USBCNC

USB Disk Key reader for CNC Controls

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Introduction

This manual is intended to provide a description of the Calmotion USBCNC disk key reader.

Requirements

The USBCNC device will work with any Fadal CNC control versions with an available DB25 serial connection at the back of the machine. Access to AC power wall outlet will be required to power the unit.

Parts

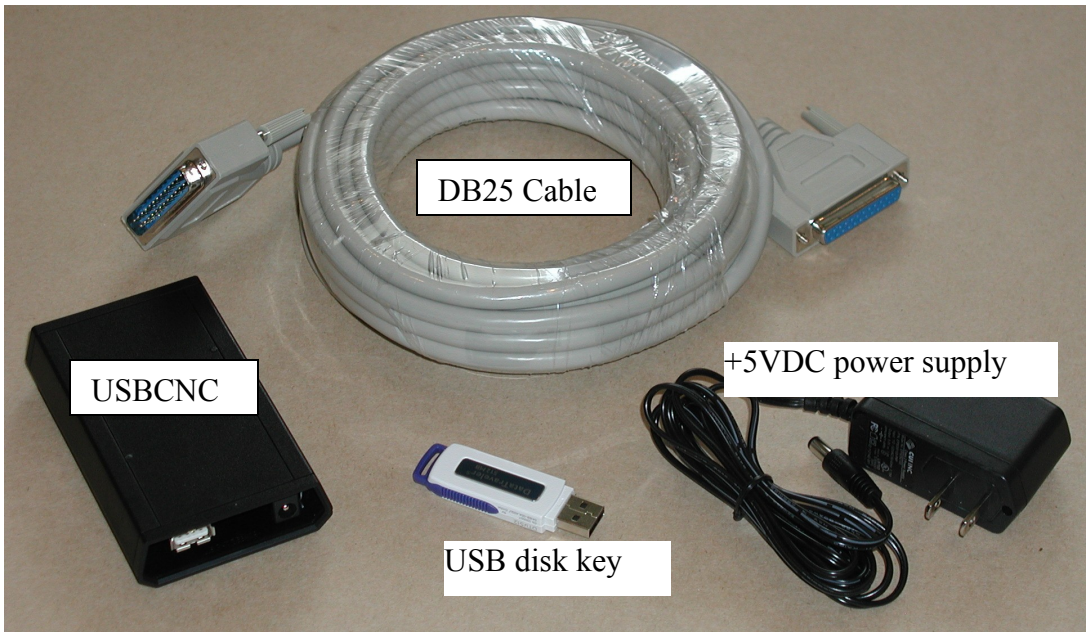

Figure 1

Installation

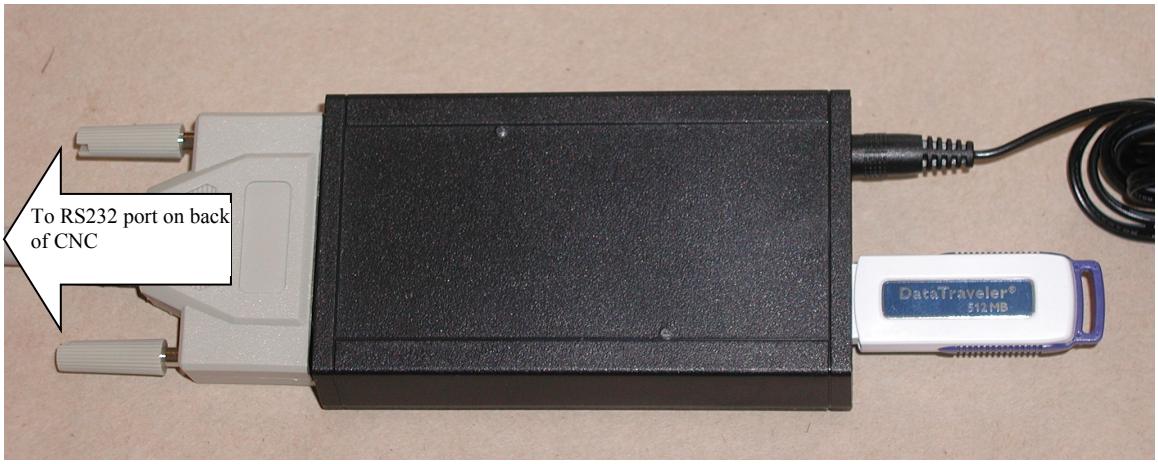

Figure 2

Description of Operation

The USBCNC requires that the correct CD,# be used for proper operation. The CNC command CD,8 sets a baud rate of 9600 to the USBCNC. Likewise, the CD,10 command sets the CNC communication rate to the USBCNC to 38400 baud rate. CD,11 sets the CNC communication rate to 57600 baud. Once a CD command is entered, a USBCNC plus command may be used. A plus command activates the USBCNC device and allows it to take control of the CNC machine. When the command is finished, the USBCNC will issue a BYE command to the machine. Another CD,# will be needed before another plus command can be sent to the USBCNC device. The following demonstrates the order of operation to execute a USBCNC command:

1. Enter the CD, Change Device, command for the USBCNC connected to machine (example: CD,10 CD,11 or CD,8).
2. Type in the USBCNC command desired, ending the entry with a + sign and not a carriage return (enter key).
3. Wait for command to be processed (a couple of seconds if USB disk just inserted).
4. Command is finished after the BYE command.

List of Available Commands

USBCNC *plus* Command	Description
DE,FILENAME+	Delete the FILENAME
DNC,FILENAME+	DNC the FILENAME (Use DNCX for Xmodem)
DNC,FILENAME,?+	DNC the FILENAME starting at line with ? text
DNC,FILENAME,,?+	DNC the FILENAME. Add ? text before the file data is sent
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

Example of Use

The USBCNC utilizes a new set of commands that are based on existing Fadal commands. These new commands are called "plus" commands. These new commands are called plus commands because a + is used at the end of the commands to tell the USBCNC device to operate on these commands. The enter key is not used at the end of the USBCNC commands.

Command: **DIR+**
Description: Displays the root directory of the USB disk key
Example:

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DIR+
@
@
O1.TXT          O1234.TXT          O111.TXT@
TOOLDATA.TXT    JOB7.              BACKUP.NC@
JOB1.TXT@
```

Command: **TA,FILENAME+**
Description: Tape input command. Loads the file named into the CNC memory.
Example:

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

Command: **PU,0,FILENAME+**
Description: Punch command. Saves program and tooling data to the USB disk key from the CNC memory.
Example:

```
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.
%
```

Command: **PU,1,FILENAME+**
Description: Punch command. Saves only tooling data to the USB disk key from the CNC memory.
SAVE TOOLING DATA ONLY TO FILENAME
Example:

```
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 <
```

Command: **PU,2,FILENAME+**
Description: Punch command. Saves program data only to the USB disk key from the CNC memory.
Example:

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

Command: **PU,3,FILENAME+**
Description: Punch command. Saves all programs in CNC memory to the USB disk key.
Example:

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

Command: **DNC,FILENAME+**
Description: DNC, direct Numerical Control, command. This command will run a program from the USB disk key on the CNC machine.
Example:

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DNC,JOB1.TXT+
```

Command: **DNCX,FILENAME+**

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 the option to be available on the Fadal control. If the DNCX feature exists on the Fadal control then this version of DNC can be used.
Example:

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DNCX,JOB1.TXT+
```

Description:

Command: **DNC,FILENAME,?+**
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.

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.
Example #1:

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

Example #2: Search for "X-12.375" in file MOLD.TXT

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

Command: **DNC,FILENAME,,?+**
Description: DNC, Direct Numerical Control with preparatory text. This runs a program from the USB disk key on the CNC machine. 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.
Example:

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

Command: **HELP+**
Description: Display the commands available for use with the USBCNC device.
Example:

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND HELP+
            * CNC USB DRIVE, VERSION 1.7.7 *
                                                              @
 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             @
```

Command: **DE,FILENAME+**
Description: This command will delete the file specified from the USB disk.
Example:

```
ENTER NEXT COMMAND CD,10
ENTER NEXT COMMAND DE,JOB1.TXT+
FILE JOB1.TXT DELETED @
```

Command: **VW,FILENAME+**
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.
Example:

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

Changing the baud rate on the USBCNC device

The USBCNC 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 can communicate. To change the USBCNC 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 text only.* To change the baud rate on the USBCNC 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 has been tested at 9600, 38400, 57600 and 115,200 baud.

Example:

CNC=9600

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

CNC=57600

To complete the baud rate change, remove power from the USBCNC device. Copy the USBCNC.INI file to a USB flash device. Insert this USB flash device into the USBCNC.

Using the BYE= 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 serial 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.

Apply power to the USBCNC. The LED's on the USBCNC will cycle, pause, and then 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 device repeatedly.

Trouble Shooting Guide

Problem: There is no response from the USBCNC device.

1. Verify the +5VDC power supply is plugged into the device and into a functioning AC outlet.
2. When there is power, at least one LED should be lit on the front panel of the device.
3. 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 device and the machine.
4. 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.
5. Verify the USBCNC device matches the baud rate expected.
6. The USBCNC 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.
7. The CD,10 and CD,8 commands are CNC commands, not "plus" commands for the USBCNC device. Press the enter key after the CD commands, do not press a plus key at the end of the commands.
8. Wait a couple seconds after just inserting a USB key. The device maybe processing the new device insertion.

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

1. The USBCNC 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. Press the enter key after the CD commands. Do not press a plus key at the end of CD commands.

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.

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.
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 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.

Revision History:
Rev 1.7.3

Added functionality:

Added DNC start at specified text line.

Added capability for user to type in preparatory block of data prior to running file from USB key.

Addition of N1 to comment lines without N words. 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.

Added 57,600 and 115,200 baud rate capability.

Rev 1.7.4

Resolved potential issue where the PU command would not operate immediately following a DNC operation.

Rev 1.7.5

This version improved the response time to certain USB commands.

Resolved issue whereby files of certain length could be truncated.

Rev 1.7.7

Support for the BYE= added

XMODEM capability was added to the USBCNC-FAD for DNC operation with machines with a dual arm tool changer. Certain Fadal CNC's do not always communicate properly if the machine has a dual arm tool changer. Operating the USBCNC-FAD using XMODEM protocol eliminates this problem.

Certain conditions could cause lines from being dropped when sending files. These could occur if a USB key was reformatted as FAT32, or a USB key was inserted with slow access times or a high baud rate was used. Version 1.7.7 corrects these possible issues.

If you do not have the latest version of firmware within your device and wish to upgrade, please contact Calmotion LLC. There are no known issues at this time.