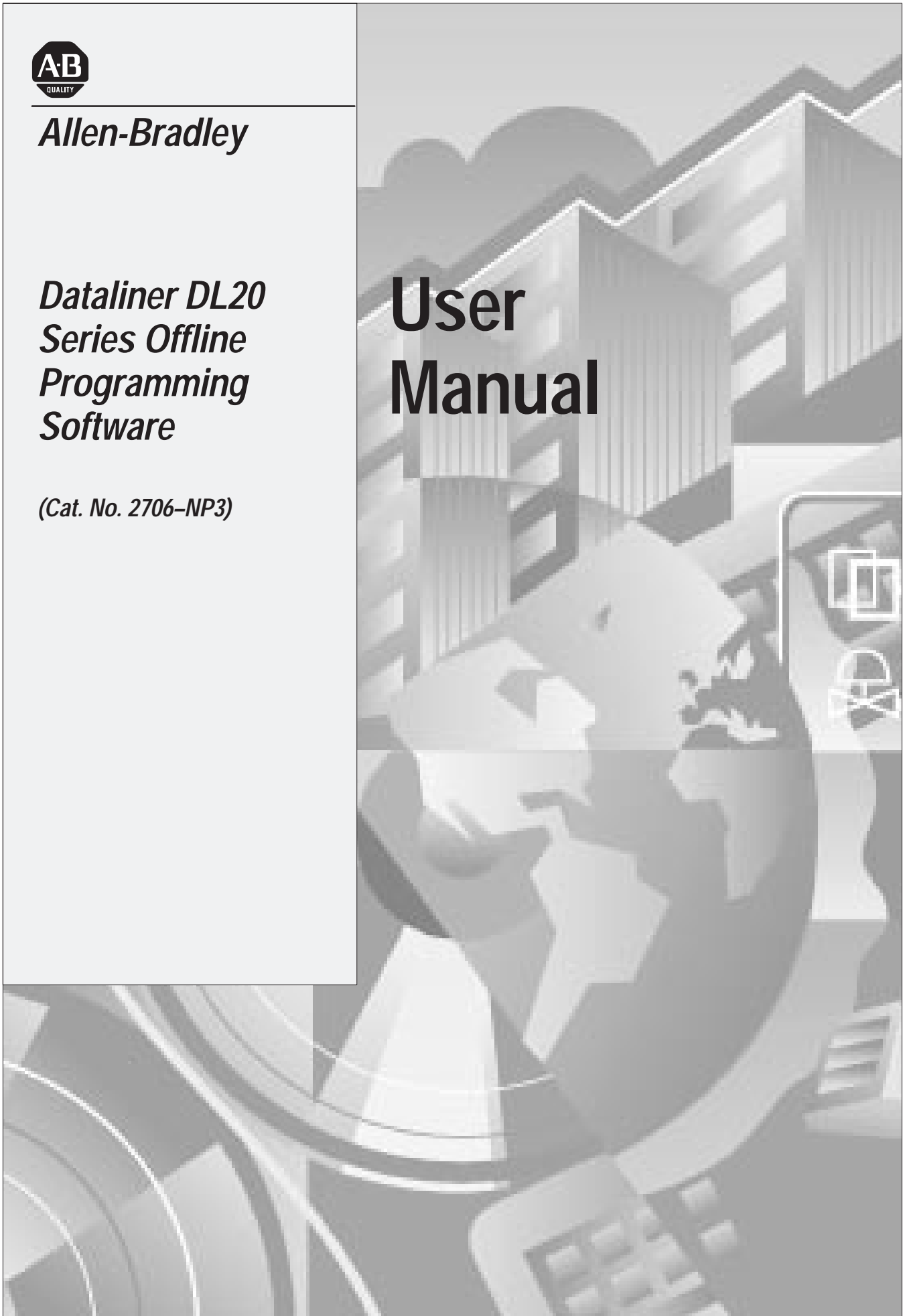**A·B** QUALITY

Allen-Bradley

Dataliner DL20 Series Offline Programming Software

(Cat. No. 2706–NP3)

User Manual

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this manual we use notes to make you aware of safety considerations:

> ⚠ **ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Attention statements help you to:
- identify a hazard
- avoid the hazard
- recognize the consequences

Important: Identifies information that is critical for successful application and understanding of the product.

Connection Diagrams

Appendix A

Using this Manual

Chapter Objectives

This chapter gives an overview of the manual, including:

- What you need to know
- Contents of manual
- Manual conventions
- Related publications

What You Need to Know

No special knowledge is required to read this manual or use the DL20 Offline Programming Software (Catalog No. 2706-NP3). However, you should be familiar with DL20 operations and how it will be integrated into your control system.

Contents of Manual

This manual describes how to use the DL20 Offline Programming Software to configure and create message files for the DL20 Dataliner Message Displays. The manual is organized as follows:

Chapter	Title	Purpose
1	Using this Manual	Provides an overview of the manual.
2	What You Need	Lists equipment needed to use the software and to transfer DL20 files between your computer and the DL20 or data recorder.
3	Installing the Software	Tells how to install the DL20 Offline Programming Software on your computer.
4	Configuration Functions	Shows how to configure the serial port of your computer, the serial and parallel port of the DL20, and special functions of the DL20.
5	Message Operations	Shows how to create, edit, copy and delete DL20 messages.
6	Message File Conversions	Tells how to convert DL20 message files to and from S Record files for downloading and storage.
7	Transferring S Record Files	Tells how to transfer S Record Files between your computer and a DL20 or data recorder.
8	Downloading Messages Files	Tells how to download DL20 message files from your computer to a DL20.
9	Using Terminal Mode	Explains how your computer can communi- cate with a DL20 in terminal/keyboard mode.
10	Printing Messages	Describes how to print DL20 messages files.

Conventions

The following conventions are used throughout this manual:

- Keys you press on your computer keyboard are enclosed in brackets [ ]. For example: [Esc] refers to the Escape key.

- [Enter] refers to the carriage return key on your computer keyboard. This key may appear on your keyboard as [Return] or [←].

- References to DL20 menu options and screens are *italicized*.

- Text you type at your keyboard appears in bold letters. For example: Type **1** and [Enter].

Related Publications

Other publications you may want to refer to include:

- **Publication No. 2706-801**
  User Manual for Series A - F DL20 Dataliner Message Displays
- **Publication No. 2706-814**
  User Manual for Series G DL20 Dataliner Message Displays
- **Publication No. 1770-6.5.4**
  User Manual for Data Cartridge Recorder

What You Need

Chapter Objectives

This chapter describes the items needed to run the DL20 Offline Programming Software including:

- Personal Computer Requirements
- DL20 Programming Software
- DL20 Dataliner Message Display
- Data Recorder
- Download Cable

Personal Computer Requirements
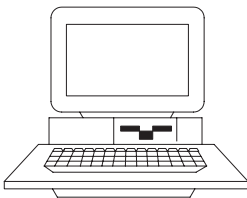
Personal Computer

The DL20 Programming Software runs on the following computers:

- IBM PC/XT/AT or 100% compatible
  Allen-Bradley T45 and T50 Industrial Computers
  Allen-Bradley 6120, 6121 and 6122 Industrial Computers
- One or two floppy drives (720K minimum)
- Hard drive is recommended and required on computers with only 1 floppy drive
- 448K of RAM
- DOS 3.0 or later
- Serial port on Com1 or Com 2
- Printer port to print messages
- Monochrome or color monitor

DL20 Programming Software
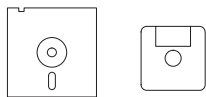
DL20 Software

The DL20 Offline Programming Software is an optional package used to create messages for the DL20 Dataliner Message Displays. You need version 4.2 or higher. The software is provided on 5 $\frac{1}{4}$ and 3 $\frac{1}{2}$ inch diskettes.

DL20 Dataliner Message Display

The DL20 Offline Programming Software creates configuration and message files for the following DL20 Dataliner Message Displays:

Description	8K Memory	16K Memory	31K Memory
	Catalog No.	Catalog No.	Catalog No.
One Line Display	2706-B13J8	2706-B13J16	2706-B13J31
Two Line Display	2706-B23J8	2706-B23J16	2706-B23J31
Four Line Display	–	2706-B43J16	2706-B43J31

Data Recorder

DL20 messages can be downloaded from your computer to a DL20 Dataliner or to one of the following Allen-Bradley Data Recorders:

- Catalog Number 1770-SA Data Recorder
- Catalog Number 1770-SB Data Recorder

Download Cables

To transfer messages between your computer and a DL20 or data recorder, or to communicate with a DL20 using terminal mode you need to use the appropriate cable. The table below lists the available cables.

Catalog No.	Description
2706-NC2	Connects the DL20 to an Allen-Bradley 6120, 1784-T45, IBM PC/XT or compatible computer with a 25-pin male connector on the serial port. Cable has spade lug connections for the RS-232 port of the DL20 and a 25-pin female D Connector for the computer's serial port.
2706-NC2 plus a 9-to-25 pin AT Adapter Cable①	Connects the DL20 to an Allen-Bradley 6121, 1784-T50, IBM PC/AT or compatible computer. The serial ports of these computers use a 9-pin male connector. Cable has spade lug connections for the RS-232 port of the DL20 and a 25-pin female D Connector. The AT Adapter Cable connects the 2706-NC2 cable to the 9-pin serial port of the computer.
2706-NC1	Connects the DL20 to an IBM compatible computer with a 25-pin female connector on the serial port. Typically, parallel ports and display ports have female connectors. Cable has spade lug connections for the RS-232 port of the DL20 and a 25-pin male D Connector for the computer's serial port (with pins 18 & 25 jumpered together).
1784-CYS	Connects the 1770-SA or -SB Data Recorder to the serial port of an Allen-Bradley 6120 computer.
1784-CAS	Connects the 1770-SA or -SB Data Recorder to an IBM AT 9-pin serial port.
1784-CXS	Connects the 1770-SA or -SB Data Recorder to the serial port of an IBM XT or Allen-Bradley 1784-T50 terminal.

① The 9-to-25 pin Adapter Cable is available at computer stores (must be Null Modem Cable).

Appendix A provides connection diagrams for the above cables if you want to make your own cables.

Installing the Software

Chapter Objectives

This chapter shows how to install the DL20 Offine Programming Software on your computer.

Checking Available RAM

You should have at least 448K of available RAM to run the DL20 Offline Programming Software on your computer. Check the available RAM on your computer using the DOS CHKDSK command.

Making a Copy of the Software

As a safety precaution, it is recommended that you make at least one copy of the DL20 Offline Programming Software and save the original disk as a master.

The 5 $\frac{1}{4}$ and 3 $\frac{1}{2}$ inch installation disks are shipped from Allen-Bradley with a write protect tab. You cannot write to the disk unless the write protect tab is removed. However, you can make copies without removing the tab.

Installing the DL20 Programming Software

This section shows how to install the DL20 Programming Software on:

- Computer with 1 Hard drive and 1 Floppy or Micro disk drive
- Computer with 2 Floppy or Micro disk drives
- Computer with 1 Floppy or Micro disk drive

Refer to the appropriate section.

The software is provided on 5 $\frac{1}{4}$ and 3 $\frac{1}{2}$ inch disks. Use the size appropriate for your computer.

Installing the DL20 Programming Software

Computer with 1 Hard and 1 Floppy or Micro Disk Drive

This section shows how to install the DL20 Offline Programming Software on a personal computer with 1 hard drive and 1 floppy or micro disk drive.

The installation procedure creates a DL20 subdirectory for storing the programming software (DL20.EXE) and all other DL20 files created with the software.

The prompts and responses you see below will be identical or similar to what you see on your computer display.

1. Turn on your computer. Your computer will display the currently active drive: A, B or C. For example:

   C:>

2. Create a DL20 subdirectory on your hard drive using the MD command.

   C:> **MD \DL20** [Enter]

   C:>

3. Move to the new DL20 subdirectory using the CD command.

   C:> **CD \DL20** [Enter]

   C:\DL20>

4. Insert the appropriate installation disk for the DL20 Offline Programming Software into the floppy drive.

5. Type the following command line to copy the DL20 Programming Software into the DL20 subdirectory.

   C:\DL20> **COPY A:DL20.EXE** [Enter]
                    1 file(s) copied

   The DL20 Programming Software is now installed on your hard drive.

6. Remove the installation disk from the floppy drive and store it in a safe place.

See page 3–5 for details on initial startup.

Computer with 2 Floppy or Micro Disk Drives

This section shows how to install the DL20 Offline Programming Software on a personal computer with 2 (720K) floppy or micro disk drives.

The installation procedure creates a System/DL20 disk which lets you run the software and store messages in a DL20 subdirectory. You can create a separate formatted disk for storing DL20 files in an S Record file format.

The prompts and responses you see below will be identical or similar to what you see on your computer display.

> ⚠ **ATTENTION:** Before beginning the procedure, write protect your DOS disk using a write protect tab. See your computer's DOS manual.

The steps below create a single System/DL20 disk that you can use to boot your computer and run the DL20 software.

1. Insert your computer's DOS write protected disk into drive A and turn on the computer. Enter date and time if applicable.

2. Insert a blank disk into drive B.

3. Format and create a system disk using the following command:

   A:> **Format B:/S** [Enter]

   When the disk is formatted, this prompt appears. Type **N** and [Enter].

   B:> Format Another (Y/N)? **N** [Enter]

4. Remove the DOS disk from drive A and store in a safe place.

5. Insert the DL20 installation disk into drive A and type:

   A:> **COPY DL20.EXE B:** [Enter]
           1 file(s) copied

   The DL20 Programming Software is now installed on the disk in drive B.

6. Remove the DL20 installation disk from drive A and store in a safe place.

7. Move the System/DL20 disk from drive B to drive A.

8. Create a DL20 subdirectory on the System/DL20 disk by entering:

   A:> **MD \DL20** [Enter]

   Operating in a subdirectory allows you to create approximately 100 DL20 messages.

Installing the DL20 Programming Software

Computer with 2 Floppy or Micro Disk Drives (continued)

9. Create an AUTOEXEC.BAT file on the System/DL20 disk by typing:

   A:> **COPY CON AUTOEXEC.BAT** [Enter]
   PROMPT PG [Enter]
   CD\DL20 [Enter]
   A:\DL20 [Enter]
   [Ctrl][Z] [Enter]

10. When the file is copied, turn your computer off and on with the System/DL20 disk in drive A. The DL20 Offline Programming Software will automatically begin.

See page 3–5 for details on initial startup.

Computer with 1 Floppy or Micro Disk Drive

This section shows how to run the DL20 Offline Programming Software on a computer with only 1 floppy or micro disk drive. We recommend that you create a separate disk for storing separate S Record files for each DL20 Dataliner you program.

Important: Storing files on the DL20 Offline Programmer disk restricts the number of files you can create.

The prompts and responses you see below will be identical or similar to what you see on your computer display.

> ⚠ **ATTENTION:** Before beginning the procedure, write protect your DOS disk using a write protect tab. See your computer's DOS manual.

1. Insert your computer's DOS write protected disk into the disk drive and turn on the computer.   You should see the A:> prompt.

2. Remove the DOS disk from the drive and store in a safe place.

3. Insert the DL20 Offline Programming Software disk in the drive.

4. Start the DL20 software by entering:

   A:> **DL20** [Enter]

5. Before you start using the software, remove the DL20 disk from the drive and insert a formatted storage disk. Any DL20 file created while running the software will be stored on this storage disk.

See page 3–5 for details on initial startup.

Initial Startup

The steps below show how to start the The DL20 Offline Programmer on a computer with a hard drive. Other systems may require different steps as described in the installation section.

1. Move to the DL20 subdirectory if necessary.

   C:\> **CD DL20** [Enter]
   C:\DL20>

2. Type **DL20** and press [Enter] to start the DL20 Offline Programmer.

   C:\DL20> **DL20** [Enter]

   Each time you enter the programmer, this screen appears.

```
                    DL20 OFF-LINE PROGRAMMER
                        Bulletin 2706-NP3
                 Copyright 1989, 1992 Allen-Bradley Co.
                       VERSION  4.2  12/2/92



      Select type of monitor:

          1 - Monochrome
          2 - Color

      Enter Selection (1 - 2): ▮
```

3. Select the type of monitor you are using by entering **1** or **2** and [Enter].

   The *Main Menu* appears.

```
          Allen-Bradley DL20 Off-Line Programmer

                         MAIN MENU

       1 - Set Up Computer Serial Port
       2 - Terminal/Keyboard (2706-NK1) Mode
       3 - Set Up DL20 Serial Port
       4 - Set Up DL20 Parallel Port
       5 - Set Up DL20 Special Functions
       6 - Edit/Create Messages (Message Files)
       7 - S Record/Message File Conversion Functions
       8 - S Record/Message File Upload(Read)/Download(Write)
       9 - Message File Download
      10 - Print Messages (Message Files)
      11 - Delete All Message Files
      12 - Exit to DOS




              Enter Selection (1 - 12): ▮
```

All menu functions are described in the remaining chapters of this manual.

Exiting the DL20 Software

To exit the DL20 Software and return to DOS, select option *12 - Exit to Dos* from the *Main Menu* and press [Enter].

Function Keys

The DL20 Offline Programmer uses the same keys for most screen operations. These keys and their functions are listed below. Keys that are specific to an operation are noted when the operation is described.

Use This Key:	To:
[Enter] or [Return] or [↵]	Accept a value in a field and move to the next field.
[↑][↓]	Move forward or backward through fields.
[Esc]	Cancels the current operation and returns to the Main Menu.
[End]	Saves settings entered on a screen and in most cases returns you to the Main Menu.
[←]	Moves cursor back one character and erases character.
[0] - [9]	Enters a number into a numeric data entry field.
[A] - [Z] [a] - [z]	Enters a letter into an alphanumeric data entry field.

DL20 Files

The DL20 creates a number of files during configuration and message operations. The table below lists the files and their functions. These files are transmitted to the DL20 during the download process.

File Name	Description
MSG####.DAT	Contains a single DL20 Message. The #### characters represent a message number from 0001 to 1022.
MSG####.OLD	Contains the old or previous version of a DL20 Message. When a message is edited, the software automatically saves the new file with a .DAT extension and the old version with the .OLD extension. The filename (#### is the same for the new and old version). The #### characters represent a message number from 0001 to 1022.
CONFIG.DAT	Stores DL20 configuration parameters including the DL20 type (# of lines) and memory size.
DL20BAUD.OLP	Stores baud rate and serial port setting your computer uses to communicate with a DL20 or data recorder.
IOFILE.DAT	Stores settings for the serial port of the DL20.
PIOFILE.DAT	Stores settings for the parallel port of the DL20.
MSTRFILE.DAT	Stores special function settings for the DL20.
SRECNAME.DAT	Stores the name of an S Record file associated with DL20 messages.

Configuration Functions

Chapter Objectives

This chapter shows how to use the DL20 Offline Programmer to configure:

- Serial communication port of your computer
- Serial port of the DL20
- Parallel port of the DL20
- Special functions of the DL20

What are the Configuration Functions?

The *Main Menu* has one function that configures the serial port of your computer and three functions that configure the DL20 ports and DL20 special functions.

```
        Allen-Bradley DL20 Off-Line Programmer

                    MAIN MENU

    ►1 - Set Up Computer Serial Port
     2 - Terminal/Keyboard (2706-NK1) Mode
    ►3 - Set Up DL20 Serial Port
    ►4 - Set Up DL20 Parallel Port
    ►5 - Set Up DL20 Special Functions
     6 - Edit/Create Messages (Message Files)
     7 - S Record/Message File Conversion Functions
     8 - S Record/Message File Upload(Read)/Download(Write)
     9 - Message File Download
    10 - Print Messages (Message Files)
    11 - Delete All Message Files
    12 - Exit to DOS




            Enter Selection (1 - 12): 0
```

Functions 3, 4 and 5 create the following files which are downloaded with messages to the DL20:

3 – Set Up DL20 Serial Port	Creates IOFILE.DAT
4 – Set Up DL20 Parallel Port	Creates PIOFILE.DAT
5 – Set Up DL20 Special Functions	Creates MSTRFILE.DAT

The files are stored on disk or in the DL20 subdirectory. You are not allowed to download messages to the DL20 without these files.

Each configuration function is described in the sections that follow.

Configuring the Computer Serial Port

Menu option *1 - Set Up Computer Serial Port* sets the baud rate and communication port your computer uses to communicate with a DL20 or data recorder. These settings are stored in the file DL20BAUD.OLP on disk or in the DL20 subdirectory and used when messages are transferred between your computer and a DL20 or data recorder.

To configure the serial port of your computer:

1. Type **1** and press [Enter] to select *1 – Set Up Computer Serial Port* from the *Main Menu*.

   This screen appears.

To accept the default values press [End] to save settings and return to Main Menu.

```
NOTE:   Reading the DL20 memory onto floppy disk may not work at
        9600 baud.  If not, use a hard disk, RAM disk, or a slower
        baud rate.  Writing to the DL20 memory and the Terminal Mode
        should work at all baud rates with all types of disks.  See
        the User's Manual for details.

                    BAUD RATE SELECTION

                    1 - 300  Baud
                    2 - 1200 Baud
                    3 - 9600 Baud

            Enter Selection (1 - 3): 1

                    PORT SELECTION

                    1 - Com1 Port
                    2 - Com2 Port

            Enter Selection (1 - 2): 1
```

2. Set the baud rate at which your computer will communicate with the serial port of the DL20. The options are 300, 1200 and 9600. The initial default is 300. Type **1**, **2** or **3** and press [Enter].

   Note: The serial port of the DL20 must be set to the same baud rate. See the DL20 User Manual for details on how to do this.

3. Select the serial port on your computer that will connect to the DL20. The options are Com1 or Com2. The initial default is Com1. Type **1** or **2** and press [Enter].

   You return to the *Main Menu*.

Configuring the DL20 Serial Port

Menu option *3 - Set Up DL20 Serial Port* sets parameters for the serial port of the DL20. These settings are stored in the file IOFILE.DAT on your work disk or DL20 subdirectory and transmitted to the DL20 at download.

To configure the serial port of the DL20 Display:

1. Type **3** and press [Enter] to select *3 - Set Up DL20 Serial Port* from the *Main Menu.*

   The following screen appears.

```
                    Set Up DL20 Serial Port Functions

    Enter Number Of Nulls (000-250)  4
    Enter Carriage Width (020-220)   80
    Enter Baud Rate (03,12,96)        3

    Set Parity? N    Odd Parity? N    Even Parity? N

    Use RS-422 In? N
    Print Blank Line Between Messages? N






    PRESS END TO SAVE FILE TO DISK.
    Press ESC to return to Main Menu without saving this file.
```

To accept the default values press [End] to save settings and return to Main Menu.

2. Specify the number of nulls to send to the printer after each line of text. Valid values are 000 through 250. The default is 4. Press [Enter] to accept the default or type another value and press [Enter].

3. Specify the carriage width or number of columns for printing. Valid values range from 020 through 220 columns. The default is 80. Press [Enter] to accept the default or type another value and press [Enter].

4. Specify the baud rate for the serial port of the DL20. Valid baud rates are 300, 1200 and 9600 (03 = 300, 12 = 1200, 96 = 9600). Press [Enter] to accept the default of 300 or type another baud rate and press [Enter].

   Important: The baud rate you enter does not take effect until settings are downloaded to the DL20 and the DL20 is reset.

Configuring the DL20 Serial Port

5. Specify the parity for the serial port of the DL20. The options are None, Odd, or Even. The default is None or No Parity.

The examples below show the correct settings for each option.

None	Set Parity? N	Odd Parity? N	Even Parity? N	Set Parity to N.
Odd	Set Parity? Y	Odd Parity? Y	Even Parity? N	Set Parity to Y. Odd Parity is set to Y. Even Parity is set to N.
Even	Set Parity? Y	Odd Parity? N	Even Parity? Y	Set Parity to Y. Set Odd Parity to N. Even Parity is set to Y.

6. Set the RS-422 port direction. The default is RS-422 output. Press [Enter] to accept the default. Type **Y** and press [Enter] to use the RS-422 port as an input port.

7. Specify whether to print a blank line between messages. The default is N. Press [Enter] to accept the default. Type **Y** and [Enter] to print blank lines between messages.

8. Press [End] to save the DL20 serial port settings to the IOFILE.DAT file. and return to the *Main Menu*.

Press [Esc] to quit and return to the *Main Menu* without saving changes.

For more information on the serial port settings of the DL20, refer to the DL20 User Manual.

Configuring the DL20 Parallel Port

Menu option *4 - Set Up DL20 Parallel Port* sets parameters for the parallel port of the DL20. The settings are stored in the file PIOFILE.DAT in the DL20 directory and transmitted to the DL20 at download.

To configure the parallel port of the DL20 Display:

1. Type **4** and press [Enter] to select *4 - Set Up DL20 Parallel Port* from the *Main Menu*.

   The following screen appears.

```
                    Set Up DL20 Parallel Port Functions

     High True Logic? Y
     Binary Message Data? Y
     Binary Variable Data? Y

     Time Driven Sampling? Y     AC Input? N
                                 Scan Rate (004 - 255)  28
                                 Debounce Time (001 - 255)   2








     PRESS END TO SAVE FILE TO DISK.
     Press ESC to return to Main Menu without saving this file.
```

To accept the default values press [End] to save settings and return to Main Menu.

2. Specify whether the parallel port will use high true logic or low true logic input levels. The default is high true logic. Press [Enter] to accept the default. Type **N** and [Enter] to use low true logic.

3. Specify whether message triggers use binary or BCD format. The default is binary message data. Press [Enter] to accept the default. To use BCD format, type **N** and [Enter].

4. Specify whether variable data uses binary or BCD format. The default is binary variable data. Press [Enter] to accept the default. To use BCD variable data, type **N** and [Enter].

5. Specify whether the parallel port uses Time Driven or Event Driven Sampling. To accept the default of Time Driven Sampling, press [Enter] and skip to Step 9.

   Note: Time Driven Sampling is recommended for use with Allen-Bradley programmable controllers.

   To specify Event Driven Sampling, type **N** and press [Enter].

Configuring the DL20 Parallel Port

6. If Event Driven Sampling was selected in Step 5, the following screen appears with the *Use High to Low* field highlighted.

```
                    Set Up DL20 Parallel Port Functions

    High True Logic? Y
    Binary Message Data? Y
    Binary Variable Data? Y

    Time Driven Sampling? N



    Use High to Low? █




    PRESS END TO SAVE FILE TO DISK.
    Press ESC to return to Main Menu without saving this file.
```

7. Specify whether Event Driven Sampling will use high-to-low or low-to-high transition. The default is low-to-high. To accept the default, press [Enter]. To select high-to-low transition, type **Y** and [Enter].

Ignore steps 9 – 12. They apply only to Time Driven Sampling.

8. Press [End] to save the DL20 parallel port settings to PIOFILE.DAT and return to the *Main Menu*.

    Press [Esc] to quit and return to the *Main Menu* without saving changes.

9. Specify whether Time Driven Sampling will use AC or DC inputs. The default is N which means to use DC inputs. Select DC inputs if using the Catalog No. 2706-NG1 or -NG2 Input Converter (Series C). Press [Enter] to accept the default.

    Select AC Inputs if using the Catalog No. 2706-NG1 or -NG2 Input Converter (Series A or B). To select AC inputs, type **Y** and press [Enter].

10. Specify the Scan Rate for Time Driven Sampling. Valid scan rates for DC inputs range from 4 – 255. Valid scan rates for AC Inputs are 28 - 255.   The default scan rate is 28. To accept the default, press [Enter]. Otherwise type another value and press [Enter].

If you selected AC inputs in Step 9, skip to Step 12.

11. Specify the debounce time for DC inputs. Valid time values range from 1 - 255 which correspond to real times of 1.95 milliseconds through 500 milliseconds. The default debounce value is 2. Press [Enter] to accept the default. Otherwise, type another value and press [Enter].

12. Press [End] to save the DL20 parallel port settings to PIOFILE.DAT You then return to the *Main Menu*.

    Press [Esc] to quit and return to the *Main Menu* without saving changes.

For more information on the parallel port settings of the DL20, refer to the DL20 User Manual.

Configuring Special Functions of DL20

Menu option *5 - Set Up DL20 Special Functions* lets you:

• Specify an Autorun Message number.

• Specify a Background Message number.

• Specify a Master Address (for serial message triggering only).

• Enable/Disable Dynamic Message Chaining.

• Enable/Disable DL20 relay when batteries are detected as low.

• Enable/Disable the display of certain error messages.

Special Function settings are saved to the file MSTRFILE.DAT on disk or the DL20 subdirectory. This file is transmitted to the DL20 at download.

For a complete description of DL20 Special Functions, refer to the DL20 User Manual.

To configure special functions for the DL20 Display:

1. Type **5** and press [Enter] to select *5 - Set Up DL20 Special Functions* from the *Main Menu.*

   The following screen appears.

```
                     Set Up Master Special Functions

    Enter Autorun Message Number (0000-1022)     0
    Enter Background Message Number (0000-1022)     0


    Set Master Address? N
    Dynamic Chaining? N
    Enable Relay On Battery Low Detection? N

    Flag Errors? N



    Note: Invalid Master Addresses are 4,6,7,13,16,18,20,22,43,45, and 48-57.
          Master Address is only used for serial communications.


    PRESS END TO SAVE FILE TO DISK.
    Press ESC to return to Main Menu without saving this file.
```

To accept the default values press [End] to save settings and return to Main Menu.

2. Enter a number to assign as the Autorun Message. Valid message numbers range from 0 to 1022. The default is 0, which means there is no autorun message. Press [Enter] to accept the default or type another number and press [Enter].

3. Enter a number to assign as the Background Message. Valid message numbers range from 0 to 1022. The default is 0, which means there is no background message. Press [Enter] to accept the default or type another number and press [Enter].

Configuring Special Functions of DL20

4. Specify whether you want to enter a Master Address for triggering messages. Valid responses are Y or N. The default is N which means a master address is not set. To accept the default, press [Enter].

   To specify a master address, type **Y** and [Enter]. This prompt appears:

   ### Master Address Number (000-127)

   Press [Enter] to accept the default address of 0 or type another address in the range of 0 - 127 and press [Enter]. Invalid master address values are listed on the screen.

5. Specify whether you want to enable Dynamic Message Chaining. Valid responses are Y or N. The default of N disables dynamic message chaining. To accept the default, press [Enter]. To enable dynamic message chaining, type **Y** and [Enter].

6. Specify whether you want to enable a relay when the DL20 detects that the lithium batteries are low. Valid responses are Y or N. The default of N disables this function. To accept the default, press [Enter]. To enable a relay, type **Y** and [Enter].

7. Specify whether you want to flag errors that are illegal message triggers (invalid triggers for non-existent messages) or invalid variable triggers for illegal numbers. Valid responses are Y or N. The default of N does not flag errors. To accept the default, press [Enter].   To flag errors, type **Y** and [Enter].

8. Press [End] to save the special function settings to MSTRFILE.DAT and return to the *Main Menu.*

   Press [Esc] to quit and return to the *Main Menu* without saving changes.

Message Operations

Chapter Objectives

This chapter shows how to use the DL20 Offline Programmer to:

- Create new messages
- Edit existing messages
- Delete messages
- Copy messages

How Messages are Stored

Messages created using the DL20 Offline Programmer are stored on disk or in the DL20 subdirectory. Each message is stored in a separate file with the name MSG####.DAT. The #### characters represent a message number from 1 to 1022. For example:

MSG0001.DAT	Message 1
MSG0002.DAT	Message 2
MSG0003.DAT	Message 3
.	
.	
.	
MSG1021.DAT	Message 1021
MSG1022.DAT	Message 1022

Note: The first sixteen messages (1 – 16) store special DL20 messages.

When you edit and save an existing message, the original version of the message is retained with the same file name but the .OLD extension. For example, if you edit Message 20, the following two files reside on disk:

MSG0020.DAT	new, edited file
MSG0020.OLD	old, original file

If you prefer the old version of the message, delete the new message and rename the old version. For example, to delete the edited version of Message 20 and retain the original version, type the commands below at DOS level.

C:\DL20>**ERASE MSG0020.DAT** [Enter]
C:\DL20>**RENAME MSG0020.OLD MSG0020.DAT** [Enter]

**Creating
New Messages**

Menu option *6 - Edit/Create Messages* lets you create new messages and edit existing messages. This section shows how to create new messages.

```
          Allen-Bradley DL20 Off-Line Programmer

                       MAIN MENU

       1 - Set Up Computer Serial Port
       2 - Terminal/Keyboard (2706-NK1) Mode
       3 - Set Up DL20 Serial Port
       4 - Set Up DL20 Parallel Port
       5 - Set Up DL20 Special Functions
    ►  6 - Edit/Create Messages (Message Files)
       7 - S Record/Message File Conversion Functions
       8 - S Record/Message File Upload(Read)/Download(Write)
       9 - Message File Download
      10 - Print Messages (Message Files)
      11 - Delete All Message Files
      12 - Exit to DOS




              Enter Selection (1 - 12): 0
```

Before creating messages for the DL20, you must specify the type of DL20 you are using and its memory size. This information is stored in the CONFIG.DAT file on disk.

To create a new DL20 message:

1. Type **6** and press [Enter] to select *6 - Edit/Create Messages (Message Files)* from the *Main Menu*.

   The first time you select this option, the following screen appears. It prompts you for a disk name, the type of DL20 you are using and its memory size.

```
              'CONFIG.DAT' FILE DOES NOT EXIST.



Enter the name to associate with the disk        :          :

How many lines does this DL20 have (1, 2 or 4)    :1:

What is this DL20's memory size (8K, 16K or 31K) : 8:
        (4-Line DL20 memory size 16K or 31K)



   Press the END key to save data to the file 'CONFIG.DAT'
```

2. Type a 1 to 16 character name to identify the disk or DL20 you are programming and press [Enter].   You must enter a name in this field.

   You can enter any ASCII character except the comma and control codes.

3. Specify the DL20 type. Type **1**, **2** or **4** and press [Enter].
   (1 = 1 line display, 2 = 2 line display, 4 = 4 line display)

4. Enter the memory size of the DL20. Type **8**, **16**, or **31** and press
   [Enter]. (8 = 8K, 16 = 16K, 31 = 31K)

   Note: Valid memory sizes for the 1 and 2 line display are 8, 16, or 31.
   The 4 line display supports memory sizes of 16 or 31.

5. Press [End] to save these DL20 parameters to CONFIG. DAT.

   Important: Settings in CONFIG.DAT must be appropriate for your
   DL20 or the download will not be successful.

   You cannot edit the CONFIG.DAT file. You should erase
   CONFIG.DAT before each editing session and create a new one to verify
   that its settings are correct. Erase the file at DOS level not using menu
   option *11 – Delete All Message Files*. Option 11 erases all DL20 files.

6. After saving CONFIG.DAT, the following screen appears. The
   top of the screen shows the DL20 type and memory size just entered.

DL20 Type and Memory Size ────────►

```
        ➤  EDIT A MESSAGE – TWO LINE UNIT WITH 8K OF MEMORY
Check DL20 Memory Used? ▌
ENTER A MESSAGE NUMBER (1-1022) :    ▌  0▌
Related S Record file name:

┊               ┊                 ┊                 ┊               ┊



















              Press ▌END▌ to return to the Main Menu

```
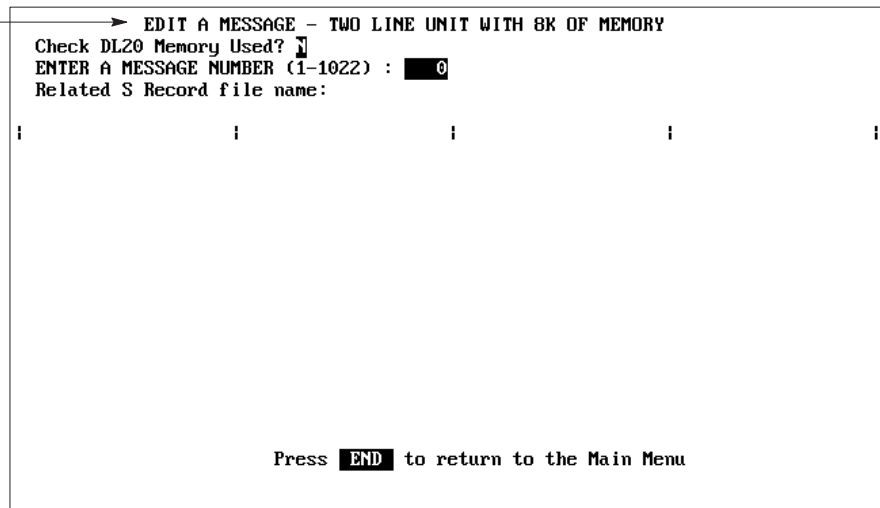
7. Press [Enter] at the *Check DL20 Memory Used* prompt. This
   prompt will be explained in the next section on editing messages.

Creating
New Messages

8. Type a message number between 1 and 1022 and press [Enter].
It is recommended that you start at 20 since DL20 special messages
are numbered 1 – 16.

The screen displays the default attributes for new messages. The
attributes change relative to the display type.

```
          EDIT A MESSAGE - TWO LINE UNIT WITH 8K OF MEMORY
Check DL20 Memory Used? N
ENTER A MESSAGE NUMBER (1-1022) :    20
Related S Record file name: DL20#1.

┆                   ┆            ┆             ┆            ┆



                Press  END  to save the attribute settings
      Scroll Mode      :N:    Auto Repeat      :N:    Use All Lines  :Y:
      Print Message    :N:    Chain Message    :N:    Use Line One   :N:
      Out To Slave     :N:    Message Number :  0:    Use Line Two   :N:
      To All Slaves    :N:    Flash Message    :N:    Use Least Used :N:
      Slave Number   :  0:    Energize Relay   :N:
      Wait Time(0-31) : 3:    Stack Message    :N:
      Auto Clear       :N:    Invisible Message:N:
```

New Message Attributes ──────────→

9. Change attributes as appropriate. Use the ↑↓ arrow keys or [Enter]
to move from field to field. Table 5.A defines valid responses for
each attribute.

For a complete description of each attribute see the DL20 User Manual.

10. Press [End] when done to save the attribute settings.

To change attributes after they have been set ([End] pressed),
press [Ctrl] [A]. The first attribute field is highlighted.

You are now ready to enter the message text. Go to the next section.

Table 5.A
Message Attributes

Attribute	DL20 Line #			Valid Responses
	1	2	4	
Auto Clear	x	x	x	Y or N
Auto Repeat	x	x	x	Y or N
Chain Message	x	x	x	Y or N
Energize Relay	x	x	x	Y or N
Flash Message	x	x	x	Y or N
Invisible Message	x	x	x	Y or N
Message Number (for chaining to)	x	x	x	1 to 254
Out to Slave	x	x	x	Y or N ①
Print Message	x	x	x	Y or N ①
Scroll Mode	x	x	x	Y or N ③
Slave Number	x	x	x	1 to 127 ④
Stack Message	x	x	x	Y or N
To All Slaves	x	x	x	Y or N
Use All Lines		x	x	Y or N ②③
Use Line 1 Only		x	x	Y or N ②
Use Line 2 Only		x	x	Y or N ②
Use Least-Used Line		x	x	Y or N ②
Use Line 3 Only			x	Y or N ②
Use Line 4 Only			x	Y or N ②
Wait Time	x	x	x	0 to 31

① The Print Message and Out to Slave attributes are mutually exclusive. The DL20 serial port can only be used for one function at a time. If one is set to Y, the other becomes N.

② Only one line attribute can be set to Y.

③ If Scroll Mode is set to Y, Use All Lines is automatically forced to N.

④ Slave Numbers 0,4,6,7,13,18,20,22,43,45, and 48–57 are illegal entries.

**Creating
New Messages**

Entering Message Text

You can now enter message text. The message text area contains 16 blocks
(20 characters/block). The maximum message length is 320 characters.

After saving the message attributes, the first message block (of 20 characters)
is highlighted.

```
           EDIT A MESSAGE - TWO LINE UNIT WITH 8K OF MEMORY
Check DL20 Memory Used? J
ENTER A MESSAGE NUMBER (1-1022) :    20
Related S Record file name: DL20#1.
```

Message Block 1

16 Message Blocks
(20 characters/block)

```
              Press CTRL-A to change the attribute settings
   Scroll Mode    :N:      Auto Repeat      :N:    Use All Lines  :Y:
   Print Message  :N:      Chain Message    :N:    Use Line One   :N:
   Out To Slave   :Y:      Message Number :  0:    Use Line Two   :N:
   To All Slaves  :Y:      Flash Message    :N:    Use Least Used :N:
   Slave Number   : 0:     Energize Relay   :N:
   Wait Time(0-31) : 3:    Stack Message    :N:
   Auto Clear     :Y:      Invisible Message:N:

   END or CTRL-Q Saves message as shown.     ESC will not save any changes made.
```

To enter new message text:

1. Enter message text starting in block 1. The DL20 automatically centers
    the message for display so you don't need to enter extra spaces.

    As you type text into the next block that block is highlighted.

    The following keys are valid while entering or editing a message.

Press this Key:	To:
[↓] or [PgDn] or [CTR] [J]	Move forward one block.
[↑] or [PgUp] or [CTR] [K]	Move back one block.
[Ins]	Insert one space character moving all characters to the right one position.
[←] or [Ctrl] [H]	Move cursor to the left one position.
[→] or [Ctrl][L]	Move cursor to the right one position.
[Del] or [Ctrl] [D]	Delete character at cursor position shifting the entire message left one position.
[Ctrl] [A]	Edit the message attributes.
[Esc]	Abort the current message and return to the Message Number prompt.
[End] or [Ctrl] [Q]	Save the message to a MSG####.DAT file and return to the Message Number prompt.

The screen below shows the text for Message 20 entered in the first two blocks.

```
              EDIT A MESSAGE - TWO LINE UNIT WITH 8K OF MEMORY
   Check DL20 Memory Used? N
   ENTER A MESSAGE NUMBER (1-1022) :    20
   Related S Record file name: DL20#1.

 :                          :                  :                        :                    :
THIS IS THE TEXT FOR MESSAGE #20


                   Press CTRL-A to change the attribute settings
        Scroll Mode      :N:    Auto Repeat      :N:    Use All Lines  :Y:
        Print Message    :N:    Chain Message    :N:    Use Line One   :N:
        Out To Slave     :Y:    Message Number :  0:    Use Line Two   :N:
        To All Slaves    :Y:    Flash Message    :N:    Use Least Used :N:
        Slave Number   :  0:    Energize Relay   :N:
        Wait Time(0-31) : 3:    Stack Message    :N:
        Auto Clear       :Y:    Invisible Message:N:

   END or CTRL-Q Saves message as shown.     ESC will not save any changes made.
```

2. When finished entering the message text, press [End]. Message 20 is automatically saved to file MSG0020.DAT.

   The screen clears and returns you to the *Message Number* prompt. Type another message number or press [End] to return to the *Main Menu*.

```
              EDIT A MESSAGE - TWO LINE UNIT WITH 8K OF MEMORY
   Check DL20 Memory Used? N
   ENTER A MESSAGE NUMBER (1-1022) :    20
   Related S Record file name: DL20#1.

 :                          :                  :                        :                    :









                   Press  END  to return to the Main Menu
```

Editing Messages

Option *6 - Edit/Create Messages* on the *Main Menu* also lets you edit existing messages.

To edit a DL20 message:

1. Type **6** and press [Enter] to select *6 - Edit/Create Messages* from the *Main Menu.*

   The following screen appears.

Compares DL20 memory size to actual memory usage.

```
              EDIT A MESSAGE – TWO LINE UNIT WITH 8K OF MEMORY
➤ Check DL20 Memory Used? N
  ENTER A MESSAGE NUMBER (1–1022) :     0
  Related S Record file name:

┇               ┇               ┇               ┇               ┇




                Press  END  to return to the Main Menu
```

2. Each time you enter an edit session from the *Main Menu*, you are asked if you want to check available DL20 memory.

   Type **Y** and press [Enter] to check the available memory. Otherwise press [Enter] to move to the next prompt.

   If you enter Y, you are also asked to enter a range of message numbers for the memory check.

```
              CHECK FOR DL20 MESSAGE MEMORY USAGE


        Start from Message #(1–1022):    0
        Stop after Message #(1–1022):    0
```

   For example, if you have 25 messages numbered from 1 to 25 you would start at 1 and stop at 25.

3. Type the start message number and press [Enter].

4. Type the end message number and press [Enter].

The screen then shows the memory required for the range of messages and the remaining free memory.

```
                    CHECK FOR DL20 MESSAGE MEMORY USAGE


               Start from Message #(1-1022):    1
               Stop after Message #(1-1022):    25






   DL20 memory required for selected messages = approximately 276 bytes.

   DL20 free memory left = approximately 7854 bytes.

   Note: This assumes that the DL20 message RAM is empty before the
   selected messages are downloaded.

                         Press any key to continue
```

5. Press any key to return to the message screen.

6. Type the number of the message you want to edit and press [Enter].

   The screen displays the message and attributes for the selected number.

```
          EDIT A MESSAGE - TWO LINE UNIT WITH 8K OF MEMORY
   Check DL20 Memory Used? N
   ENTER A MESSAGE NUMBER (1-1022) :    20
   Related S Record file name: DL20#1.


 :                 :              :            :            :
 THIS IS THE TEXT FOR MESSAGE #20




              Press CTRL-A to change the attribute settings
      Scroll Mode    :N:      Auto Repeat      :N:      Use All Lines  :Y:
      Print Message  :N:      Chain Message    :N:      Use Line One   :N:
      Out To Slave   :Y:      Message Number :  0:      Use Line Two   :N:
      To All Slaves  :Y:      Flash Message    :N:      Use Least Used :N:
      Slave Number  :  0:     Energize Relay   :N:
      Wait Time(0-31) : 3:    Stack Message    :N:
      Auto Clear     :Y:      Invisible Message:N:

   END or CTRL-Q Saves message as shown.    ESC will not save any changes made.
```

If a message is converted to or from an S Record file, the screen will show the Related S Record File name. Otherwise, this field is blank. (Chapter 6 defines S Record Files.)

Deleting Messages

Menu option *11 – Delete All Message Files* deletes all message files and the following DL20 files from disk or the DL20 subdirectory:

- Message Files (MSG####.DAT, MSG####.OLD)
- Configuration File (CONFIG.DAT)
- Serial I/O File (IOFILE.DAT)
- Parallel I/O File (PIOFILE.DAT)
- Special Function File (MSTRFILE.DAT)
- S Record File Name File (SRECNAME.DAT)

To delete all DL20 Message Files:

1. Type **11** and press [Enter] to select option *11 – Delete all Message Files* from the *Main Menu*.

   The following message appears.

   ```
   Delete all Message files on the present 'working' drive? ▌
   ```

2. Type **Y** and press [Enter] to delete all DL20 files.

   The following message displays as the files are deleted.

   ```
   All DL20 message, serial port, parallel port, and special function files
                 are deleted from current 'working' drive.
   ```

   You then return to the *Main Menu*.

Copying Messages

To create several messages that are the same or similar, you can use the DOS COPY command to copy MSG####.DAT message files. For example, to duplicate Message 20 and copy it into Message 21 use this command.

> C:\DL20>**COPY MSG0020.DAT MSG0021.DAT** [Enter]
> 1 File Copied

Note: Your DOS prompt may look different.

Copied message files are stored on disk, like message files created with the DL20 Offline Programmer.

To create a third identical message, press the [→] key and your computer will duplicate the above command.

> C:\DL20>COPY MSG0020.DAT MSG0021.DAT

Change the 1 in MSG0021.DAT to a 2 and press [Enter] as shown below. This command copies Message 20 into Message 22.

> C:\DL20>COPY MSG0020.DAT MSG002**2**.DAT [Enter]
>   1 file(s) copied

To copy multiple messages simultaneously, use the * (wild card character) in place of a digit. For example the command:

> C:\DL20>**COPY MSG032*.DAT MSG033*.DAT** [Enter]
>   10 file(s) copied

copies Message Numbers 320 through 329 into Message Numbers 330 through 339.

To make changes to any file you copy, enter the Offline Programmer and select option *6 - Edit/Create Messages*.

Message File Conversions

Chapter Objectives

This chapter shows how to:

- Convert DL20 message files to an S Record File
- Convert an S Record File to DL20 message files
- View DL20 files on disk

Overview of Conversion Functions

It is recommended that you convert all DL20 files to an S Record file. The S Record file stores all message files (MSG####.DAT) and configuration files (IOFILE.DAT, PIOFILE.DAT, MSTRFILE.DAT) in a single file. Downloading an S Record file to a DL20 or data recorder is more efficient and faster then downloading individual files. You can then delete the original .DAT files to save disk space.

To print DL20 message files or to modify the configuration files, you must convert the S Record file back to the individual DL20 message files. The files are converted with their original names.

Menu option 7 – *S Record/Message File Conversion Functions* accesses the file conversion functions.

```
        Allen-Bradley DL20 Off-Line Programmer

                      MAIN MENU

      1 - Set Up Computer Serial Port
      2 - Terminal/Keyboard (2706-NK1) Mode
      3 - Set Up DL20 Serial Port
      4 - Set Up DL20 Parallel Port
      5 - Set Up DL20 Special Functions
      6 - Edit/Create Messages (Message Files)
   ➔  7 - S Record/Message File Conversion Functions
      8 - S Record/Message File Upload(Read)/Download(Write)
      9 - Message File Download
     10 - Print Messages (Message Files)
     11 - Delete All Message Files
     12 - Exit to DOS




          Enter Selection (1 - 12): 0
```

Selecting option 7 displays the *File Conversion Functions* submenu.

Overview of Conextrsion Functions

```
         FILE CONVERSION FUNCTIONS




      1 – Convert S Record File to MSG*.DAT Files
      2 – Convert MSG*.DAT Files to S Record File
      3 – View File Names


           Enter Selection (1 – 3):█
```

From this submenu you can:

- Convert DL20 message files to an S Record file
- Convert an S Record file back to individual DL20 message files
- View all DL20 files and S Record files currently on disk

The sections that follow describe each function.

Converting Message Files to S Record File

This section shows how to convert all DL20 message files (MSG####.DAT) and configuration files (IOFILE.DAT, PIOFILE.DAT, MSTRFILE.DAT) to an S Record file for downloading or storage.

You can convert messages of any size. However, only the first 16 blocks of 20 characters/block will be displayed when using menu option
6 – Edit/Create Messages.

If you are programming multiple Dataliners with different configurations and messages, create a separate S Record file for each DL20. If using the same configuration and messages for multiple DL20 Dataliners you only need one S Record file.

The configuration files (IOFILE.DAT, PIOFILE.DAT, MSTRFILE.DAT) must exist before you begin the conversion. These files are created with the following *Main Menu* options.

3 – Set Up DL20 Serial Port	Creates IOFILE.DAT
4 – Set Up DL20 Parallel Port	Creates PIOFILE.DAT
5 – Set Up DL20 Special Functions	Creates MSTRFILE.DAT

If these files do not exist, you will get an error message during the conversion.

To convert DL20 files to an S Record file:

1. Select option 7 – *S Record/Message File Conversion Functions* from the *Main Menu*.

2. Select option 2 - *Convert MSG*.DAT Files to S Record File* from the *File Conversion Functions* submenu.

   You are asked you to enter a name for the S Record file.

   Enter file to be created: ▮▮▮▮▮▮

3. Type a 1 to 8 character name and press [Enter]. Do not enter a file extension. You can include a drive letter in the name, e.g., A:DL20#1.

   The conversion begins. The screen displays message numbers as they are converted. At the end of the conversion, this message displays:

   CONVERSION COMPLETED

4. Press any key to return to the *Main Menu*.

You can download the S Record file to a DL20 Dataliner or an Allen-Bradley 1770-SA or -SB Data Recorder.

The original MSG####.DAT and configuration files are still intact. You can delete them to free up disk space.

When using *Main Menu* option *6 – Edit/Create Messages* the screen will display the name of the S Record file associated with the messages.

Converting S Record File to Message Files

You cannot modify DL20 configuration files or print messages that were converted to an S Record file. To modify or print these files, you must first convert the S Record file back to the individual DL20 files.

During the conversion you are prompted to delete all DL20 messages currently on the drive. It is recommended that you do this to avoid combining the converted message files with any files that exist.

To convert an S Record file to DL20 message files:

1. Select option *7 – S Record/Message File Conversion Functions* from the *Main Menu*.

2. Select option *1 - Convert S Record File to MSG*.DAT Files* from the *File Conversion Functions* submenu.

   You are asked if you want to delete all message files that are currently on disk or in the DL20 directory.

   ```
   Delete all Message files on the present 'working' drive?
   ```

3. Type **Y** and press [Enter] to delete DL20 message files.

   The following message appears.

   ```
   All DL20 message, serial port, parallel port, and special function files
                  are deleted from current 'working' drive.
   ```

   You are then asked to enter the name of the S Record file to convert.

   ```
   Enter file to be converted:
   ```

4. Type the name of an existing S Record file and press [Enter].

   You are then asked to enter the type of DL20 (number of lines) the messages were originally created for.

   ```
   What was the number of lines in the DL-20 that
   these messages were created for? ( 1, 2 or 4 )
   ```

5. Type the number of lines **1**, **2**, or **4** and press [Enter].

   The conversion begins. The screen displays the message numbers as they are converted. At the end of the conversion, this message displays:

   ```
   CONVERSION COMPLETED
   ```

6. Press any key to return to the *Main Menu.*

The converted message files and configuration files are restored to disk with their original names. Messages may be padded with the ~ character. Ignore these characters. They are not transmitted to the DL20.

The S Record file is not deleted after the conversion but remains on disk. When editing messages that have been converted, the *Related S Record File Name* appears on the message edit screen.

Viewing DL20 Files

Option *3 - View File Names* on the *File Conversion Functions* submenu lets you display a list of DL20 files in the DL20 subdirectory (or another drive). You can display the following types of DL20 files:

- S Record files
- Message files including DL20 configuration files (.DAT)
- Old message files (.OLD)

To view DL20 files:

1. Select option *7– S Record/Message File Conversion Functions* from the *Main Menu.*

2. Select option *3 - View File Names* from the *File Conversion Functions* submenu.

   The following screen appears with *S Record Files* selected.

```
                        Directory Function

        Select 1 type of file to look for:

        S Record Files (*. ) Y
        Message Files (*.DAT)
        Old Message Files (*.OLD)

        * Select the Drive the Disk is in (A:,B:,C: or D:) A:




        * Note: for subdirectories, use the following format A:\MACH1\

                        Press ESC to exit
```

3. Select the type of DL20 files you want to view. You are only allowed to view one type (S Record files, *.DAT files or *.OLD files). Type **Y** next to the type of files you want to list and press [Enter].

4. Select the drive on which you want to search for the files.

   To select a drive other than A, backspace [←] over *A:*, type another drive letter followed by the colon (B: C: or D:) and press [Enter].

   The screen then displays a list of files for the selected type. The next page shows sample file listings.

5. Press [Esc] to exit and return to the *File Conversion Functions* submenu.

Viewing DL20 Files

Sample DL20 File Listings

S Record Files (*.   )

```
                           Directory Function

            Select 1 type of file to look for:

            S Record Files (*. ) Y
            Message Files (*.DAT)
            Old Message Files (*.OLD)

               * Select the Drive the Disk is in (A:,B:,C: or D:) C:
C:\DL20
    .    <DIR>          .. <DIR> DL20#1
 3358720 Bytes free




               * Note: for subdirectories, use the following format A:\MACHI\

                          Press ESC to exit
```

Message Files (*.DAT)

```
                           Directory Function

            Select 1 type of file to look for:

            S Record Files (*. ) N
            Message Files (*.DAT) Y
            Old Message Files (*.OLD)

               * Select the Drive the Disk is in (A:,B:,C: or D:) C:
C:\DL20
IOFILE  .DAT       PIOFILE .DAT       MSTRFILE.DAT       CONFIG  .DAT
MSG0020 .DAT       MSG0021 .DAT       MSG0022 .DAT       MSG0023 .DAT
MSG0024 .DAT       MSG0025 .DAT       MSG0026 .DAT       SRECNAME.DAT
MSG0027 .DAT
 3184640 Bytes free




               * Note: for subdirectories, use the following format A:\MACHI\

                          Press ESC to exit
```

Transferring S Record Files

Chapter Objectives

This chapter shows you how to:

- Download S Record File to a DL20 or Data Recorder
- Upload DL20 Memory to a Personal Computer
- Upload S Record File from Data Recorder to Personal Computer
- View DL20 Files on disk

Accessing File Read/Write Functions

Menu option *8 - S Record/Message File Upload (Read)/Download (Write)* lets you transfer S Record files between your computer and a DL20 or data recorder (Catalog No. 1770-SA or -SB).

Important: It is recommended that you use option 8 to transfer files between a computer and DL20. Transferring S Record files is more efficient then downloading message files (menu option 9).

```
        Allen-Bradley DL20 Off-Line Programmer

                    MAIN MENU

     1 - Set Up Computer Serial Port
     2 - Terminal/Keyboard (2706-NK1) Mode
     3 - Set Up DL20 Serial Port
     4 - Set Up DL20 Parallel Port
     5 - Set Up DL20 Special Functions
     6 - Edit/Create Messages (Message Files)
     7 - S Record/Message File Conversion Functions
  ▶  8 - S Record/Message File Upload(Read)/Download(Write)
     9 - Message File Download
    10 - Print Messages (Message Files)
    11 - Delete All Message Files
    12 - Exit to DOS




            Enter Selection (1 - 12): 0
```

Selecting option 8 displays the *File Read/Write Functions* submenu.

```
            FILE READ/WRITE FUNCTIONS




        1 - Read DL-20 Memory To Disk File
        2 - Write Disk File To DL-20 Memory
        3 - Read 1770-SB Cartridge To Disk File
        4 - Write Disk File To 1770-SB Cartridge
        5 - View File Names


    Press ESC or END to return to the main menu.

    Enter Selection (1 - 5): 
```

Connecting Equipment

Before transferring files between your computer and a DL20 or data recorder, you must connect the equipment using the appropriate cable.

Connecting Personal Computer to DL20

The figure below shows the connection between your personal computer and a DL20 Dataliner Display using the Catalog No. 2706-NC2 Cable.
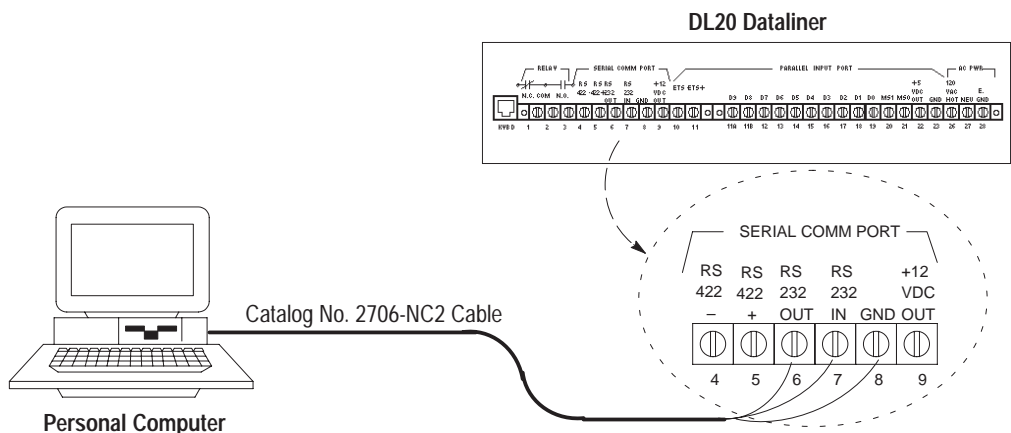
DL20 Dataliner

SERIAL COMM PORT

Catalog No. 2706-NC2 Cable

Personal Computer

RS 422 −	RS 422 +	RS 232 OUT	RS 232 IN	GND	+12 VDC OUT
4	5	6	7	8	9

> ⚠ **ATTENTION:** Do not connect computer to DL20 when power is applied to the DL20. Damage to DL20 could result.

1. Attach the 25-pin connector end of cable to the Com1 or Com2 serial communication port of your computer.

   If your computer's serial port has 9 pins use an AT Adapter with the 2706-NC2 cable.

2. Attach the three spade connectors on the other end of cable to the same numbered terminals on the back of the DL20 display.

   Important: The DL20 must be set to the same baud rate as the serial port of your computer to establish communications.

3. Power on the DL20.

4. You can use menu option *2 - Terminal/Keyboard (2706-NK1 Mode)* to verify the communication link between the computer and DL20.

When the computer is connected to the DL20 Display you can transfer files between the two devices. To download a file to the DL20, see page 7–4. To upload a file from the DL20, see page 7–6.

Connecting Personal Computer to Data Recorder

The figure below shows the connection between an AT compatible personal computer (9-pin serial port) and a Catalog No. 1770-SB Data Recorder using the Catalog No. 1770-CAS cable. The required cable varies for the computer type. Available cables are listed in Chapter 2.

To 120 VAC
Power Source

Catalog No. 1770-SB Data Recorder

AT Personal Computer
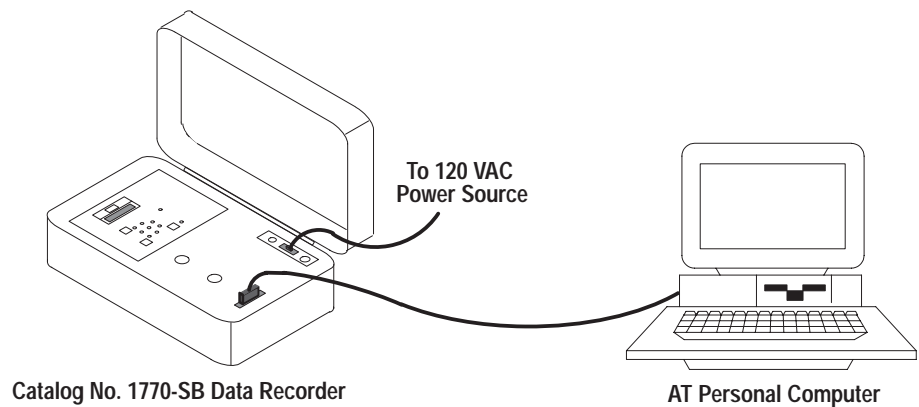
> **ATTENTION:** Do not connect computer to recorder when power is applied to the recorder. Damage to the recorder could result.

1. Attach 9-pin connector end of cable to the Com1 or Com2 serial communication port of your computer.

2. Attach other end of cable to communication port on data recorder.

3. Power on data recorder. Power indicator should light.

When the computer is connected to the data recorder you can transfer S Record files between the two devices. To download an S Record file to the data recorder, see page 7–8. To upload an S Record file from the data recorder, see page 7–10.

Downloading
S Record File to DL20

This section shows how to download an <u>S Record file</u> from your computer to a DL20 Display. DL20 message files are converted to an S Record file using option *7 - S Record /Message File Conversion Functions.*

Before starting the download:

- Your personal computer must be connected to the DL20 Display.

- You must know the name of the S Record file to download.

  You can view all S Record files on disk by selecting option *5 - View File Names* on the *File Read/Write Functions* submenu.

- Verify that the DL20 has enough memory to store the S Record file. To check the file size, convert the file back to a message file using menu option 7. Then select option 6 to "Check Available DL20 Memory".

  Important: The DL20 must have enough memory to store the S Record file or the messages in the DL20 may be altered.

To download an S Record file to a DL20:

1. Select option *8 - S Record Message File Upload (Read)/Download (Write)* from the *Main Menu*.

   The *File Read/Write Functions* submenu appears.


```
              FILE READ/WRITE FUNCTIONS




          1 - Read DL-20 Memory To Disk File
          2 - Write Disk File To DL-20 Memory
          3 - Read 1770-SB Cartridge To Disk File
          4 - Write Disk File To 1770-SB Cartridge
          5 - View File Names



      Press ESC or END to return to the main menu.

      Enter Selection (1 - 5):
```
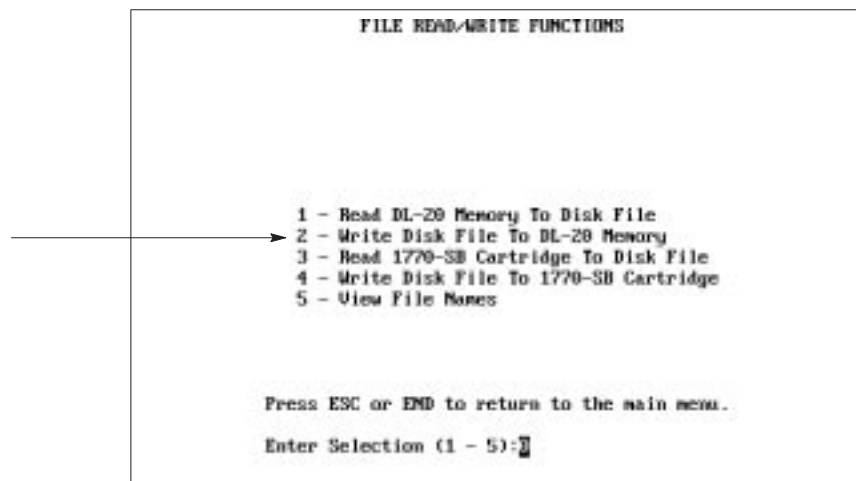
2. Select option *2 - Write Disk File to DL-20 Memory.*

    The following screen appears.

```
                          WRITE FILE TO DL20'S MEMORY
    File name (Type EXIT to return to main menu):  ████████
                                                      BAUD RATE : 9600
                                                          Port: COM 1



      Note: This function can only be used if a file is on the disk which
      was created in the S Record format.
```

3. Type the name of the S Record file to download and press [Enter]. You
    can include a drive in the name (A:, B: , C: or D:).

    The program verifies the format of all records in the file. The records
    display on the screen as they are checked. *OK* appears next to
    each record that is free of errors. For example:

```
    S113009067652032FF0300000003000000000000039        OK
    S11300A0000054686973206973207468652074655E         OK
    S11300B078742066726F6D206D6573736167652057         OK
    S11300C034FF04000000030000000000000000549E         OK
```

    You are then asked if you want to send the records.

```
                          WRITE FILE TO DL20'S MEMORY
    File: DL20#1
                                                      BAUD RATE : 9600
                                                          Port: COM 1
          Send Records to DEVICE? Y
               RECORDS VERIFIED :
```
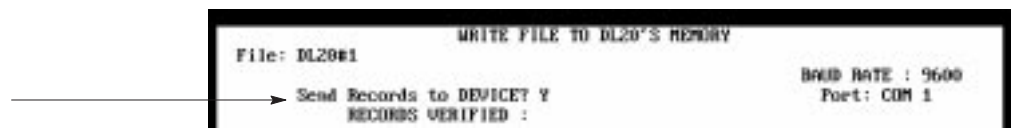
4. Press [Enter] to download the records. Otherwise type **N** and press
    [Enter] to return to the *Main Menu.*

    When the download is done, you return to the *Main Menu*. To abort the
    download at any time, press [Ctrl][Z].

Uploading DL20 Memory to Personal Computer

This section shows how to transfer DL20 memory contents to an S Record file on your personal computer. The S Record file is created during the transfer.

Option *1 - Read DL-20 Memory to Disk File* serves the same purpose as the DL20's tape read function with a Catalog No. 1770-SB Data Recorder. This option is easier to use because the program handles all communication with the DL20 and you do not need to respond to any of the DL20 prompts.

Before starting the upload, make sure your personal computer is connected to the DL20 Display as described on page 7–2.
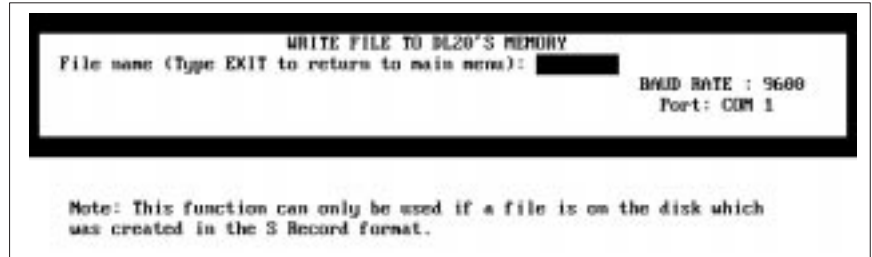
To upload DL20 memory to your computer:

1. Select option *8 - S Record/Message File Upload (Read)/Download (Write)* from the *Main Menu*.

   The *File Read/Write Functions* submenu appears.

```
              FILE READ/WRITE FUNCTIONS




                1 - Read DL-20 Memory To Disk File
                2 - Write Disk File To DL-20 Memory
                3 - Read 1770-SB Cartridge To Disk File
                4 - Write Disk File To 1770-SB Cartridge
                5 - View File Names


        Press ESC or END to return to the main menu.

        Enter Selection (1 - 5):
```
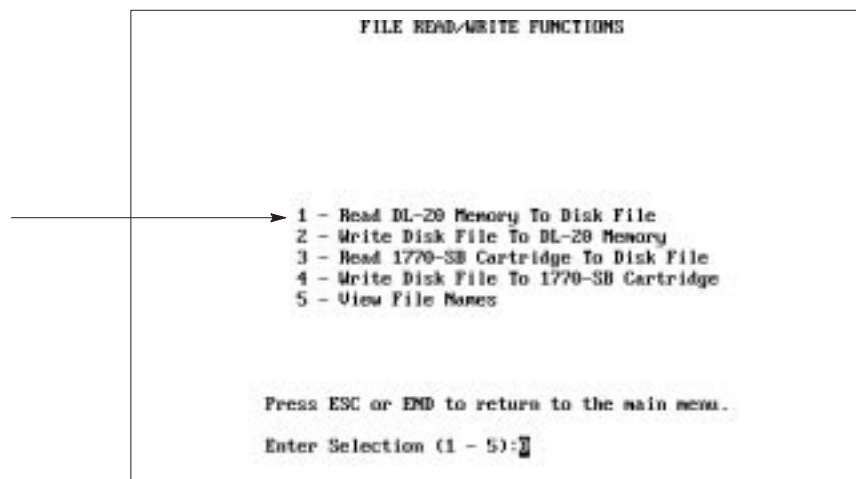
2. Select option *1 - Read DL-20 Memory to Disk File.*

   The following screen appears.

```
                    READ DL20'S MEMORY TO A FILE
        File name (Type EXIT to return to main menu):
                                                        BAUD RATE : 9600
                                                           Port: COM 1
                    READING RECORDS  :
```

3. Type a 1 to 8 character name of the file to receive the data and press [Enter]. Do not enter a file extension. You can include a drive letter in the name, e.g., A:DL20#1.

   If the file exists, this message appears.

   File Already Exists!! Okay to overwrite it? N

   Type **Y** and press [Enter] to overwrite file; otherwise press [Enter] to provide a different file name.

   The upload operation reads data from the DL20 memory and writes records to the specified file.   The records display on the screen as they are received. To abort the operation and return to the *Main Menu*, press [Ctrl][Z].

   When the transfer is complete, each record is verified. OK appears next to each record that is free of checksum errors. If the entire file is free of errors, you will briefly see the message ALL OKAY and return to the *Main Menu*.

   Note: This operation does not perform a file to file comparison of data.

Downloading S Record File to Data Recorder

This section shows how to transfer an S Record file to a 1770-SB Recorder for storage or for downloading the same messages to multiple DL20 displays.

Before starting the download:

- The recorder must be connected to your computer and powered on as described on page 7–3.

- You must know the name of the S Record file to download.

  You can view all S Record files on disk by selecting option *5 - View File Names* off the *File Read/Write Functions* submenu.

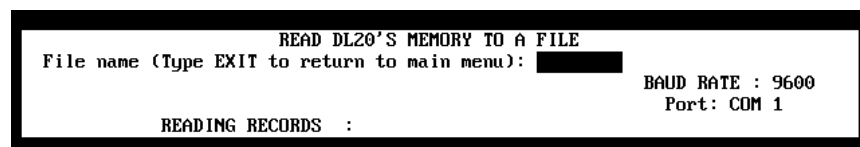**To download an S Record file to a data recorder:**

1. Select option *8 - S Record Message File Upload (Read)/Download (Write)* from the *Main Menu*.

   The *File Read/Write Functions* submenu appears.


```
              FILE READ/WRITE FUNCTIONS




         1 - Read DL-20 Memory To Disk File
         2 - Write Disk File To DL-20 Memory
         3 - Read 1770-SB Cartridge To Disk File
    ───► 4 - Write Disk File To 1770-SB Cartridge
         5 - View File Names


      Press ESC or END to return to the main menu.

      Enter Selection (1 - 5):
```
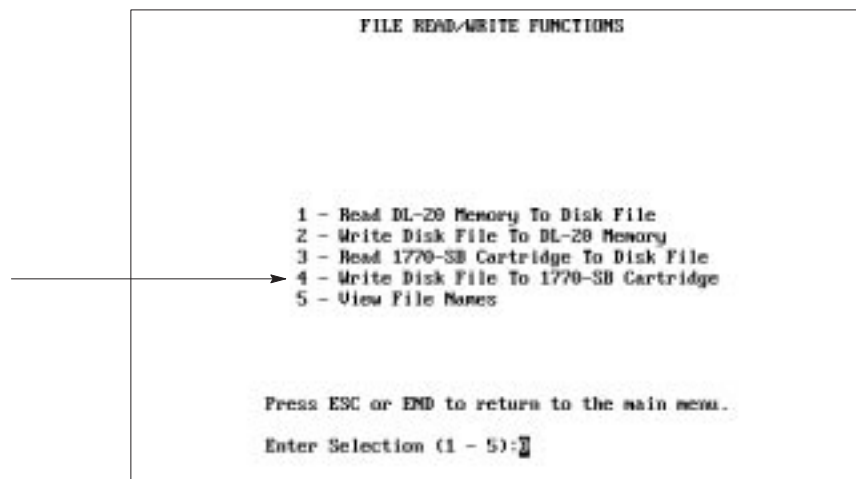
2. Select option *4 - Write Disk File to 1770-SB Cartridge.*

   The following screen prompts you for an S Record file name. It also shows the selected baud rate and communication port.


```
                  WRITE FILE TO 1770-SB CARTRIDGE
 File name (Type EXIT to return to main menu):
                                                  BAUD RATE : 9600
                                                  Port: COM 1


   Note: This function can only be used if a file is on the disk which
   was created in the S Record format.
```

3. Set baud rate of data recorder to same baud rate shown on screen.

4. Verify that a tape cartridge is installed in data recorder.

5. Set the "Track Select Switch" to the correct setting on the recorder.

6. Type the name of the S Record file you want to download and press [Enter]. You can include a drive in the name (A: B: C: or D:).

   The program verifies the format of all records in the file. The records display on the screen as they are checked. *OK* appears next to each record that is free of errors. For example:

   ```
   S113009067652032FF03000000030000000000000039          OK
   S11300A00000546869732069732074686652074655E          OK
   S11300B078742066726F6D206D6573736167652057          OK
   S11300C034FF0400000000300000000000000000549E          OK
   ```

   You are then asked if you want to send the records.

   ```
                       WRITE FILE TO 1770-SB CARTRIDGE
   File: DL20#1
                                               BAUD RATE : 9600
           Send Records to DEVICE? Y                Port: COM 1
                RECORDS VERIFIED :
   ```

7. Press [Enter] to send the records. If you type N, you return to the *Main Menu*.

   After pressing [Enter], the following message appears:

   Preparing recorder. Please wait 60 sec.

   The "Record on Tape" indicator lights when the download begins. Records are displayed on the screen as they are downloaded.

   You can abort the download at any time by pressing [Ctrl][Z].

   When the download is done you return to the *Main Menu*.

Uploading File from Data Recorder

This section shows how to transfer an S Record file from a 1770-SB Data Recorder to a personal computer.

Before starting the upload, make sure the recorder is connected to your computer as described on page 7–3.

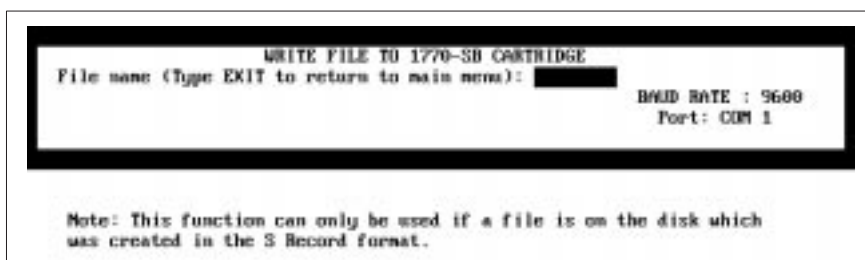**To upload an S Record file from the data recorder to your computer:**

1. Select option *8 - S Record/Message File Upload (Read)/Download (Write)* from the *Main Menu*.

   The *File Read/Write Functions* submenu appears.

```
                      FILE READ/WRITE FUNCTIONS




                1 - Read DL-20 Memory To Disk File
                2 - Write Disk File To DL-20 Memory
                3 - Read 1770-SB Cartridge To Disk File
                4 - Write Disk File To 1770-SB Cartridge
                5 - View File Names


             Press ESC or END to return to the main menu.

             Enter Selection (1 - 5):
```
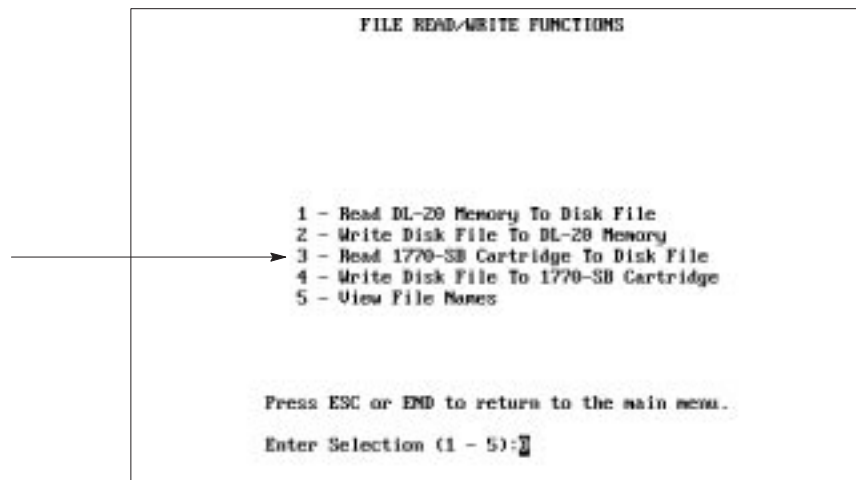
2. Select option *3 - Read 1770-SB Cartridge to Disk File*.

   The following screen appears. It prompts you to type the name of an S Record file to receive the data.

```
                   READ 1770-SB CARTRIDGE TO A FILE
      File name (Type EXIT to return to main menu):
                                                      BAUD RATE : 9600
                                                         Port: COM 1

                   READING RECORDS  :
```

3. Set the baud rate of the data recorder to same baud rate shown on screen.

4. Verify that a tape cartridge is installed in the data recorder.

5. Verify that the "Track Select" switch on the recorder is set to the correct track.

6. Type the name of an S Record file and press [Enter].

   If the file exists, this message appears.

   File Already Exists!! Okay to overwrite it? N

   Type **Y** and press [Enter] to overwrite file; otherwise press [Enter] to provide a different file name.

   The following message appears:

   Preparing recorder. Please wait 30 sec.

   The "Read from Tape" indicator lights when the upload begins. Records are verified for the correct format and then displayed on the screen as they are downloaded.

   You can abort the upload at any time by pressing [Ctrl][Z].

   When the download is done, the message *ALL OKAY* appears briefly and you return to the *Main Menu*.
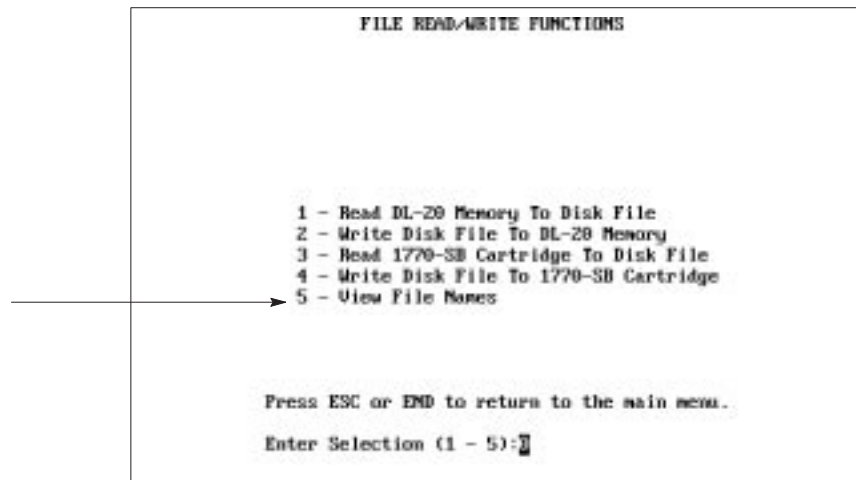
Viewing DL20 Files

Option *5 - View File Names* on the *File Conversion Functions* submenu lets you display a list of DL20 files in the DL20 directory (or another drive). You can display the following types of DL20 files:

- S Record files
- Message files including DL20 configuration files (.DAT)
- Old message files (.OLD)

To view DL20 files:

1. Select option *8 - S Record/Message File Upload (Read)/Download (Write)* from the *Main Menu*.

```
                    FILE READ/WRITE FUNCTIONS




                1 - Read DL-20 Memory To Disk File
                2 - Write Disk File To DL-20 Memory
                3 - Read 1770-SB Cartridge To Disk File
                4 - Write Disk File To 1770-SB Cartridge
           ➤    5 - View File Names



            Press ESC or END to return to the main menu.

            Enter Selection (1 - 5):█
```

2. Select option *5 - View File Names* from the *File Read/Write Functions* submenu.

   The following screen appears with S Record files selected.

```
                        Directory Function

            Select 1 type of file to look for:

            S Record Files (*. ) █
            Message Files (*.DAT)
            Old Message Files (*.OLD)

            * Select the Drive the Disk is in (A:,B:,C: or D:) A:




            * Note: for subdirectories, use the following format A:\MACH1\

                        Press ESC to exit
```

3. Select the type of DL20 files you want to view. You are only allowed to view one type (S Record files, *.DAT files or *.OLD files). Type **Y** next to the type of files you want to list and press [Enter].

4. Select the drive on which you want to search for the files.

   To select a drive other than A, backspace [←] over *A:*, type another drive letter followed by the colon (B: C: or D:) and press [Enter].

   The screen then displays a list of files for the selected type. Below are sample file listings.

5. Press [Esc] to exit and return to the *File Read/Write Functions* menu.

S Record Files (*.   )

```
                        Directory Function

          Select 1 type of file to look for:

          S Record Files (*. ) Y
          Message Files (*.DAT)
          Old Message Files (*.OLD)

              * Select the Drive the Disk is in (A:,B:,C: or D:) C:
      C:\DL20
          .    <DIR>        ..  <DIR> DL20#1
        3358720 Bytes free




          * Note: for subdirectories, use the following format A:\MACHIN

                        Press ESC to exit
```

Message Files (*.DAT)

```
                        Directory Function

          Select 1 type of file to look for:

          S Record Files (*. ) N
          Message Files (*.DAT) Y
          Old Message Files (*.OLD)

              * Select the Drive the Disk is in (A:,B:,C: or D:) C:
      C:\DL20
      IOFILE  .DAT      PIOFILE .DAT      MSTRFILE.DAT      CONFIG  .DAT
      MSG0020 .DAT      MSG0021 .DAT      MSG0022 .DAT      MSG0023 .DAT
      MSG0024 .DAT      MSG0025 .DAT      MSG0026 .DAT      SRECNAME.DAT
      MSG0027 .DAT
        3184640 Bytes free



          * Note: for subdirectories, use the following format A:\MACHIN

                        Press ESC to exit
```

Helpful Hints

If you are having problems downloading or uploading, check the following:

- **Verify Cable Connections**

  Make sure the cable is securely connected to the serial communication port (Com1 or Com2) of your computer and the serial RS-232 port of the DL20 or the 1770-SB Recorder.

- **Verify Serial Port on Computer**

  Verify that the cable is connected to the same serial port (Com1 or Com2) selected using menu option *1 - Set Up Computer Serial Port.*

- **Check Baud Rate**

  Your computer must be set to the same baud rate as the DL20 or 1770-SB Data Recorder. Check the baud rate of your computer using menu option *1 - Set Up Computer Serial Port.*

- **Check Earth Ground Connection**

  Verify that the DL20's earth ground (E. GND) is connected to earth ground (preferably to the same ground as your computer).

- **Check Communication Link**

  Select menu option 2 - *Terminal/Keyboard (2706-NK1) Mode* to verify that a communication link exists.

- **Check CONFIG.DAT File**

  Verify that your CONFIG.DAT file is configured for the same number of lines as the DL20 to which you are downloading.

  Use the DOS Type command to display the CONFIG.DAT file. The first line displays the DL20 type (number of lines) the messages were configured for.

- **Check Available RAM in Computer**

  Make sure your computer has enough RAM for the messages being downloaded or you may get a Device I/O error. Check the size of your messages using menu option *6 - Edit/Create Messages (Message Files).*

- **Check "Echo All to Slaves" Parameter on DL20**

  This parameter must be set to N. Check setting using menu option 2 - *Terminal/Keyboard (2706-NK1) Mode* and going to the Set up Master Special Function within the display editor.

- **Disable Internal Modem (if necessary)**

  Verify that internal modem (e.g., internal modem of 1784-T45) is disabled. Refer to DOS manual.

- **Check Track Setting on Data Recorder**

  If reading files to disk from a recorder, verify that the "Track Select" switch is set to the correct track.

Downloading Message Files

Chapter Objectives

This chapter shows how to use menu option *9 - Message File Download* to download message files from a computer to a DL20 Display.

Note: It is recommended that you use option *8 - S Record/Message File Upload (Read)/Download (Write)* to download large numbers of messages. The S Record file transfer is more efficient and faster.

Connecting to DL20

Before transferring files between your computer and a DL20 Display, you must connect the equipment using the appropriate cable. The figure below shows this connection using the Catalog No. 2706-NC2 Cable.
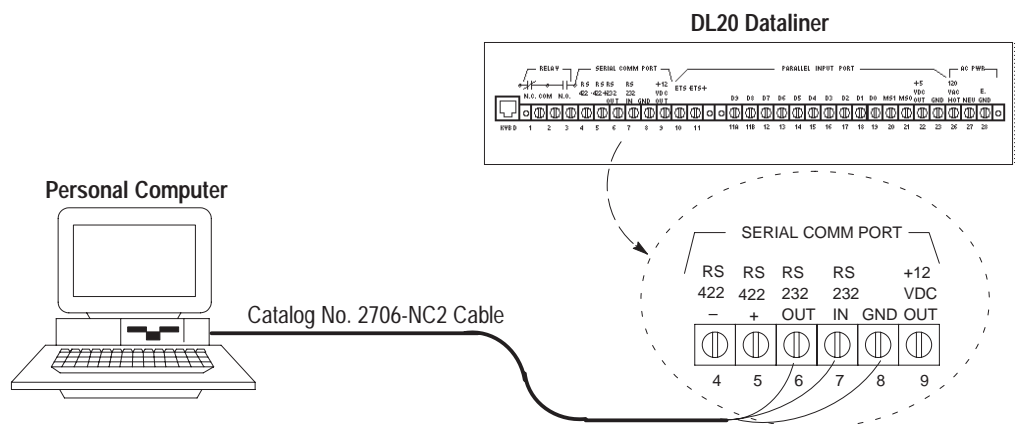
ATTENTION: Do not connect computer to DL20 when power is applied to the DL20. Damage to DL20 could result.

1. Attach the 25-pin connector end of cable to the Com1 or Com2 serial communication port of your computer.

2. Attach the three spade connectors on other end of cable to the same numbered terminals on the back of the DL20 display.

   Important: The DL20 must be set to the same baud rate as the serial port of your computer to establish communications.

3. Power on DL20.

4. You can use menu option *2 - Terminal/Keyboard (2706-NK1 Mode)* to verify communication link between the computer and DL20.

**Downloading
Message Files**

This section shows how to use option *9 - Message File Download* on the
Main Menu to download message files.

```
           Allen-Bradley DL20 Off-Line Programmer

                        MAIN MENU

       1 - Set Up Computer Serial Port
       2 - Terminal/Keyboard (2706-NK1) Mode
       3 - Set Up DL20 Serial Port
       4 - Set Up DL20 Parallel Port
       5 - Set Up DL20 Special Functions
       6 - Edit/Create Messages (Message Files)
       7 - S Record/Message File Conversion Functions
       8 - S Record/Message File Upload(Read)/Download(Write)
    ➤  9 - Message File Download
      10 - Print Messages (Message Files)
      11 - Delete All Message Files
      12 - Exit to DOS




              Enter Selection (1 - 12): 0
```

This option allows you to download:

- All DL20 Files including:

  - MSTRFILE.DAT (DL20 special function file)
    Created with menu option *5 - Set Up DL20 Special Functions*

  - IOFILE.DAT (DL20 serial port configuration)
    Created with menu option *3 - Set Up DL20 Serial Port*

  - PIOFILE.DAT (DL20 parallel port configuration)
    Created with menu option *4 - Set Up DL20 Parallel Port*

  - MSG####.DAT (all DL20 message files)
    Created with menu option *6 - Edit/Create Messages (Message Files)*

  If downloading a large number of message files this option is faster than
  downloading selected DL20 files.

- DL20 Special Function File only (MSTRFILE.DAT)

- Selected Message Files

  Important: DL20 memory is cleared before files are downloaded when
  sending all messages and special functions.

To download message files to the DL20:

1. Select option *9 - Message File Download* from the *Main Menu*.

   The following screen appears.

If the CONFIG.DAT file does not exist another screen will appear first prompting you for the DL20 type and memory size.

```
DOWNLOAD MESSAGES TO A TWO LINE UNIT WITH 8K OF MEMORY
     Send all messages and special functions? Y
     (Will Clear DL20 RAM first!)
          Start from Message #(1-1022):
          Stop after Message #(1-1022):




                  PRESS End to return to the Main Menu
```

The procedures below show what selections to make for each of the download options.

If an S Record file exists for the messages being downloaded, the screen displays the name of the file.

Downloading All Files

1. Type **Y** and [Enter] at the first prompt to download all files including message files, configuration files and the special function file.

   ```
   Send all messages and special functions? Y
   ```

   The download begins. The screen displays a message verifying that the special functions file will be downloaded. As each message file is downloaded, the screen displays the message number, message contents and the number of lines the message will occupy.

   ```
   Sending Message :

   Contents of Message Block :

   Number of Lines Used:
   ```

   Press [Esc] to stop the download and return to the *Main Menu*. The current message will finish downloading before the download is aborted.

2. Press [End] when the download is complete to return to the *Main Menu*.

Downloading Message Files

Downloading Special Function File Only

1. Press [Enter] at the first prompt if you don't want to send all files.

   ```
   Send all messages and special functions? N
   ```

   You are then asked if you want to send the Special Function file only.

   ```
   Send special functions only? N
   ```

2. Type **Y** and press [Enter] to send only the Special Function file.

   The download begins. During the download, the screen displays the message "Sending Special Functions".

3. When the download is complete, you can enter a range of messages to send or press [End] to return to the *Main Menu*.

Downloading Selected Range of Files

1. Press [Enter] at the first prompt if you don't want to send all files.

   ```
   Send all messages and special functions? N
   ```

   You are then asked if you want to send the Special Function file only.

   ```
   Send special functions only?  N
   ```

2. Press [Enter] to download a selected range of message files without the Special Function file.

   You are then prompted to enter a range of numbers to download.

   ```
   Start from Message #(1-1022):      0
   Stop after Message #(1-1022):      0
   ```

3. Enter the message number at which to start the download and press [Enter]. The number must be in the range 1 - 1022.

4. Enter the last message number to download and press [Enter]. You must enter a number that is equal to or greater than the start number.

   As each message is downloaded, the screen displays the message number, message contents and the number of lines the message will occupy.

   ```
   Sending Message :

   Contents of Message Block :

   Number of Lines Used:
   ```

   You can press [Esc] at any time to stop the download and return to the *Main Menu*. The current message will finish downloading before the download is aborted.

5. When the download is complete you can enter another range of numbers or press [End] to return to the *Main Menu*.

Verifying
Message Download

To verify that messages have been downloaded correctly, enter terminal mode using menu option 2 - *Terminal/Keyboard (2706-NK1) Mode* and check the messages in the DL20. For details on Terminal/Keyboard mode, see Chapter 9 *Using Terminal Mode*.

Helpful Hints

If you are having problems with downloading, check the following:

- **Verify Cable Connections**

  Make sure the cable is securely connected to the serial communication port (Com1 or Com2) of your computer and the serial RS-232 port of the DL20.

- **Verify Communication Port**
  Verify that the cable is connected to the same communication port (Com1 or COM2) selected with menu option *1- Set Up Computer Serial Port.*

- **Check Baud Rate**
  The DL20 must be set to the same baud rate as the serial communication port of your computer using menu option *1- Set Up Computer Serial Port.*

- **Check Earth Ground Connection**
  Verify that the DL20's earth ground (E. GND) is connected to earth ground (preferably to the same ground as your computer).

- **Check Communication Link**
  Select menu option 2 - *Terminal/Keyboard (2706-NK1) Mode* to verify that a communication link exists.

- **Check CONFIG.DAT File**
  Verify that your CONFIG.DAT file is configured for the same number of lines to which you are downloading.

- **Check "Echo All to Slaves" parameter on DL20**
  This parameter must be set to N.   Check setting using menu option 2 - *Terminal/Keyboard (2706-NK1) Mode* and going to Set up Master Special Function within the display editor.
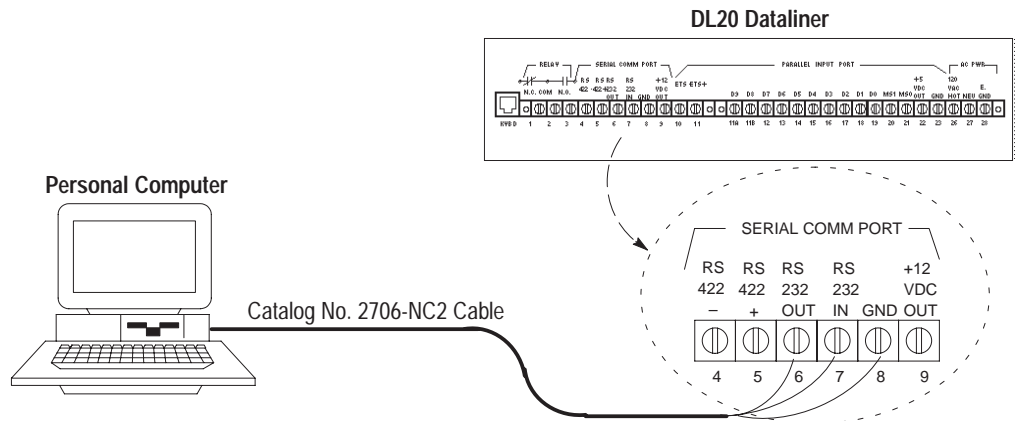
Using Terminal Mode

Chapter Objectives

This chapter shows how to use menu option *2 - Terminal/Keyboard (2706-NK1) Mode* to communicate with a DL20. This option allows your computer keyboard to emulate a Catalog No. 2706-NK1 or -NK2 Keyboard. Terminal/Keyboard mode is useful for:

• verifying a communication link between your computer and a DL20

• verifying messages after a download operation

• performing DL20 data entry and configuration functions

Connecting to DL20

To use your computer in terminal/keyboard mode you must first connect to the DL20 using the appropriate cable. The figure below shows this connection using the Catalog No. 2706-NC2 Cable. It is identical to the download connection in Chapter 8.

DL20 Dataliner

Personal Computer

Catalog No. 2706-NC2 Cable

SERIAL COMM PORT

RS 422 −	RS 422 +	RS 232 OUT	RS 232 IN	GND	+12 VDC OUT
4	5	6	7	8	9

⚠ **ATTENTION:** Do not connect computer to DL20 when power is applied to the DL20. Damage to DL20 could result.

1. Attach the 25-pin connector end of cable to the Com1 or Com2 serial communication port of your computer.

   If your computer's serial port has 9 pins use an AT Adapter with the 2706-NC2 cable.

2. Attach the three spade connectors on other end of cable to the same numbered terminals on the back of the DL20 display.

   Important: The DL20 must be set to the same baud rate as the serial port of your computer to establish communications.

3. Power on DL20.

Entering Terminal Mode

To use your computer in terminal/keyboard mode:

1. Select option *2 - Terminal/Keyboard (2706-NK1) Mode* from the *Main Menu*.

```
        Allen-Bradley DL20 Off-Line Programmer

                       MAIN MENU

        1 - Set Up Computer Serial Port
       ►2 - Terminal/Keyboard (2706-NK1) Mode
        3 - Set Up DL20 Serial Port
        4 - Set Up DL20 Parallel Port
        5 - Set Up DL20 Special Functions
        6 - Edit/Create Messages (Message Files)
        7 - S Record/Message File Conversion Functions
        8 - S Record/Message File Upload(Read)/Download(Write)
        9 - Message File Download
       10 - Print Messages (Message Files)
       11 - Delete All Message Files
       12 - Exit to DOS




              Enter Selection (1 - 12): 0
```

The following screen appears showing the selected baud rate and the communication port. You are now in terminal mode.

```
        Allen-Bradley DL20 Terminal/(Keyboard) Mode

                    Baud Rate: 9600
                     Port: COM 1











           Press END to return to the Main Menu
```

2. You can now use your keyboard to operate as a 2706-NK1 or -NK2 keyboard. Any key pressed on the keyboard is transmitted to the DL20.

    Data you enter will appear on the DL20 Display but not on your computer screen.

3. Press [End] to quit terminal mode and return to the *Main Menu.*

See the DL20 User Manual for details on how the Catalog No. 2706-NK1 or -NK2 Keyboards are used to communicate with and configure a DL20 Display.

Printing Messages

Chapter Objectives

This chapter shows how to use menu option *10 - Print Messages (Message Files)* to print DL20 messages.

Connecting Printer

Before printing messages, you must first connect a printer to your computer's printer (LPT1) port using the appropriate cable.

Personal Computer

Printer

Communications Cable
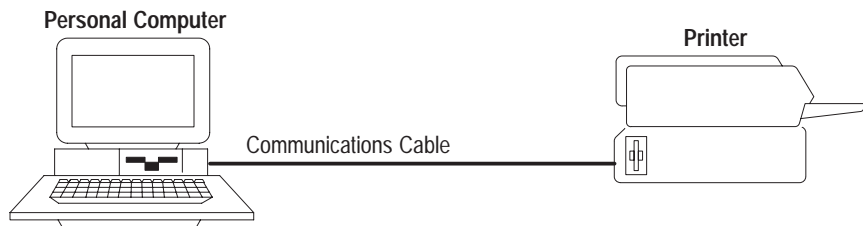
The printer port is usually a parallel port. You can redirect the printer output to a serial port such as Com1 or Com2 by typing the following commands at DOS level.

MODE LPT1: =COM2 [Enter]
MODE COM2: 9600, N, 8, 1 [Enter]

These commands may vary depending on the computer and printer. Consult your computer's User Manual for the exact commands required.

Printing Messages

To print DL20 messages:

1. Select option *10 - Print Messages (Message Files)* from the *Main Menu*.

```
            Allen-Bradley DL20 Off-Line Programmer

                        MAIN MENU

        1 - Set Up Computer Serial Port
        2 - Terminal/Keyboard (2706-NK1) Mode
        3 - Set Up DL20 Serial Port
        4 - Set Up DL20 Parallel Port
        5 - Set Up DL20 Special Functions
        6 - Edit/Create Messages (Message Files)
        7 - S Record/Message File Conversion Functions
        8 - S Record/Message File Upload(Read)/Download(Write)
        9 - Message File Download
      ▶10 - Print Messages (Message Files)
       11 - Delete All Message Files
       12 - Exit to DOS




            Enter Selection (1 - 12): 0
```

The following screen appears prompting you for a range of message numbers to print and other attributes.

If the CONFIG.DAT file does not exist, another screen will appear first prompting you for the DL20 type and memory size.

```
                        PRINT MESSAGES

        Print From Message #(0001-1022): 1
        Stop after Message #(0001-1022):

        Print Message Attributes also? (Y or N):
        Print System Attributes? (Y or N):
        Printing Message :








        Press ESC to return to the Main Menu.

    Related S Record file name: DL20#1.
```

2. Type the number of the first message you want to print and press [Enter]. Valid numbers are in the range 1 - 1022. The numbers 255, 256, 511, 512, 767 and 768 are ignored.

3. Type the number of the last message you want to print and press [Enter]. Valid numbers are in the range 1 - 1022. The numbers 255, 256, 511, 512, 767 and 768 are ignored.

4. Specify whether you want to print message attributes with each message. Type **Y** or **N** and press [Enter].

5. Specify whether you want to print system attributes. Type **Y** or **N** and press [Enter].

   Printing starts. The screen displays the number of each message as it prints. Only the messages in the current DL20 subdirectory or on disk will be printed.

   Press [Esc] to abort printing. The current message will finish printing before you return to the *Main Menu*.

   After all messages have printed you are asked if you want to delete them from disk.

   ```
   Delete all Message files on the present 'working' drive? ▌
   ```

   Important: Do not delete messages before saving or converting the message files to an S Record file.
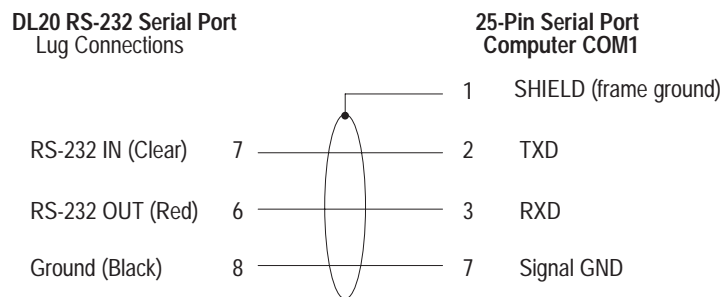
6. Type **Y** and [Enter] to delete messages. Otherwise, just press [Enter].
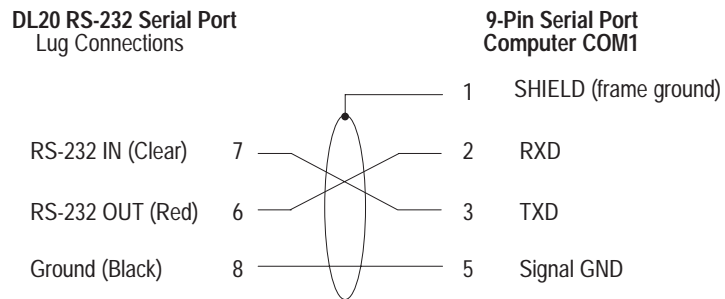
   You return to the *Main Menu.*

Connection Diagrams

This appendix provides connection diagrams that you can use to make your own cables.

Figure A.1
Connecting DL20 to an XT (25-Pin) Compatible Computer

DL20 RS-232 Serial Port			25-Pin Serial Port
Lug Connections			Computer COM1
		1	SHIELD (frame ground)
RS-232 IN (Clear)	7	2	TXD
RS-232 OUT (Red)	6	3	RXD
Ground (Black)	8	7	Signal GND

The wire colors refer to the Allen-Bradley Catalog No. 2706-NC1 and -NC2 cables.

Figure A.2
Connecting DL20 to an AT (9-Pin) Compatible Computer

DL20 RS-232 Serial Port			9-Pin Serial Port
Lug Connections			Computer COM1
		1	SHIELD (frame ground)
RS-232 IN (Clear)	7	2	RXD
RS-232 OUT (Red)	6	3	TXD
Ground (Black)	8	5	Signal GND

The wire colors refer to the Allen-Bradley Catalog No. 2706-NC1 and -NC2 cables.
The shield ground of the Adapter Cable should connect to Pin 1 at the computer end only.

Figure A.3
25-to-9 Pin Adapter Cable (Null Modem)

To 2706-NC2 or -NC7 Cable		To Computer Serial Port	
(25-Pin D Shell Connector)		(9-Pin Female D Shell Connector)	
2		2	RCV
3		3	XMT
7		5	Signal GND
		1	Signal GND
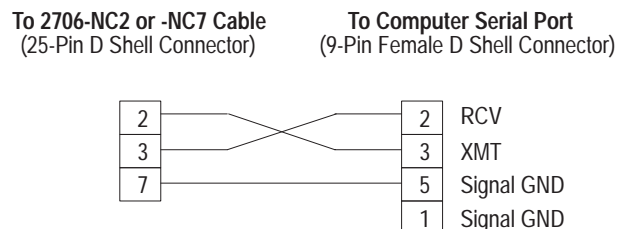
Shielded cable is recommended for accurate data transmission

Figure A.4
Connecting 1770-SA or -SB Data Recorder to IBM XT Serial Port
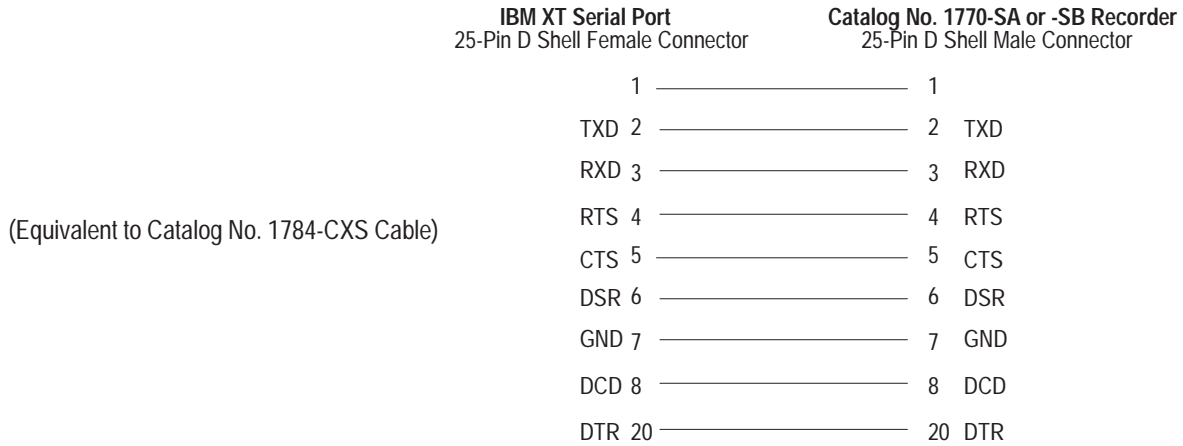
IBM XT Serial Port
25-Pin D Shell Female Connector

Catalog No. 1770-SA or -SB Recorder
25-Pin D Shell Male Connector

(Equivalent to Catalog No. 1784-CXS Cable)

	IBM XT		Recorder	
	1	——	1	
TXD	2	——	2	TXD
RXD	3	——	3	RXD
RTS	4	——	4	RTS
CTS	5	——	5	CTS
DSR	6	——	6	DSR
GND	7	——	7	GND
DCD	8	——	8	DCD
DTR	20	——	20	DTR

Figure A.5
Connecting 1770-SA or -SB Data Recorder to IBM AT Serial Port

IBM AT Serial Port
9-Pin D Shell Female Connector

Catalog No. 1770-SA or -SB Recorder
25-Pin D Shell Male Connector

(Equivalent to Catalog No. 1784-CAS Cable)

	IBM AT		Recorder	
			1	Shield (frame ground)
TXD	3	——	2	TXD
RXD	2	——	3	RXD
RTS	7	——	4	RTS
CTS	8	——	5	CTS
DSR	6	——	6	DSR
GND	5	——	7	GND
DCD	1	——	8	DCD
DTR	4	——	20	DTR
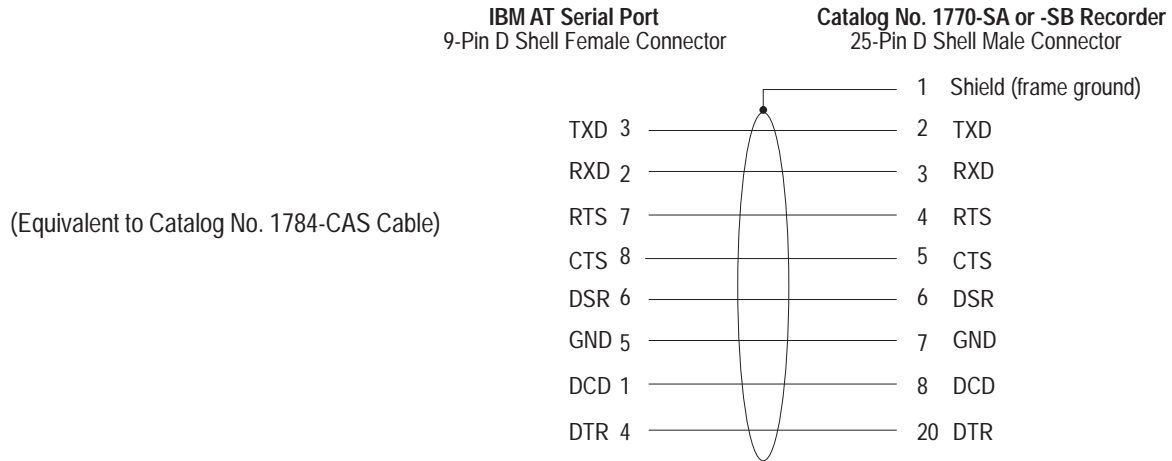
Figure A.6
Connecting 1770-SA or -SB Data Recorder to 6120 Serial Port

Allen-Bradley 6120 Serial Port
9-Pin D Shell Female Connector

Catalog No. 1770-SA or -SB Recorder
25-Pin D Shell Male Connector

(Equivalent to Catalog No. 1784-CYS Cable)

	6120		Recorder	
			1	Shield (frame ground)
TXD	2	——	2	TXD
RXD	3	——	3	RXD
RTS	4	——	4	RTS
CTS	5	——	5	CTS
DSR	6	——	6	DSR
GND	7	——	7	GND
DCD	8	——	8	DCD
DTR	9	——	20	DTR

Rockwell *Automation*
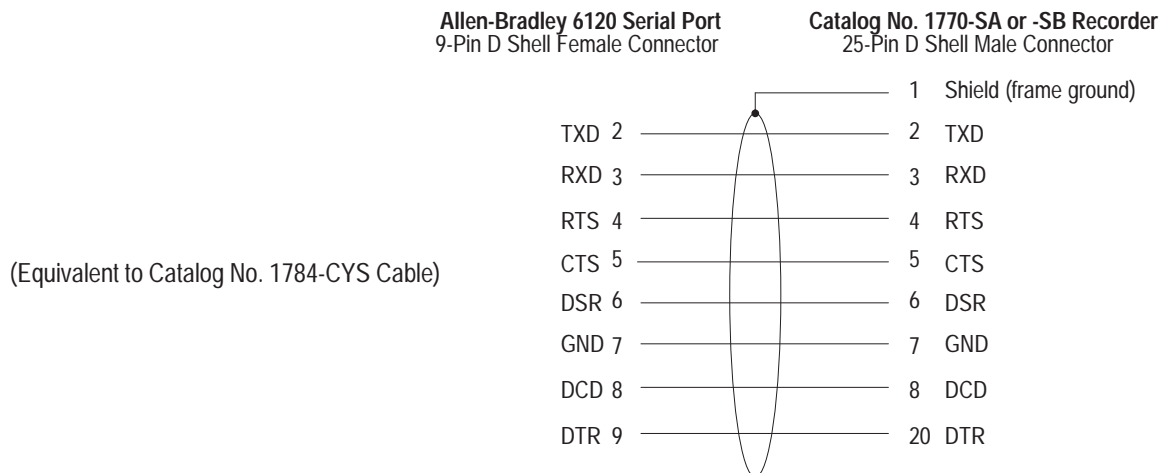
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