

Protecting and Storing Programs

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- Password Protection
- Storing Programs on Cassette Tapes

Handheld Programmer D3-HP & D3-HPP have been retired as of 03/2021 & 01/2018 respectively. User H2-HPP to program D3-350 CPU. Please consider Productivity, BRX, or CLICK series PLC systems as upgrades.

Password Protection

The DL305 CPUs provide an extra measure of protection by allowing you to enter a password that prevents unauthorized machine operations. The password must be a four-character numeric (0-9) code. Once you've entered a password, you can remove it by entering all zeros (0000). This is the default from the factory.

The password is stored in the CPU, not in the Handheld Programmer. If the battery backup is lost and the power is cycled, you could lose the password (and the program too.)

You can enter a password in either the Run or Program mode. Use the following keystrokes to use the password features.

Use these keystrokes to enter a password

| | | | | |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| CLR | SHF | 9 | 8 | 7 |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 6 | DEL | SHF | X | X |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| X | X | ENT | NXT | |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | |

| | | | |
|-----------------|---------|---------|----------|
| XXXXX | | | |
| ADDRESS/DATA | | | |
| 0 (AND) | 4 (OUT) | 0 (MCS) | 4 (ADR) |
| 1 (OR) | 5 (TMR) | 1 (MCR) | 5 (SHF) |
| 2 (STR) | 6 (CNT) | 2 (SET) | 6 (DATA) |
| 3 (NOT) | 7 (SR) | 3 (RST) | 7 (REG) |
| ON/OFF RUN BATT | | | |
| PWR CPU | | | |

(X represents the password. The display depends on the password entered.)

Once you've entered the password, you can enable it by using the following keystrokes.

Use these keystrokes to enable the password

| | | | | |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| CLR | SHF | 1 | 2 | 3 |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 4 | DEL | NXT | | |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | | |

| | | | |
|-----------------|---------|---------|----------|
| 1234 | | | |
| ADDRESS/DATA | | | |
| 0 (AND) | 4 (OUT) | 0 (MCS) | 4 (ADR) |
| 1 (OR) | 5 (TMR) | 1 (MCR) | 5 (SHF) |
| 2 (STR) | 6 (CNT) | 2 (SET) | 6 (DATA) |
| 3 (NOT) | 7 (SR) | 3 (RST) | 7 (REG) |
| ON/OFF RUN BATT | | | |
| PWR CPU | | | |

Once password protection has been enabled, you must enter the password before you can make any changes to the program. You can still view the program and use the Handheld to monitor machine operations, but you cannot make changes.

Use these keystrokes to access a password protected CPU

| | | | | |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| CLR | SHF | 5 | 6 | 7 |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| 8 | DEL | SHF | X | X |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| X | X | ENT | NXT | |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | |

| | | | |
|-----------------|---------|---------|----------|
| 0.0.0.0 | | | |
| ADDRESS/DATA | | | |
| 0 (AND) | 4 (OUT) | 0 (MCS) | 4 (ADR) |
| 1 (OR) | 5 (TMR) | 1 (MCR) | 5 (SHF) |
| 2 (STR) | 6 (CNT) | 2 (SET) | 6 (DATA) |
| 3 (NOT) | 7 (SR) | 3 (RST) | 7 (REG) |
| ON/OFF RUN BATT | | | |
| PWR CPU | | | |

(X represents the password. The display depends on the password entered.)

Storing Programs on Cassette Tapes

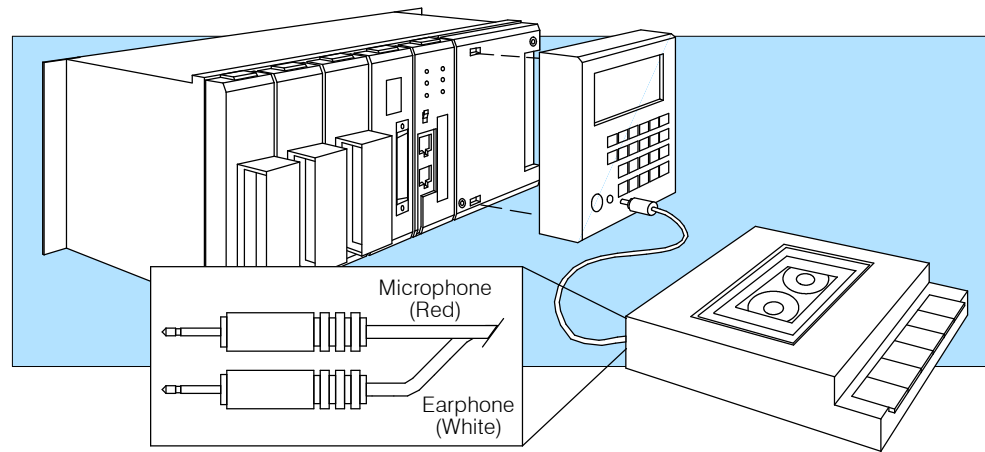
Cassette Characteristics

Although the best way to store programs is to use **DirectSOFT** and computer diskettes, you can also copy the programs from the CPU to cassette tapes. Both forms of media allow you store several programs, but the diskette method is much easier to use and it's more reliable due to the differences in various cassette recorders.

When you select a recorder, choose one designed for use with Personal Computers (PCs). These types of recorders are much more suitable than those used for normal audio recordings. However, most audio recorders will record or play the digital information accurately if they have both volume and tone controls.

Connecting the Cassette Recorder

The cassette recorder cable, included with the Handheld Programmer, connects to the small jack on the front of the Handheld Programmer.



NOTE: Connect the cable to the tape recorder microphone jack when you are writing a program to the cassette. Connect the cable to the earphone jack when you are reading a program from the cassette.

Program Names on Cassettes

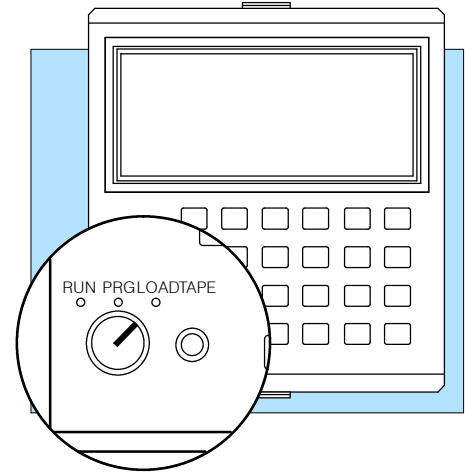
Since it is very easy to store multiple programs on a single cassette it is very important idea to name each program. You can use a four-digit number to name the various programs. You do not *have* to use a name, but it's a good idea.

Writing a Program to the Cassette

If you examine the front of the Handheld Programmer you will notice one of the keyswitch positions is labeled "LOAD". You must set the keyswitch to this position before you can save a program to a cassette.

It generally takes about 75 seconds to copy a program from the CPU to a cassette tape.

NOTE: Remember tape programs are stored sequentially. It is very easy to overwrite existing programs if you do not position the tape correctly before beginning this procedure. Use the tape counter on the recorder to keep track of program locations.



If you want to make your life easier, it's a good idea to make a few notes on the cassette case.

- File number (if you use one)
- Tape counter reading (helps you position the tape later)
- Volume and tone control settings (helps you read the tape later)

When you have the cable connected to the recorder microphone jack, place the Handheld Programmer keyswitch in the LOAD position. Once the keyswitch has been placed in the LOAD position, the display will go blank and the SHF LED will be turned on. Then, use the following procedure to copy the program.

Enter a four-digit program name (or 0 if you do not want a name)

X

X

X

X

XXXX

| | | | | |
|-----------------|-----|-----|-----|------|
| | 0 | 4 | 0 | 4 |
| | AND | OUT | MCS | ADR |
| ADDRESS/DATA | 1 | 5 | 1 | 5 |
| | OR | TMR | MCR | SHF |
| ON/OFF RUN BATT | 2 | 6 | 2 | 6 |
| | STR | CNT | SET | DATA |
| PWR CPU | 3 | 7 | 3 | 7 |
| | NOT | SR | RST | REG |

Start the cassette recorder

REC

OR

REC

PLAY

Press Write

WRITE

(Program takes about 75 seconds to transfer.)

| | | | | |
|-----------------|-----|-----|-----|------|
| | 0 | 4 | 0 | 4 |
| | AND | OUT | MCS | ADR |
| ADDRESS/DATA | 1 | 5 | 1 | 5 |
| | OR | TMR | MCR | SHF |
| ON/OFF RUN BATT | 2 | 6 | 2 | 6 |
| | STR | CNT | SET | DATA |
| PWR CPU | 3 | 7 | 3 | 7 |
| | NOT | SR | RST | REG |

Display when transfer is complete

END

| | | | | |
|-----------------|-----|-----|-----|------|
| | 0 | 4 | 0 | 4 |
| | AND | OUT | MCS | ADR |
| ADDRESS/DATA | 1 | 5 | 1 | 5 |
| | OR | TMR | MCR | SHF |
| ON/OFF RUN BATT | 2 | 6 | 2 | 6 |
| | STR | CNT | SET | DATA |
| PWR CPU | 3 | 7 | 3 | 7 |
| | NOT | SR | RST | REG |

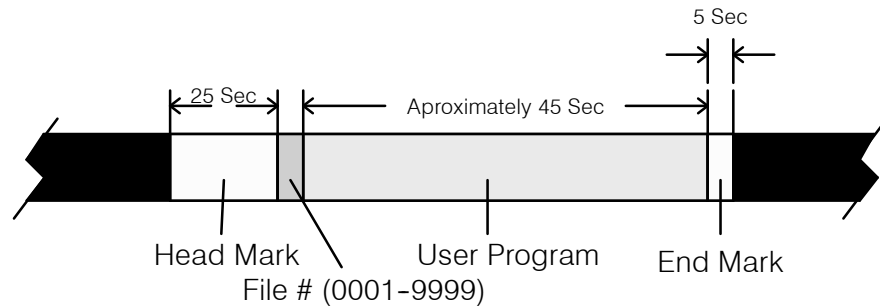
Stop the cassette recorder

STOP

Verifying the Tape Contents

It's usually a good idea to verify the tape contents match what is stored in the CPU. The last thing you want to do is to reload the program at a later date only to find the program isn't what you expected.

Before you begin, it's important to understand how the information is placed on the tape. You'll need to know this when in order to position the tape correctly.



- ☐ The Head and End marks are written with 2kHz signals
- ☐ One signal is at 2kHz and 0 signal is at 1kHz
- ☐ This can be omitted if program identification by number is not needed

Part of the problem with cassette storage is that tape positioning can mean the difference between a successful transfer and a serious headache. Before you begin the procedure make sure you have positioned the tape just before the first head mark, or, just before the location of the program you want to read. If you position the tape in the head mark, an error will occur.

Set the tape recorder TONE and VOLUME controls to the settings you used when you recorded the program. If you don't remember the settings, set the controls to the midway position. (You may have to adjust the volume later.)

Also, remember the Handheld Programmer keyswitch has to be in the LOAD position to perform tape operations.

When you have the cable connected to the earphone jack, place the Handheld Programmer keyswitch in the LOAD position. The display will go blank and the SHF LED will be turned on. Then, use the following procedure to copy the program.

Enter the four-digit program name (if you used one)

| | | | | |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| X | X | X | X | CHECK |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> |

| | | | |
|--------------|-------|-------|--------|
| XXXX | | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |
| ADDRESS/DATA | | | |
| ON/OFF | RUN | BATT | |
| PWR | CPU | | |

Start the cassette recorder

| |
|------|
| PLAY |
|------|

| | | | |
|--------------|-------|-------|--------|
| E 28 | | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |
| ADDRESS/DATA | | | |
| ON/OFF | RUN | BATT | |
| PWR | CPU | | |

LED 5 flashes and the message E28 appears when the head mark is found. The message disappears and LED 7 comes on if the procedure is working correctly. If the E28 message does not disappear, adjust the volume level until it does. You have 12 seconds to complete the volume adjustment.

If you entered a file number, the system will check the tape to make sure the file numbers match. If the file does not match, the current file will be "passed" and the process will continue until the correct file is located. The following displays are used.

Display when the file number does not match

| | | | |
|--------------|-------|-------|--------|
| PASS | | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |
| ADDRESS/DATA | | | |
| ON/OFF | RUN | BATT | |
| PWR | CPU | | |

Display when the file number is found

| | | | |
|--------------|-------|-------|--------|
| F | | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |
| ADDRESS/DATA | | | |
| ON/OFF | RUN | BATT | |
| PWR | CPU | | |

When the check is complete, one of two displays will appear.

Display when the programs match

| | | | |
|--------------|-------|-------|--------|
| <i>End</i> | | | |
| ADDRESS/DATA | | | |
| ON/OFF | RUN | BATT | |
| PWR | CPU | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |

Display when an error occurs

| | | | |
|--------------|-------|-------|--------|
| <i>E 25</i> | | | |
| ADDRESS/DATA | | | |
| ON/OFF | RUN | BATT | |
| PWR | CPU | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |

You can press CLR to remove the error message and start over. If you get an error there are several things you can check.

- Check the tape positioning. It is very important to position the tape correctly. This is the cause of most errors.
- Adjust the volume level and/or tone controls.
- Check the cable connections.
- Clean the tape recorder head. Use the documentation that came with your recorder to determine the correct cleaning procedures.

Reading a Program from a Cassette

The procedure to read a program is almost exactly the same as the one for verifying the tape contents. Before you begin the procedure make sure you have positioned the tape just before the first head mark, or just before the location of the program you want to read. If you position the tape in the head mark, an error will occur.

Set the tape recorder TONE and VOLUME controls to the settings you used when you recorded the program. If you don't remember the settings, set the controls to the midway position. (You may have to adjust the volume later).

Also, remember the Handheld Programmer keyswitch has to be in the LOAD position to perform tape operations.

When you have the cable connected to the earphone jack, place the Handheld Programmer keyswitch in the LOAD position. The display will go blank and the SHF LED will be turned on. Then, use the following procedure to copy the program.

Enter the four-digit program name (if you used one)

X X X X READ

| | | | |
|-------|-------|-------|--------|
| XXXXX | | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |

ADDRESS/DATA

ON/OFF RUN BATT

PWR CPU

Start the cassette recorder

PLAY

| | | | |
|-------|-------|-------|--------|
| E 28 | | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |

ADDRESS/DATA

ON/OFF RUN BATT

PWR CPU

LED 5 flashes and the message E28 appears when the headmark is found. The message disappears and LED 7 comes on if the procedure is working correctly. If the E28 message does not disappear, adjust the volume level until it does. You have 12 seconds to complete the volume adjustment.

If you entered a file number, the system will check the tape to make sure the file numbers match. If the file does not match, the current file will be “passed” and the process will continue until the correct file is located. The following displays are used.

Display when the file number does not match

| | | | |
|--------------|-------|-------|--------|
| <i>PASS</i> | | | |
| ADDRESS/DATA | | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |

Display when the file number is found

| | | | | |
|--------------|-------|-------|-------|--------|
| <i>F</i> | | | | |
| <hr/> | | | | |
| ADDRESS/DATA | | | | |
| <hr/> | | | | |
| ON/OFF | RUN | BATT | | |
| <hr/> | | | | |
| | PWR | CPU | | |
| <hr/> | | | | |
| | | | | |
| | 0 | 4 | 0 | 4 |
| | (AND) | (OUT) | (MCS) | (ADR) |
| | 1 | 5 | 1 | 5 |
| | (OR) | (TMR) | (MCR) | (SHF) |
| | 2 | 6 | 2 | 6 |
| | (STR) | (CNT) | (SET) | (DATA) |
| | 3 | 7 | 3 | 7 |
| | (NOT) | (SR) | (RST) | (REG) |

When the program has been loaded, the following display will appear.

Display when the program has been loaded

| | | | |
|--------------|-------|-------|--------|
| <i>END</i> | | | |
| ADDRESS/DATA | | | |
| <hr/> | | | |
| ON/OFF | RUN | BATT | |
| <hr/> | | | |
| PWR CPU | | | |
| <hr/> | | | |
| 0 | 4 | 0 | 4 |
| (AND) | (OUT) | (MCS) | (ADR) |
| 1 | 5 | 1 | 5 |
| (OR) | (TMR) | (MCR) | (SHF) |
| 2 | 6 | 2 | 6 |
| (STR) | (CNT) | (SET) | (DATA) |
| 3 | 7 | 3 | 7 |
| (NOT) | (SR) | (RST) | (REG) |

You can press CLR to remove the error message and start over. If you get an error there are several things you can check.

- Check the tape positioning. It is very important to position the tape correctly. This is the cause of most errors.
- Adjust the volume level and/or tone controls.
- Check the cable connections.
- Clean the tape recorder head. Use the documentation that came with your recorder to determine the correct cleaning procedures.

As you've seen, entering and storing programs with the Handheld is a pretty simple task. Once you've got the program entered and the machine is up and running, you can use the Handheld to monitor and change machine operations almost as easily. The next chapter shows the details.