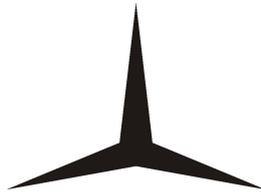




**Blackthorn OS**

**User Manual**



## Table of Contents

Health and Safety.....	4
Version Updates.....	5
Drive allocations.....	6
Drive A:.....	6
Drive B:.....	6
Drive C:.....	6
USB Pen Drives.....	7
File Types.....	8
.bat.....	8
.bin.....	8
.bte.....	8
.cut.....	8
.drv.....	8
.env.....	8
.exe.....	8
.map.....	8
.par.....	9
.reg.....	9
.txt.....	9
Operating commands.....	10
Cd - Change Directory.....	10
Checkram.....	10
Cls - Clear Screen.....	10
Copy.....	10
Defrag.....	10
Del - Delete.....	10
Delay.....	10
Dir.....	11
Drawpt.....	11
Format.....	11
Ifexist.....	11
Ifnexist.....	11
Led.....	11
Md - Make Directory.....	12
Pause.....	12
Print.....	12
Rd - Remove Directory.....	12
Ren - Rename.....	12
Type.....	12
Upgrade.....	12
Example installation file.....	14
System Error Messages.....	15
Unspecified error.....	15
BAD FILE NAME.....	15



BAD PATH.....	15
Command not supported.....	15
Dir not empty.....	15
NO DRIVE ATTACHED.....	15
Program Corrupt.....	15
The file already exists.....	15
NON executable file.....	16
File does not exist.....	16
Disk full.....	16
Program needs to much Memory.....	16
Bad data on command line.....	16



## Health and Safety.

1. The user should ensure that safe working practices are adhered to and that correct Personal Protective Equipment (PPE) is used at all times relevant to the nature of work undertaken and the type of machinery being operated.
2. This software (Blackthorn) cannot control machinery itself. A user interface needs to be installed to enable access to the IO of the controller it is installed on.
3. TRM cannot be held liable for the miss-operation or incorrect programming of the system be it operating program or setup parameters.
4. Training and operation of machinery is solely the user's/owners responsibility and appropriate Risk Assessment records should be kept at all times.



## Version Updates

- 1.0.28 Updated motion driver implementation (motcntl.drv)  
FPGA modifications to 1.1 (displayed on boot screen)  
Performance enhancements.
- 1.0.29 Commands list added to.
- 1.0.30 Jog encoder precision increased and FPGA updated to 1.2

## Drive allocations

The OS and controllers currently support A, B and C drives. These have different functions and are designated as follows:

### Drive A:

Battery backed SRAM memory. Data can be lost if the rechargeable battery runs flat. Data would normally be retained for upto a year from a full charge.

The size of the memory varies depending on controller configuration and is intended for files where data changes frequently.

### Drive B:

Flash memory. Data stored here is permanent and is intended for files that change infrequently. Normally user programs and drivers are stored here.

### Drive C:

This is allocated to the USB Pen Drive port. Pen Drive sizes can be from 256K to 8Gb so long as they support FAT32. This drive can only be selected when a pen drive is mounted.

There is no need to 'eject' or 'safely remove' pen drives from our system as all file reads and writes are carried out instantaneously. Once a command has completed the pen drive can be removed from the system.

The search order of drives for Autoboot files and driver files is C:, A:, B:.



## USB Pen Drives

Many pen drives are compatible with the TRM range of controllers however they must be formatted as FAT32. Any other format such as ntfs, fat16, exfat will not be recognised and will produce an error message.

We are also finding that some pen drives do not obey the official USB standards therefore these are not supported and will return an Error message such as 'unusable USB device'.

Currently only pen drives are supported in the Blackthorn OS therefore a hub cannot be used as an extension lead. If the port needs to be extended a standard USB A male to USB A female lead is required.

## File Types

### **.bat**

This is the extension given to a batch file. A batch file can contain a list of commands to either carry out updates, backups or re-installations. On boot up, if the controller finds an autoboot.bat file in c:, a: or b: in that order, it will execute the commands within the file.

If the controller is already running and at the OS prompt, when a pen drive is plugged in to the USB port the OS will prompt the user with an autorun request with a Y/N option. If 'N' is selected the autorun ends and you are returned to the OS prompt. If 'Y' is selected the commands are run within the file. See the full list of operating commands on the following pages.

In the file it is important to press return after the command and enter an empty line.

### **.bin**

Operating system upgrade file.

### **.bte**

Blackthorn extension.

### **.cut**

PROCUT Software cuts file.

### **.drv**

Driver file e.g. motion.drv or motcntl.drv. These files are loaded by the OS and act as extension code to add features to the user program.

### **.env**

This is an environment file. Many parameters of the software being run are stored in these files when the system is initialised and setup. We would recommend taking a backup of these files once the machine is setup correctly.

### **.exe**

These are the executable files e.g. map.exe, procut.exe. By typing the name in on the command line or listing it in a batch file the user program will be run. Normally these will be referenced in an Autoboot.bat file so that when the controller is powered up it automatically boots in to the user program.

### **.map**

MAP software commands file



## **.par**

Parameter file

## **.reg**

This file stores the values held in registers which are used in MAP and MAP CNC. These values are retained during power off however in the setup menus the user can setup the system to clear all registers on first run.

## **.txt**

Purely a Text file. This can be used for job notes, contact information, disclaimer and many other functions. The text file cannot contain commands, if commands have been entered they will be printed to screen as text and not executed.

## Operating commands

Whilst all of the following commands can be typed in on the command line and will execute as intended, some commands like 'delay' and 'pause' are really intended for use within a batch file where the user wants to interact with the operator, check if certain files exist on the controller or perform backup and restore routines.

### Cd - Change Directory

*Usage: "CD \programmes"*

Where "programmes" is a sub folder; the current folder will be changed to programmes. Please note that the folder name must be preceded by a '\' character otherwise the directory will not change.

CD .. will change the current folder to it's parent folder.

CD \ will change to the root folder.

### Checkram

*Usage: "checkram"*

Performs a non-destructive test on the static ram and reports any errors. If any errors are reported the unit should be returned to the factory for further analysis.

### Cls - Clear Screen

*Usage: "Cls"*

Clears the screen and uses the current paint colour for the background.

### Copy

*Usage: "copy a:map.exe c:" or "copy a:map.exe c:map.tmp"*

"\*" wildcards can be used to replace characters, extensions, or all letters i.e. \*.\* , \*.exe, map.\* etc.

### Defrag

*Usage: "defrag a:"*

After a period of time files can become fragmented as they are deleted and created. This command will re-write the files in a compact order.

### Del - Delete

*Usage: "del c:map.exe"*

If the file is not located on the current drive it is necessary to specify the drive letter. If no drive letter is specified the file will be deleted from the current drive. To avoid file deletion errors wildcards cannot be used.

### Delay

*Usage: "delay 10000"*

Used in a batch file, this command is followed with a value in milliseconds, hence

10000 is 10 seconds. Once the time is reached the next command in the file is processed.

## Dir

*Usage* “dir” or “dir b:”

This is used to list the directory of drives or folders to the screen.

## Drawpt

*Usage*: “drawpt 50 20”

The command is followed by an x and y co-ordinate in pixels and will position the starting drawing point for the following print or type command. Subsequent text lines will appear below the initial line however they will be left justified unless another drawpt command is used.

## Format

*Usage*: “Format a:”

A drive to format must be specified. This will erase all contents of the drive and files will be unrecoverable.

## Ifexist

*Usage*: “ifexist map.exe”

An if test mainly for use in batch files for checking if files already exist on drives or in folders. If the condition is true the commands within the braces are executed.

## Ifnexist

*Usage*: “ifnexist map.exe”

An if test mainly for use in batch files for checking if files do not exist on drives or in folders. If the condition is true the commands within the braces are executed.

Example:

```
ifnexist
{
copy c:run.map a:
copy c:test.map a:
}
c:map.exe
```

If the files exist they will not be copied.

## Led

*Usage*: “led 255”

Turns on all the keypad LED's. This is calculated as a hex number from a binary table. Insert a '1' in the column for the LED(s) that needs to be turned on, add up all the columns with a '1' in and that is the value you need to enter after the LED command.

7	6	5	4	3	2	1	0
---	---	---	---	---	---	---	---

1	2	4	8	16	32	64	128

## Md - Make Directory

*Usage: "md backup"*

Creates a folder called backup on the current drive in the current folder.

## Pause

*Usage: "pause"*

Used in a batch file where there is a need to wait for a user input before continuing. This may be that the user needs to read on screen instructions or confirm that the machine has been checked before continuing.

## Print

*Usage: "print Please ensure the machine is clear of Debris."  
"print Press any key to continue"  
"pause"*

The print command is followed by the text to print on screen. If the text is too long for a line it will automatically be wrapped to the next line.

## Rd - Remove Directory

*Usage: "rd a:backup"*

Removes an empty directory.

## Ren - Rename

*Usage "ren a:autoboot.bak a:autoboot.tmp"*

Can be used, when for example, a file has a version change and the previous file does not want to be lost. The new file can be tested and if necessary deleted and the original restored.

## Type

*Usage: "type autoboot.bat"*

Prints the contents of the specified file to the screen. This can also be used in a batch file when the controller is powered up to print the contents of a text file as either instructions, a disclaimer, job notes etc.

## Upgrade

*Usage: "upgrade"*

To upgrade the operating system boot the controller up and while the controller is showing the RAM test (multiple \*\*), press the escape key twice. This prevents the controller from booting into MAP or any other application written into the autoboot.bat file. Prepare a flash disk newly formatted as FAT32 and copy the file UPGRADE\_SMC.BIN onto the flash disk.

When the controller shows the command prompt A> insert the flash disk, if there is



an autoboot file written on the flash disk the controller will prompt “run auto Boot y/n” select n. The controller will then show the command prompt.

At this prompt type “upgrade” and press enter, the controller will read the .bin file from the flash disk and will display a message saying that it is upgrading.

**Do not turn the power off until such time as the controller indicates the action has been completed and to reboot.**

This is all that is required to upgrade the operating system, now boot back into the user program and test that all settings are correct and the system is safe to run.

## Example installation file

Create a blank file with the name autoboot.bat. In the absence of an autoboot.bat file the controller on boot up will present the operator with a cursor at the a: prompt.

The following commands would be contained within a batch file (.bat).

```
Cls //clears the screen
if exist b:map.exe //test to see if map is already installed
{ //if not found process lines within braces
    format a: //format the a: drive
    format b: //format the b: drive
    copy c:map.exe b: //copy file to b: drive
    copy c:motion.drv b: //copy file to b: drive
    copy c:autoboot.bak a: //copy file to a: drive
    ren a:autoboot.bak a:autoboot.bat //rename a file
}
print you can now remove Pen Drive //prints the following text
print and reboot controller. //prints the following text
```

In this example the code checks to see if the map.exe file exists, if it does exist the commands within the { } braces are skipped. This avoids overwriting a good installation accidentally.

To enable the commands to run, the user must delete or rename the map.exe file on the b: drive.

Also in this example the lines:

```
copy c:autoboot.bak a:
ren a:autoboot.bak a:autoboot.bat
```

could be replaced with the following:

```
copy c:autoboot.bak a:autoboot.bat
```

Mostly an Autoboot file will contain two lines:

```
map.exe
{empty line}
```

The empty line is required in the file and in this case the program map will be run immediately.

## System Error Messages

The OS uses various error messages to inform the user that there has been a problem in carrying out a particular request. The user should check to see if the command is correctly formed, that any files are present or deleted as required by the operation being carried out.

### Unspecified error

Unspecified error

### BAD FILE NAME

When a command is executed requesting a particular file that does not exist this message is shown. Check to ensure the correct file is being called and check to see which drive it exists on.

### BAD PATH

The folder(s) specified in the path statement do not exist and therefore the destination is unusable. Check statement for typing errors, incorrect '/' characters, the correct drive is specified and finally use the Dir and Cd commands to manually navigate the tree to ensure the folders exist.

### Command not supported

The user has either mis-typed a command or the command is not supported by the OS. Also check the latest revision notes to see if any commands have been deprecated.

### Dir not empty

Normally appears following a request to delete (remove RD) a folder. Navigate into the folder and if the files are no longer needed delete them, move back up to the parent folder and then try to remove again.

### NO DRIVE ATTACHED

Normally a request has been made to access a file or navigate to the c: drive which is not present. Check to see if a pen drive is mounted.

### Program Corrupt

The program being run is not of the correct format and has probably been damaged. Replace the file and try again.

### The file already exists

An attempt has been made to copy over a file that is already present on that particular drive. Normally followed by a Y/N prompt to overwrite. Be careful files are not overwritten by mistake as this can render the system non-functional and all setup parameters lost.



## **NON executable file**

Is displayed when an exe file is run and the code is corrupt. Replace the file with a good copy. Also this can occur where a file has been copied and given the wrong extension. The system tries to run the contents which are not instruction code.

## **File does not exist**

A command has been asked to perform an operation on a file and the file cannot be found in the location given. Check the file name is correct and that the drive referred to is correct.

## **Disk full**

An attempt has been made to copy to a drive that has insufficient space remaining to accommodate the file being copied. Either copy to another drive or remove unused files to free up space.

## **Program needs to much Memory**

A message that should never be seen. Normally if a mis-compiled program is run it will require more memory than the system has available and produce an error.

## **Bad data on command line**

The parameters being passed to a command are incorrect and cannot be parsed. Check the command structure and correct as necessary.

