00\00\00^AZ01^BAA\1B0b\1C1HARD HATS REQUIRED^D
Steady Green Message	\00\00\00\00\00^AZ01^BAA\1B0b\1C2HARD HATS REQUIRED^D

Notes:

1. In order for text “**hold**” or other features to properly work, Message Centers should have the “Auto-mode” disabled. This can be done one time, directly from the remote control, in “Program” mode, or can be sent serially via note 2 clear memory.
2. The serial string to clear memory is: \00\00\00\00\00^AZ01^BE\$AAU0100FD00^D This string sets the message centers's memory configuration for File Label A, Text File A, Unlocked, File Size 0100h (256 bytes), Start Time = FD (Run message All day), Stop Time = 00 and <EOT>

SECTION VII: Additional Support

For questions please call our tech support line 203-699-3300. Additional codes are available for controlling message center text strings in our Communications Protocol available from your local Edwards Signaling representative.

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