



**USBCNC-FAD  
USBCNC-FAD-INT  
USBCNC-FAD-SW**

**User Manual for USB Disk Key readers**

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# Table of Contents

1	Introduction.....	1
2	Requirements.....	1
3	Part List for Devices.....	1
3.1	Parts List for USBCNC-FAD Kit.....	1
3.2	Parts List for USBCNC-FAD-INT Kit.....	1
3.3	Parts List for USBCNC-FAD-SW Kit.....	2
4	Installation.....	2
5	Description of Operation.....	2
6	Available Plus Commands.....	3
7	Examples of Plus Command and Command Usage.....	5
7.1	DIR+ Command.....	5
7.2	DIR /<DirectoryName>+ Command.....	5
7.3	DIR <MaskCharacter>+ Command.....	6
7.4	TA,<FileName>+ Command.....	6
7.5	PU,0,<FileName>+ Command.....	7
7.6	PU,1,<FileName>+ Command.....	7
7.7	PU,2,<FileName>+ Command.....	7
7.8	PU,3,<FileName>+ Command.....	8
7.9	DNC,<FileName>+ Command.....	8
7.10	DNCX,<FileName>+ Command.....	9
7.11	DNC,<FileName>,?+ Command.....	9
7.12	DNC,<FileName>,?,?+ Command.....	10
7.13	HELP+ Command.....	10
7.14	DE,<FileName>+ Command.....	11
7.15	VW,<FileName>+Command.....	11
8	Changing the Baud rate on the USBCNC-FAD device.....	11
8.1	Baud Rate 57600.....	12
8.2	Baud Rate 38400.....	12
8.3	Baud Rate 19200.....	12
8.4	Baud Rate 9600.....	12
8.5	Baud Rate 2400.....	12
9	Using the BYE=ON/OFF Parameter.....	13
10	Using the DNC=ONE TIME Parameter.....	13
11	Saving the parameter changes.....	13
12	Trouble Shooting Guide.....	13
12.1	Problem: There is no response from the USBCNC-FAD device.....	13
12.2	Problem: The CNC gives an error that the command is not recognized.....	14
12.3	Problem: Program stops for no apparent reason when using DNC mode.....	14
12.4	Problem: Part of the file is missing.....	14

## Illustration Index

Example 1: DIR+ Command.....	5
Example 2: DIR /INI+ Command.....	5
Example 3: DIR A+ Command.....	6
Example 4: DIR PRO+ Command.....	6
Example 5: TA, JOB1.TXT+ Command.....	6
Example 6: PU,0, PRG2.NC+ Command.....	7
Example 7: PU,1, TOOL2.NC+ Command.....	7
Example 8: PU,2, PRG3.TXT+ Command.....	8
Example 9: PU,3, ALL.TXT+ Command.....	8
Example 10: DNC, JOB2.TXT+ Command.....	8
Example 11: DNCX, JOB3.TXT+ Command.....	9
Example 12: DNC, MOLD.TXT, ?+ Command N1000.2.....	9
Example 13: DNC, MOLD.TXT, ?+ Command X-12.375.....	10
Example 14: DNC, MOLD2.TXT, ,, ?+ Command.....	10
Example 15: HELP+ Command.....	10
Example 16: DE, JOB3.TXT+ Command.....	11
Example 17: VW, ALL2.TXT+ Command.....	11
Example 18: Baud Rate 57600.....	12
Example 19: Baud Rate 38400.....	12
Example 20: Baud Rate 19200.....	12
Example 21: Baud Rate 9600.....	12
Example 22: Baud Rate 2400.....	12
Example 23: BYE=ON Parameter.....	13
Example 24: BYE=OFF Parameter.....	13
Example 25: DNC=ONE TIME.....	13

## Index of Tables

Table 1: USBCNC-FAD Parts List.....	1
Table 2: USBCNC-FAD-INT Parts List.....	1
Table 3: USBCNC-SW Parts List.....	2
Table 4: FADAL CNC Baud Rates.....	3
Table 5: Summary of Plus Commands.....	4

## 1 Introduction

This manual is intended to provide a description of the Calmotion USBCNC-FAD, USBCNC-FAD-INT and USBCNC-FAD-SW disk key readers.

## 2 Requirements

The USBCNC-FAD, USBCNC-FAD-INT and USBCNC-FAD-SW devices will work with any FADAL CNC control version with an available RS-232 connection at the back of the machine. Access to AC power wall outlet will be required to power the external version of the USBCNC-FAD device.

## 3 Part List for Devices

The following parts lists are for the three different USB products available for the FADAL controls:

### 3.1 Parts List for USBCNC-FAD Kit

**Table 1: USBCNC-FAD Parts List**

Item	Qty	Part Number	Description
1	1	XX-XXXX-XX	DB25 Cable, 25'
2	1	XX-XXXX-XX	5 Volt Power Supply, White Box
3	1	XX-XXXX-XX	External FADAL Box, Black Box with White Lettering
4	1	XX-XXXX-XX	USB Disk Key
5	1	XX-XXXX-XX	Calmotion Magnet

### 3.2 Parts List for USBCNC-FAD-INT Kit

**Table 2: USBCNC-FAD-INT Parts List**

Item	Qty	Part Number	Description
1	1	XX-XXXX-XX	5-Volt power cord (has +5VDC label), 2.5mm
2	1	XX-XXXX-XX	USB cap
3	1	XX-XXXX-XX	USB panel mount plug
4	1	XX-XXXX-XX	Internal USB Black Box, No Ends
5	1	XX-XXXX-XX	USB-AB Cable 14' +
6	1	XX-XXXX-XX	USB Disk Key
7	1	XX-XXXX-XX	Calmotion Magnet

### 3.3 Parts List for USBCNC-FAD-SW Kit

**Table 3: USBCNC-SW Parts List**

Item	Qty	Part Number	Description
1	2	XX-XXXX-XX	3' CAT5 Ethernet Cable
2	1	XX-XXXX-XX	6' Power Cord, 2.1mm
3	1	XX-XXXX-XX	USB Cap
4	1	XX-XXXX-XX	USB Panel Mount Plug
5	1	XX-XXXX-XX	Connector p/n RJ45DB25M-STR, To PC DB25 Connector
6	1	XX-XXXX-XX	Connector p/n RJ45DB25M-NULL, To CNC DB25 Connector
7	1	XX-XXXX-XX	DB25 Male to Male gender changer, Screw Kit Included
8	1	XX-XXXX-XX	USBCNC-FAD-SW Board, DIN Rails and Clips Included
9	1	XX-XXXX-XX	USB-AB Cable 14' +
10	1	XX-XXXX-XX	USB Disk Key
11	1	XX-XXXX-XX	Calmotion Magnet

#### 4 Installation

These USBCNC devices will work with any FADAL CNC control version with an available DB25 RS-232 connection located at the back of the machine. Only service personnel with appropriate knowledge should install this device.

#### 5 Description of Operation

The USBCNC-FAD is setup by default to operate at 38400 baud using the CD,10 command. The USBCNC-FAD requires that the correct CD,# be used for proper operation. If the CNC does not have the 38400 baud rate available, the USBCNC-FAD baud rate can be changed. See ***Changing the baud rate on the USBCNC-FAD device*** section later on in the manual. To determine the maximum baud rate available on the CNC, execute the MU command at the ENTER NEXT COMMAND prompt. Inspect the Change Device section to view a list of available CD,# commands.

**Table 4: FADAL CNC Baud Rates**

<b>Change Device Command</b>	<b>Baud Rate</b>
CD,11	57600
CD,10	38400
CD,9	19200
CD,8	9600
CD,6	2400

The CNC command CD,8 communicates to the USBCNC-FAD devices at a baud rate of 9600. The CD,10 command sets the CNC communication rate to 38400 baud rate and CD,11 sets the CNC communication rate to 57600 baud. Once a CD command is entered, a USBCNC-FAD device *plus* command may be used. A *plus* command activates the USBCNC-FAD device and allows the device to take control of the CNC machine. The USBCNC-FAD device will issue a BYE command to the machine when the command is finished. Another CD,# will be required before another *plus* command can be sent to the USBCNC-FAD device. The following instructions demonstrate the order of operation required to execute a USBCNC-FAD device command:

1. Enter the CD, Change Device, command for the USBCNC-FAD connected to a machine (example: CD,10 CD,11 or CD,8).
2. Type in the USBCNC-FAD command desired, ending the entry with the “+” character being careful to not end with the *enter key*.
3. Wait for the command to be processed. Expect a short delay if the USB disk was recently inserted.
4. Command processing is complete when the BYE command is issued.

Note: Do not remove the USB disk until the USBCNC-FAD command has completed and the USB has stopped flashing.

## **6 Available *Plus* Commands**

The USBCNC-FAD utilizes a new set of commands that are based on existing Fadal commands. These new commands are called *plus* commands as the USBCNC-FAD executes based on receiving a “+” character terminating the command line. The *enter key* is never used at the end of the USBCNC-FAD *plus* commands.

**Table 5: Summary of *Plus* Commands**

<b>USBCNC-FAD <i>plus</i> Command</b>	<b>Description</b>
DE,FILENAME+	Delete the FILENAME
DIR+	Display root directory of the USB disk. USBCNC-FAD will now operate out of the root directory
DIR /SUB+	Display directory named SUB directory of the USB disk. USBCNC-FAD will now operate out of the sub-directory entered
DNC,FILENAME+	DNC the FILENAME
DNC,FILENAME,?+	DNC the FILENAME starting at line with ? text
DNC,FILENAME,,?+	DNC the FILENAME. Add ? text before the file data is sent
DNCX,FILENAME+	DNC the FILENAME (Use for Xmodem)
DNCX,FILENAME,?+	DNC the FILENAME starting at line with ? text (Use for Xmodem)
DNCX,FILENAME,,?+	DNC the FILENAME. Add ? text before the file data is sent (Use for Xmodem)
HELP+	Display the HELP menu
PU,0,FILENAME+	Punch tooling data and current program
PU,1,FILENAME+	Punch tooling data only
PU,2,FILENAME+	Punch current program only
PU,3,FILENAME+	Punch all programs
PU,4,FILENAME+	Punch machine parameters
PU,5,FILENAME+	Punch machine's axis surveys
TA,FILENAME+	Tape input FILENAME
VW,FILENAME+	View FILENAME

## 7 Examples of *Plus* Command and Command Usage

The following examples utilize the new set of USBCNC-FAD *plus* commands that are based on existing Fadal commands. It is important to note that the *enter key* is never used at the end of any USBCNC-FAD *plus* commands.

### 7.1 DIR+ Command

Description: Display file(s) in the root directory of the USB disk key. This will also reset the operating directory back to the root directory if a sub directory was previously selected.

```
ENTER NEXT COMMAND CD , 10
ENTER NEXT COMMAND DIR+
@
@
CNC1 . TXT          CNC2 . TXT@
BYE
ENTER NEXT COMMAND <
```

#### Example 1: DIR+ Command

### 7.2 DIR /<DirectoryName>+ Command

Description: Display file(s) located in <DirectoryName> of the USB disk. In the example the directory name *INI* is used. Use the directory name that is to be accessed in place of the <DirectoryName> parameter. The USBCNC-FAD will now operate out of the sub-directory entered for other commands until the DIR+ command resets the USB to the root directory.

```
ENTER NEXT COMMAND CD , 10
ENTER NEXT COMMAND DIR /INI+
@
@
. <DIR>          . . <DIR>@
USBCNC . INI    @
BYE
ENTER NEXT COMMAND <
```

#### Example 2: DIR /INI+ Command



### 7.3 DIR <MaskCharacter>+ Command

Description: Display a portion of a directory containing a large number of files. Use the mask character(s) to display file(s) utilizing the <MaskCharacter> parameter. The following example displays all files in the current directory beginning with the character *A*. A second example displays all files in the current directory beginning with the characters *PRO*.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DIR A+
@
@
A1.TXT                A2.TXT                ATOM.TXT@
BYE
ENTER NEXT COMMAND <
```

#### Example 3: DIR A+ Command

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DIR PRO+
@
@
PRO72.TXT            PROG3.TXT            PROGRAM_21.TXT@
BYE
ENTER NEXT COMMAND <
```

#### Example 4: DIR PRO+ Command

### 7.4 TA,<FileName>+ Command

Description: Tape input command. Loads the specified file into the CNC memory. In the following example the file name to be loaded is *JOB1.TXT*. Use the file name to be accessed in place of the <FileName> parameter.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND TA,JOB1.TXT+
M2
TAPE INPUT TERMINATED
ENTER NEXT COMMAND <
```

#### Example 5: TA,JOB1.TXT+ Command

### 7.5 PU,0,<FileName>+ Command

Description: Punch command. Saves program and tooling data to the USB disk key from the CNC memory. In the following example the file name to be loaded is *PRG2.NC*. Use the file name to be accessed in place of the <FileName> parameter.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND PU,0,PRG2.NC+
%
O2 (PRG2
X1.
M2
TO,1,2.11
TO,2,3.
FO,1,1.,1.,2.
%
ENTER NEXT COMMAND <
```

#### Example 6: PU,0,PRG2.NC+ Command

### 7.6 PU,1,<FileName>+ Command

Description: Punch command. This will save only the tooling data to the USB disk key from the CNC memory. In the following example the file name to be loaded is *TOOL2.NC*. Use the file name to be accessed in place of the <FileName> parameter.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND PU,1,TOOL2.NC+
%
TO,1,2.11
TO,2,3.
FO,1,1.,1.,2.
%
ENTER NEXT COMMAND <
```

#### Example 7: PU,1,TOOL2.NC+ Command

### 7.7 PU,2,<FileName>+ Command

Description: Punch command. Saves program data only to the USB disk key from the CNC memory. In the following example the file name to be loaded is *PRG3.TXT*. Use the file name to be accessed in place of the <FileName> parameter.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND PU,2,PRG3.TXT+
%
O3 (PRG3
X1.Y2.G1
M2
%
ENTER NEXT COMMAND <
```

### Example 8: PU,2,PRG3.TXT+ Command

#### 7.8 PU,3,<FileName>+ Command

Description: Punch command. This instruction saves all programs in CNC memory to the USB disk key. In the following example the file name to be loaded is *ALL.TXT*. Use the file name that is to be accessed in place of the <FileName> parameter.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND PU,3,ALL.TXT+
%
O2 (PRG2
X1.
M2
O3 (PRG3
X1.Y2.G1
M2
%
ENTER NEXT COMMAND <
```

### Example 9: PU,3,ALL.TXT+ Command

#### 7.9 DNC,<FileName>+ Command

Description: DNC, Direct Numerical Control command. This command will run a program from the USB disk key on the CNC machine. In the following example the file name to be loaded is *JOB2.TXT*. Use the file name that is to be accessed in place of the <FileName> parameter.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DNC,JOB2.TXT+
```

### Example 10: DNC,JOB2.TXT+ Command

### 7.10 DNCX,<FileName>+ Command

Description: DNCX, Direct Numerical Control with Xmodem. This command will run a program from the USB disk key on the CNC machine. The Xmodem version of DNC requires that the option to be available on the Fadal control. If the DNCX feature exists on the Fadal control, the Xmodem version of DNC can be used. In the following example the file name to be loaded is *JOB3.TXT*. Use the file name that is to be accessed in place of the <FileName> parameter.

Note: With version 1.8.0 and later, a file in DNC mode will continuously repeat. An end of program *must* be included at the end of the program file that is being sent via DNC. An end of program command will ensure that the control will enter the WAITING mode at the end of the program. If the user wishes to repeat the program via DNC, press the Start button on the Fadal keyboard. Additional commands are not required.

```
ENTER NEXT COMMAND CD,10  
ENTER NEXT COMMAND DNCX,JOB3.TXT
```

#### Example 11: DNCX,JOB3.TXT+ Command

### 7.11 DNC,<FileName>,+ Command

Description: DNC, Direct Numerical Control with block search. The DNC command has an optional parameter to start at a specific block of data within the file to be sent via DNC. Type the desired search text following the file name. The USBCNC-FAD controller will search the file until it matches the specified text. For example, suppose the operator were to type in `DNC,MOLD.TXT,N1000.2`. DNC will begin when a block that contains "N1000.2" is found. In the following examples the file name to be utilized is *MOLD.TXT*. Use the file name to be searched in place of the <FileName> parameter.

Note: An N word can be added to a single line of the file in order to establish a starting block number. This is true even if there are no other block numbers in the file. N words cannot exceed 99,999. For large files, increments other than 1 can be used.

```
ENTER NEXT COMMAND CD,10  
ENTER NEXT COMMAND DNC,MOLD.TXT,N1000.2+
```

#### Example 12: DNC,MOLD.TXT,+ Command N1000.2

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DNC ,MOLD.TXT ,X-12.375+
```

### Example 13: DNC,MOLD.TXT,?+ Command X-12.375

## 7.12 DNC,<FileName>,,?+ Command

Description: DNC, Direct Numerical Control with preparatory text. This runs a program from the USB disk key on the CNC machine. In the following example the file name to be loaded is *MOLD2.TXT*. Use the file name that is to be accessed in place of the <FileName> parameter. Preparatory data can be sent prior to running the file. For example, the operator might want to make a tool change prior to running a file.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DNC ,MOLD2.TXT , ,M6T1+
```

### Example 14: DNC,MOLD2.TXT,,?+ Command

## 7.13 HELP+ Command

Description: Display the commands available for use with the USBCNC-FAD device.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND HELP+
      * CNC USB DRIVE, VERSION 1.8.2 (03.66) *

DIR+           DISPLAY ROOT DIRECTORY
DE,FILENAME+   DELETE FILENAME
TA,FILENAME+   LOAD FILENAME INTO CNC MEMORY
PU,0,FILENAME+ SAVE PROGRAM AND TOOLING DATA TO FILENAME
PU,1,FILENAME+ SAVE TOOLING DATA ONLY TO FILENAME
PU,2,FILENAME+ SAVE PROGRAM ONLY TO FILENAME
PU,3,FILENAME+ SAVE ALL PROGRAMS IN MEMORY TO FILENAME
DNC,FILENAME+  DNC FILENAME (USE DNCX FOR XMODEM)
DNC,FILENAME,?+ DNC FILENAME STARTING AT LINE WITH ? TEXT
DNC,FILENAME,,?+ DNC FILENAME SEND ? TEXT BEFORE FILE DATA
VW,FILENAME+   VIEW FILENAME WITHOUT LOADING
```

### Example 15: HELP+ Command

### 7.14 DE,<FileName>+ Command

Description: This command will delete the file specified from the USB disk. In the following example the file name to be loaded is *JOB3.TXT*. Use the file name that is to be accessed in place of the <FileName> parameter.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DE,JOB3.TXT+
FILE JOB3.TXT DELETED @
```

#### Example 16: DE,JOB3.TXT+ Command

### 7.15 VW,<FileName>+Command

Description: Displays the first 12 lines of the file specified. This can be used before loading or deleting files to verify the contents of a file. In the following example the file name to be loaded is *ALL2.TXT*. Use the file name that is to be accessed in place of the <FileName> parameter.

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND VW,ALL2.TXT+
%@
O2 (PRG2@
X1.@
M2@
O3 (PRG3@
X1.Y2.G1@
M2@
%@
```

#### Example 17: VW,ALL2.TXT+ Command

## 8 Changing the Baud rate on the USBCNC-FAD device

The USBCNC-FAD defaults to 38400 baud. If a different baud rate is desired, verify that the CNC can support the new baud rate to ensure that the CNC and the USBCNC-FAD can communicate. To change the USBCNC-FAD device baud rate, use a PC to create a text file on a USB disk key with the file name USBCNC.INI in the root directory. ***This file must be edited using a text editor such as Windows Notepad and saved as a text document.*** To change the baud rate on the USBCNC-FAD device to 9600 baud, type CNC=9600 in the first line of the USBCNC.INI file. The USBCNC.INI file must be text only. The current version of USBCNC-FAD has been tested at 9600, 38,400, 57,600 and 115,200 baud.

### **8.1 Baud Rate 57600**

To change the baud rate on the USBCNC-FAD device to 57600 baud, change the first line of the INI file as follows:

```
CNC=57600
```

#### **Example 18: Baud Rate 57600**

### **8.2 Baud Rate 38400**

To change the baud rate on the USBCNC-FAD device to 38400 baud, change the first line of the INI file as follows:

```
CNC=38400
```

#### **Example 19: Baud Rate 38400**

### **8.3 Baud Rate 19200**

To change the baud rate on the USBCNC-FAD device to 19200 baud, change the first line of the INI file as follows:

```
CNC=19200
```

#### **Example 20: Baud Rate 19200**

### **8.4 Baud Rate 9600**

To change the baud rate on the USBCNC-FAD device to 9600 baud, change the first line of the INI file as follows:

```
CNC=9600
```

#### **Example 21: Baud Rate 9600**

### **8.5 Baud Rate 2400**

To change the baud rate on the USBCNC-FAD device to 2400 baud, change the first line of the INI file as follows:

```
CNC=2400
```

#### **Example 22: Baud Rate 2400**

## 9 Using the BYE=ON/OFF Parameter

The **BYE=OFF** is for older CNCs that clear the screen after receiving the BYE command. The BYE command is important because it closes the RS-232 port and allows the keyboard on the Control to start functioning again. If the BYE is not sent, press the MANUAL key or the ENTER key to regain keyboard control. Set the BYE=OFF in the INI file only if the control version clears the screen after a BYE command. Otherwise keep it at the default of BYE=ON.

```
BYE=ON
```

### Example 23: BYE=ON Parameter

```
BYE=OFF
```

### Example 24: BYE=OFF Parameter

## 10 Using the DNC=ONE TIME Parameter

The **DNC=ONE TIME** is used to configure the USBCNC-FAD so that the file used with the DNC command will only be run once and not repeated.

```
DNC=ONE TIME
```

### Example 25: DNC=ONE TIME

## 11 Saving the parameter changes

To complete the parameter changes, remove power from the USBCNC-FAD device. Copy the USBCNC.INI file to a USB flash device. Insert this USB flash device into the USBCNC-FAD.

Apply power to the USBCNC-FAD. The LED's on the USBCNC-FAD will cycle, pause, and cycle again. Indication of the baud rate update will occur when the lights stop flashing. Enter the correct baud rate on the CNC with the corresponding CD,8 CD10 or CD,11. Delete the INI file so that the INI file does not update the USBCNC-FAD device repeatedly.

## 12 Trouble Shooting Guide

### 12.1 Problem: There is no response from the USBCNC-FAD device.



1. The AC power outlet on Fadal CNC machines can cause problems powering the external version of the USBCNC-FAD. Move the DC power supply to another source.
2. Verify the +5VDC power supply is properly connected into a functioning AC outlet.
3. At least one LED should be lit on the front panel of the device when there is power,
4. The straight through DB25 cable provided should be connected directly into the back of the machine. Do not use a null modem cable between the USBCNC-FAD device and the machine.
5. Verify that the machine version supports the baud rate being used. CD,10 is for 38400 baud machines. CD,8 is for 9600 baud machines. To verify the machines capability, use the MU command at the ENTER NEXT COMMAND prompt and go to page for Change Device.
6. Verify the USBCNC-FAD device matches the baud rate expected.
7. The USBCNC-FAD command set requires a *plus* to be used instead of the enter key. After entering a command, end the command with a *plus* and do not press the enter key or return key.
8. The CD,10 and CD,8 commands are CNC commands, not *plus* commands for the USBCNC-FAD device. Press the enter key after the CD commands, do not press a *plus* key at the end of the commands.
9. Wait a couple seconds after just inserting a USB key. The device maybe processing the new device insertion.

**12.2 Problem: The CNC gives an error that the command is not recognized.**

1. The USBCNC-FAD command set requires a *plus* to be used instead of the enter key. After entering a command, end the command with a *plus* and do not press the enter key or return key.
2. The CD,10 and CD,8 commands are commands for the CNC and not the USBCNC-FAD. Press the enter key after the CD commands. Do not press a *plus* key at the end of CD commands.

**12.3 Problem: Program stops for no apparent reason when using DNC mode.**

1. Certain Fadal versions require comment block lines to have an N word on the comment line. If they do not have the N word, the CNC will give an error. Delete the comments or add N words to the comment lines. The same comment line can be used if desired. Version 1.7.3 and later dynamically adds an N1 before a comment character. The comment character must be the first character in the line.

**12.4 Problem: Part of the file is missing.**

1. USB devices require time to finish writing data before removing them. This is true for both a PC and the USBCNC-FAD.
2. When using a PC, always use the “Safely remove hardware” icon before removing the USB disk key from a computer.
3. On the USBCNC-FAD device, wait for the lights on the panel to stop flashing before removing a USB disk key.
4. There is not enough room on the USB disk to save the file completely.