ADAPTIVE TechMemo #99-0005

PRIORITY:	Normal
DATE:	November 23, 1999
TITLE:	Using an Automation Direct PLC and EZ95 ASCII protocol to trigger messages to display on ALPHA signs
ECO REFERENCE:	None
PRODUCT(S) AFFECTED:	Standard Adaptive ALPHA signs
SUMMARY:	This document shows how to format the EZ95 ASCII protocol to display text messages on standard ALPHA signs. Using a hand-held Remote Control, messages are created, assigned a message number, and then stored in signs. The EZ95 ASCII protocol can be used to display these stored messages by using the message numbers.

1.Ø Related documentation

Part #	Title	Description
97Ø4-ØØØ2	ALPHA Remote Control Programming Manual	Describes how to create and store text messages on ALPHA signs.
97Ø8-8Ø46	Network Configurations	Describes how to network ALPHA signs.
97Ø8-8Ø61	ALPHA Sign Communications Protocol	Explains how to use the EZ95 communication protocol to transmit to ALPHA signs.

2.Ø Materials needed

Not all parts listed are required for all configurations. See Figure 1 on page 3, Figure 2 on page 4, and Figure 3 on page 4 for specific configurations.

Automation Direct part number	Adaptive part number	Description
DØ-Ø5DR		Automation Direct PLC
	Call Adaptive.	Standard ALPHA sign
	1Ø88-1111	Converter Box III
D2DSCBL		DB9-to-RS232 RJ11 cable (connects Automation Direct PLC to a PC)
	1Ø88-8626	RS485 cable (connects Converter Box III to an ALPHA sign)
	Call Adaptive.	RJ11 null modem cable (to connect the PLC to one sign) - or - Standard modem cable (to connect the PLC to Converter Box III for more than one sign)
	1Ø88-91Ø8	DB9-to-RJ11 RS232 adapter (to connect the PLC to Converter Box III for more than one sign)

Adaptive Micro Systems, Inc. • 7840 North 86th Street • Milwaukee, WI 53224 USA
414-357-2020 (phone) • 414-357-2029 (fax) • www.ams-i.com • techsupport@ams-i.com

3.Ø Create & store messages

A hand-held Remote Control is used to program the ALPHA sign to store messages for later use by the PLC. (For more information, see the **ALPHA Remote Control Programming Manual**, pn 97Ø4-ØØØ2.)

For example, let's say we want to display any of three different messages that are stored in files A, B, and C on an ALPHA sign. The message displayed is based on a "closed switch" input to the PLC. When a switch is closed, the associated message is displayed and remains until a different switch is closed.

PLC switch input	Message number	Example message text
XØ	A	Parts bin filled. Empty now!
X1	B	Safety gate open
X2	C	#8 tray empty

Using a hand-held Remote Control, program and store the messages above in the ALPHA sign, following these steps:

Message A

1. Press the **PROGRAM** button.
2. Press the **ADV** button.
3. Type: *Parts bin filled. Empty now!*
4. Press **RUN** twice.

Message B

5. Press the **PROGRAM** button.
6. Press the **SELECT** button.
7. Press **B**.
8. Press the **CURSOR** button until the sign's cursor is on the bottom line.
9. Type: *Safety gate open*
10. Press **RUN** twice.

Message C

11. Press the **PROGRAM** button.
12. Press the **SELECT** button.
13. Press **C**.
14. Press the **CURSOR** button until the sign's cursor is on the bottom line.
15. Type: *#8 Tray empty*
16. Press **RUN** twice.

4.Ø Set up the PLC

1. Connect an Automation Direct DØ-Ø5DR PLC to a computer as shown here.

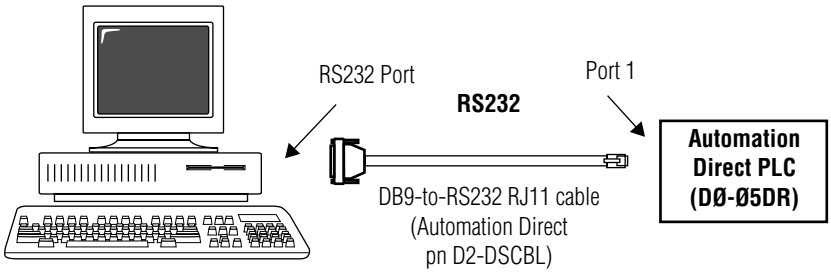


Figure 1: Connecting a computer to an Automation Direct PLC

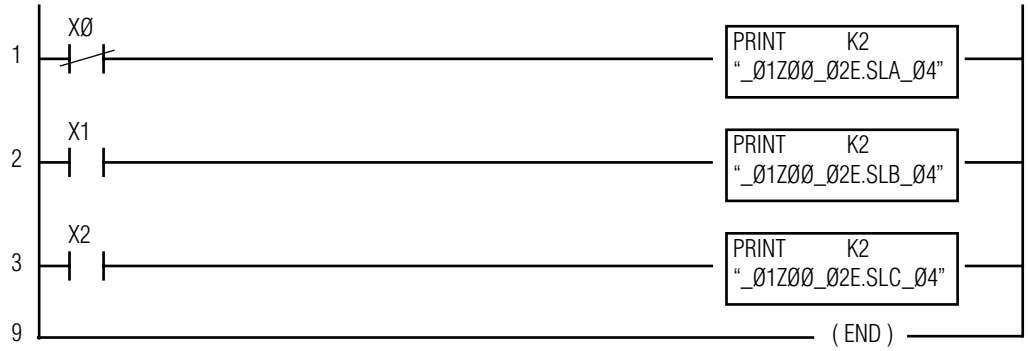
2. Using Automation DirectSOFT32, open a project (new or existing.)
3. Choose *PLC > Setup > Setup Sec. Comm Port…*
4. Set up Port 2 of the PLC to use one of the following communication formats for the sign.

   NOTE: Format 1 is recommended.

	Format 1	Format 2
Port	2	2
Protocol	Non-sequence	Non-sequence
Time-out	8ØØ ms	8ØØ ms
RTS on delay time	Ø ms	Ø ms
RTS off delay time	Ø ms	Ø ms
Data bits	8	7
Baud rate	96ØØ	96ØØ
Stop bits	1	2
Parity	None	Odd
Memory Address	TAØ	TAØ
XON/XOF flow control	Not checked	Not checked
RTS flow control	Not checked	Not checked

5. Set the ladder logic diagram:

   A message command to a sign can be inserted into a Print instruction by placing the command in quotation marks:



When a "closed switch" input is detected by the PLC, for example XØ above, it will enable the Print instruction, which will write the data (in quotations) to port 2 for the sign. For more information on the Print instruction, refer to "6.Ø Reference: EZ95 ASCII strings in the PLC Print statement" on page 5 or the Automation Direct programming manual.

5.Ø Connect the PLC to signs

Connect an Automation Direct PLC to ALPHA signs using one of the following two configurations.

5.1 PLC to *one* ALPHA sign

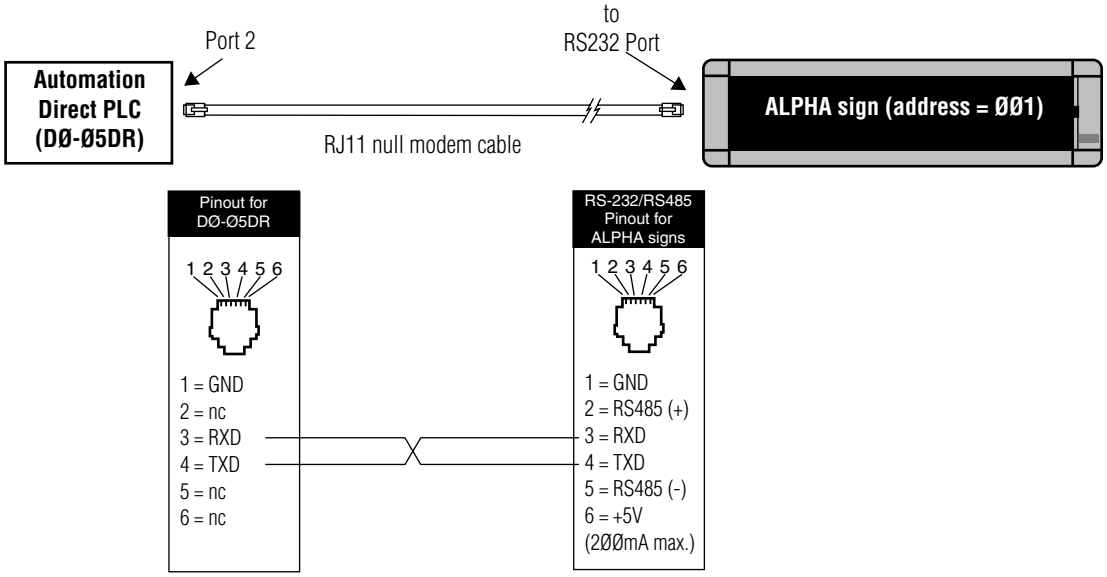


Figure 2: Connecting an Automation Direct PLC to *one* ALPHA sign using a null modem cable

5.2 PLC to *more than one* ALPHA sign

NOTE: For more information on networking multiple ALPHA signs, refer to the **Network Configurations** manual (pn 97Ø8-8Ø46.)

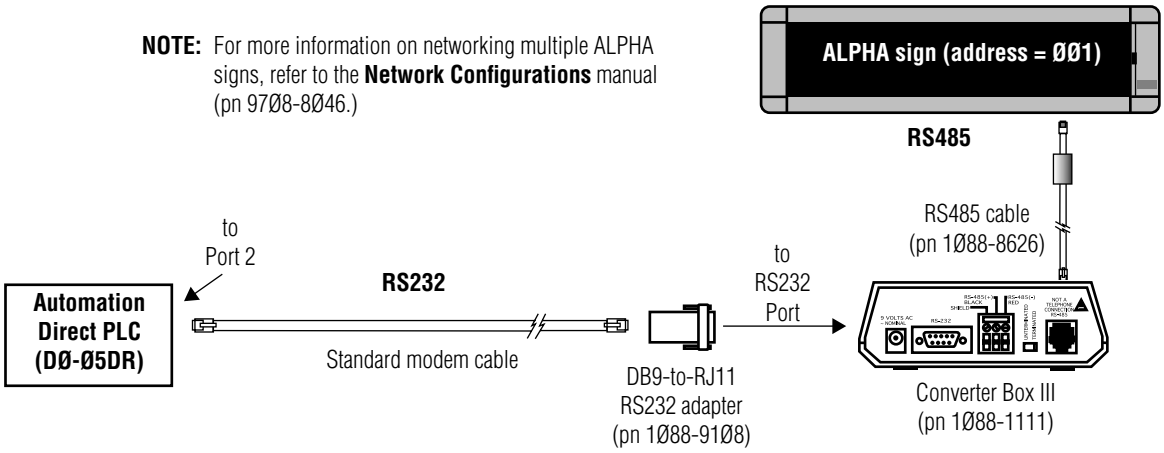


Figure 3: Connecting an Automation Direct PLC to *more than one* ALPHA sign using a standard modem cable

6.Ø Reference: EZ95 ASCII strings in the PLC Print statement

EZ95 ASCII strings can be formatted to act like switches that turn sign messages on and off. Shown below is a diagram with descriptions. The diagram illustrates the specific format for Message A shown in "3.Ø Create & store messages" on page 2.

NOTE: *A message's **letter**, not the actual message text itself, is used in an EZ95 ASCII string.*

NOTE: For more information, see **ALPHA Sign Communications Protocol,** pn 97Ø8-8Ø61.

In our example, we want to turn on message A. To do this, the EZ95 ASCII code string would look like the following:

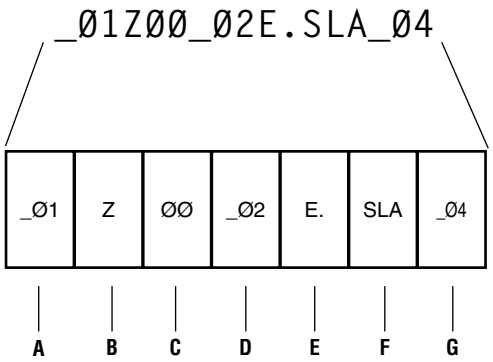


Figure 4: EZ95 ASCII code string to turn on Message A in the sign

Item	Name	Number of bytes	Data programmed in PLC	Data as seen by the sign	Description
A	Start of header delimiter	3	_Ø1	Ctrl A	Indicates the start of transmission.
B	Type Code	1	Z	Z	Indicates that this transmission is for all types of signs.
C	Sign Address	2	ØØ	ØØ	Value from ØØ to FFh which represents the address of an ALPHA sign. This address is used to identify a sign in a network of signs. When address ØØh is used, a message will be broadcast to *all* the signs on a network.
D	Start of Text	3	_Ø2	Ctrl B	Indicates the start of text.
E	Command Code	3	E.	E.	Command to the sign to set the sign's run sequence to that designated in Item F.
F	Lock, File Name	2 or more	SLA	SLA	"S" = Sets the Run Sequence as follows regardless of any file's run time. "L" = Lock the Run Sequence on the sign for the PLC's use only; makes the Run Sequence inaccessible from a Remote Control. "A" = Character of the file/message to be run in this Run Sequence. Substitute any other letter (upper or lower-case), character, or number on the Remote Control for messages as needed. Up to 128 files/messages can be in a Run Sequence.
I	End of Transmission	3	_Ø4	Ctrl D	Indicates the end of transmission.