



## Application User Guide

AUG 069 / Rev. 1.1

# EUM Card - Extend eWON User directory memory

Learn how to extend the embedded filesystem (meaning the /usr directory) of the eWON with an EUM Card plugged inside.



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## 1. Introduction

Since firmware v12.1s2, it is possible to extend of the embedded filesystem of the eWON Flexy and Cosy 131.

Thanks to the **Extended User Memory Card (EUM Card)**, the /usr directory of the eWON can be extended to increase eWON's memory using the SD Card slot.

### Use Cases

The EUM Card can be used in different cases, for example:

#### Store camera images

Let's imagine the situation where an IP camera is plugged in an eWON Flexy and where the user wants to backup from time to time snapshots of the camera live stream.

The user can catch the snapshots the camera proposes using the BASIC IDE of the eWON Flexy and transfer the image to the EUM Card.

A coded example of snapshots from a camera being created when an eWON tag changes is available on [eWON TechForum](#).

#### Store reports

Another situation could be the user wishing to store text reports of the eWON's state, tags value, ... at a given time.

The eWON can be ordered using the BASIC IDE of the eWON Flexy to export a block descriptor and store the result in the EUM Card (as a text file for example).

A coded example of this case is available on the [eWON TechForum](#).

#### Extend website

The EUM Card can also be used in a website purpose such as storing images, script files, HTML files...

When creating web pages and uploading them on the eWON, the EUM Card can extend the space available for resources asked for such web pages.

## 2. EUM Card preparation

### Filesystem

The EUM Card must use the ext3 filesystem (or Third Extended File System). This extension is commonly used by Linux based environment and is chosen to ensure a high level of reliability.

The EUM Card must be formatted in this ext3 filesystem and the cluster size must be  $\geq 4\text{Kb}$  in order to work properly in the eWON.

For Windows users, an external tool is needed to format/explore correctly the SD Card. For more info on this, see description in [#1.EaseUS Partition Master Free 11.9 | outline](#).

### Type of Card

Regarding the type of the EUM Card, we strongly recommend using an **industrial grade** SD Card based on SLC which doesn't exceed 4Gb. Other types will work but are not designed for industrial applications.

### eWON EUM Card

eWON proposes its own EUM Card:

- Capacity of 1Gb
- Originally formatted in ext3 filesystem
- SLC type

The differences with other SD Cards are mainly

- the sustainability
- a higher amount of Program/Erase cycles per lifetime (especially in a wide range of temperature)

For more information, please contact [your local distributors or eWON Team](#).

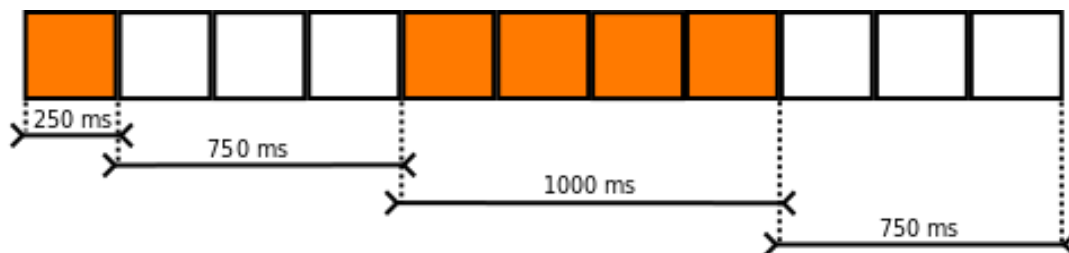
## 3. Usage

### General usage

Once the EUM Card is prepared following [#2.SD Card preparation | outline](#), plug it in the eWON.

There are two results possible:

- EUM Card is corrupted or is using a non-compatible file system (EXT3 only).  
A LED pattern will occur on the USR LED of the eWON



- EUM Card has been recognized.  
A new directory is created in the eWON /usr directory: /usr/sdext
  - Everything put in “/usr” and subfolders except “/usr/sdext” will be stored in the eWON embedded memory
  - Everything put in “/usr/sdext” will be stored on the EUM Card

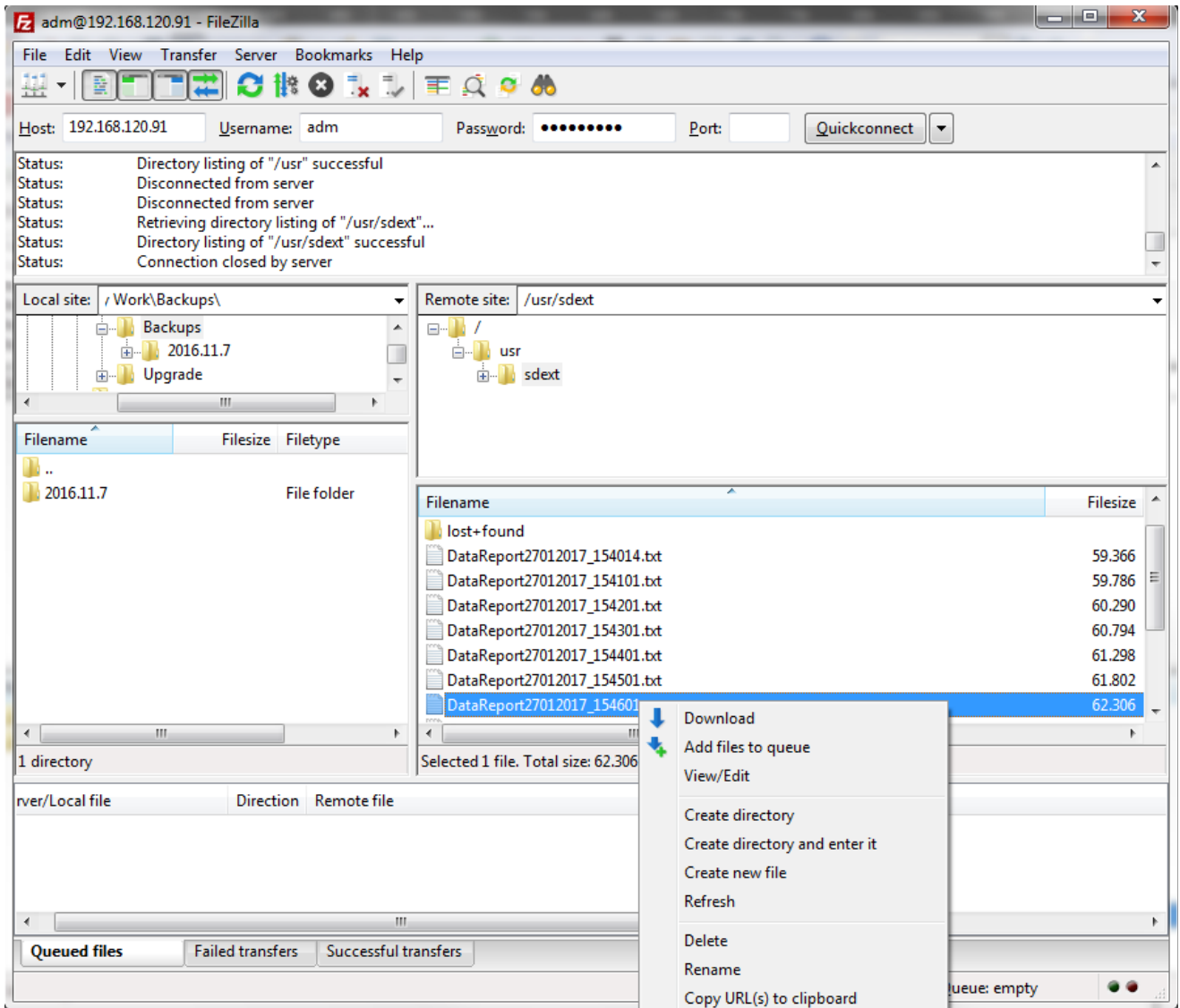
### Retrieve data

The EUM Card contains data that can easily be retrieved remotely by FTP using the eWON.

As the EUM Card is plugged in the eWON, below is the process to retrieve the data:

- open an FTP file transfer software such as FileZilla, Cyberduck, ...
- connect to the eWON where the data needs to be retrieved from
- browse to the “usr/sdext/” folder
- copy the needed files or the whole folder from the eWON to the computer

All data contained in the EUM Card is located in the “sdext” folder of the eWON. From there on, copy/paste using FTP from the eWON to the computer.



## Formatting

Because the EUM Card is used as a user storage extension, each time the /usr directory is formatted, the SD Card will be erased as well.

This includes, but is not restricted to:

- Formatting the /usr directory using the web interface.
- Formatting the /usr directory by programming the eWON.
- Restoring a backup.
- Performing a reset level 1 or 2.

## 4. EUM Autorepair

From a general point of view, the EUM card should never be removed when the Cosy 131 or Flexy is powered up.

In some cases, an EUM corruption can occur (power cut, reboot, ...).

To fix an EUM card that is tagged as corrupted, 2 methods can be used:

- **Repair**

At boot, the device performs a sanity check of the EUM card. If this filesystem is not *clean* (inode table, bad block table, etc.) , it tries to repair it. This procedure can only recover cases where the EUM card was improperly inserted/removed

- **Format**

If the repair didn't work, a system parameter *SDEUMAutoformat* indicates if the device should format the card. In case of a repair fail and if this parameter is set to 1 (0 by default, requires a reboot if changed), the device will format the EUM card. It will also set a label to this new partition "eWON EUM".

**- Warning -**

*In case of a format, the data on the EUM card will be lost.*

## 5. Card Information

### Storage indication

As soon as the EUM Card is plugged and ready to be used, the eWON firmware indicates the total amount of memory available on the EUM Card but also the remaining space.

- When an EUM Card is not plugged



System Counters		Description	Value	Unit	Stat
<b>Memory Information</b>		<b>Total memory allocated</b>	3719168	Bytes	
NAT & IP Forwarding		Number of Free Chunks	14		
VCom		Number of free blocks in fast bin	0		
<b>I/O Servers Counters</b>		<b>Maximum allocated space</b>	0	Bytes	
Modbus		Fast bin block size used	0	Bytes	
Unitelway		Total Alloc Space	3615064	Bytes	
DF1		Total Free Space	104104	Bytes	
EthernetIP		Memory that could be trimmed	73624	Bytes	
EthernetIP gateway		<b>Total Memory Available</b>	60555264	Bytes	
FINS		Tcp Ip allocated memory	0	Bytes	
FINS gateway		<b>Sockets allocated</b>	32		
SS AS511		Snmp allocated memory	0	Bytes	
PPI		<b>Config free memory</b>	522537	Bytes	
MPI/PROFIBUS		<b>Script Execution free memory</b>	505792	Bytes	
ISOTCP		<b>Script code free memory</b>	262135	Bytes	
ISOTCP gateway		<b>/usr partition free space</b>	25284608	Bytes	
HITACHI		<b>/usr partition total size</b>	26816512	Bytes	
MITSUBISHI FX		<b>SD Card extension total size</b>	0	Bytes	
MELSEC		<b>SD Card extension available size</b>	0	Bytes	
<b>System Info</b>					
Status					
Info					
System					



- When an EUM Card is plugged



System Counters		View I/O				Alarm Summary	
Event Log		Status				Alarm History	
System Counters		Description	Value	Unit	Stat		
Memory Information		<b>Total memory allocated</b>	3719168	Bytes			
NAT & IP Forwarding		Number of Free Chunks	14				
VCom		Number of free blocks in fast bin	0				
<b>I/O Servers Counters</b>		<b>Maximum allocated space</b>	0	Bytes			
Modbus		Fast bin block size used	0	Bytes			
Unitelway		Total Alloc Space	3621056	Bytes			
DF1		Total Free Space	98112	Bytes			
EthernetIP		Memory that could be trimmed	67616	Bytes			
EthernetIP gateway		<b>Total Memory Available</b>	60555264	Bytes			
FINS		Tcp Ip allocated memory	0	Bytes			
FINS gateway		<b>Sockets allocated</b>	33				
S5 AS511		Snmp allocated memory	0	Bytes			
PPI		<b>Config free memory</b>	522537	Bytes			
MPI/PROFIBUS		<b>Script Execution free memory</b>	505792	Bytes			
ISOTCP		<b>Script code free memory</b>	262135	Bytes			
ISOTCP gateway		<b>/usr partition free space</b>	25280512	Bytes			
HITACHI		<b>/usr partition total size</b>	26816512	Bytes			
MITSUBISHI FX		<b>SD Card extension total size</b>	1007312896	Bytes			
MELSEC		<b>SD Card extension available size</b>	917590016	Bytes			
<b>System Info</b>							
Status							
Info							
System							

**- Note -**

The information can be grabbed using the export block descriptor: \$dIES

- The "SDExtTotal" is the EUM Card total size.
- The "SDExtFree" is the available (remaining) space on your EUM Card.

## Logs

Some logs are generated during the process (traces, info, warning or errors).

Hereunder is a list of the patterns that can be encountered:

- Plug in/out a valid EUM Card:
  - **sdcard-The SD device has been inserted (originator: udevmon)**  
indicates that an EUM Card is detected
  - **sdcard-The SD device is now used as a filesystem extension (originator: sdcard)**  
indicates that the EUM Card is used as a filesystem extension and gives the access point.
  - **sdcard-The SD device has been removed (originator: udevmon)**  
indicates that the EUM Card was removed.
- During a format:
  - **Filesystem not formatable to ext3**  
indicates that the eWON is not able to format the EUM Card.
- After a valid EUM Card plug-in, the eWON performs a memory check to ensure that the filesystem is valid.
  - **Filesystem uncheckable**  
indicates that the EUM Card can not be checked. Maybe it's usable, but the eWON wasn't able to perform a check on it.
- Plug an invalid EUM Card
  - **The filesystem is not ext3**  
indicates that the EUM Card is not in the correct format.
- During an EUM autorepair
  - **The SD filesystem check returned with some anomalies**  
indicates the device checked the filesystem and returns issues ((inode table, bad block table, etc.)).
  - **SD Extension has a corrupted filesystem**  
indicated the filesystem repair has failed and status is still not clean.
  - **The SD filesystem was repaired**  
indicates the filesystem has been fixed.

- **The SD filesystem was formatted (eWON EUM, ext3)**  
indicates the EUM card has been cleaned of its data as the filesystem check & repair failed and the SDEUMAutoformat parameter as been previously activated.
- **Filesystem not formattable to ext3 (FS repair and format impossible, replace your SD card)**  
indicates the file check, repair and format failed.

## 6. Back up / Restore an eWON

Performing a backup or a restore while an EUM Card is plugged inside the eWON will impact the content of this EUM Card.

### Back up an eWON

By default, when performing a backup, the content of the EUM Card (the `/usr/sdext` folder) is not included in the final backup file.

However, the parameter "BackupSkipSD" located in the `config.txt` file can be changed to modify the default behaviour. If the "BackupSkipSD" parameter is set to:

- 0: the `/usr/sdext` will be included
- 1: normal behaviour, the `/usr/sdext` will be ignored when backing up the eWON

### Restore a backup into eWON

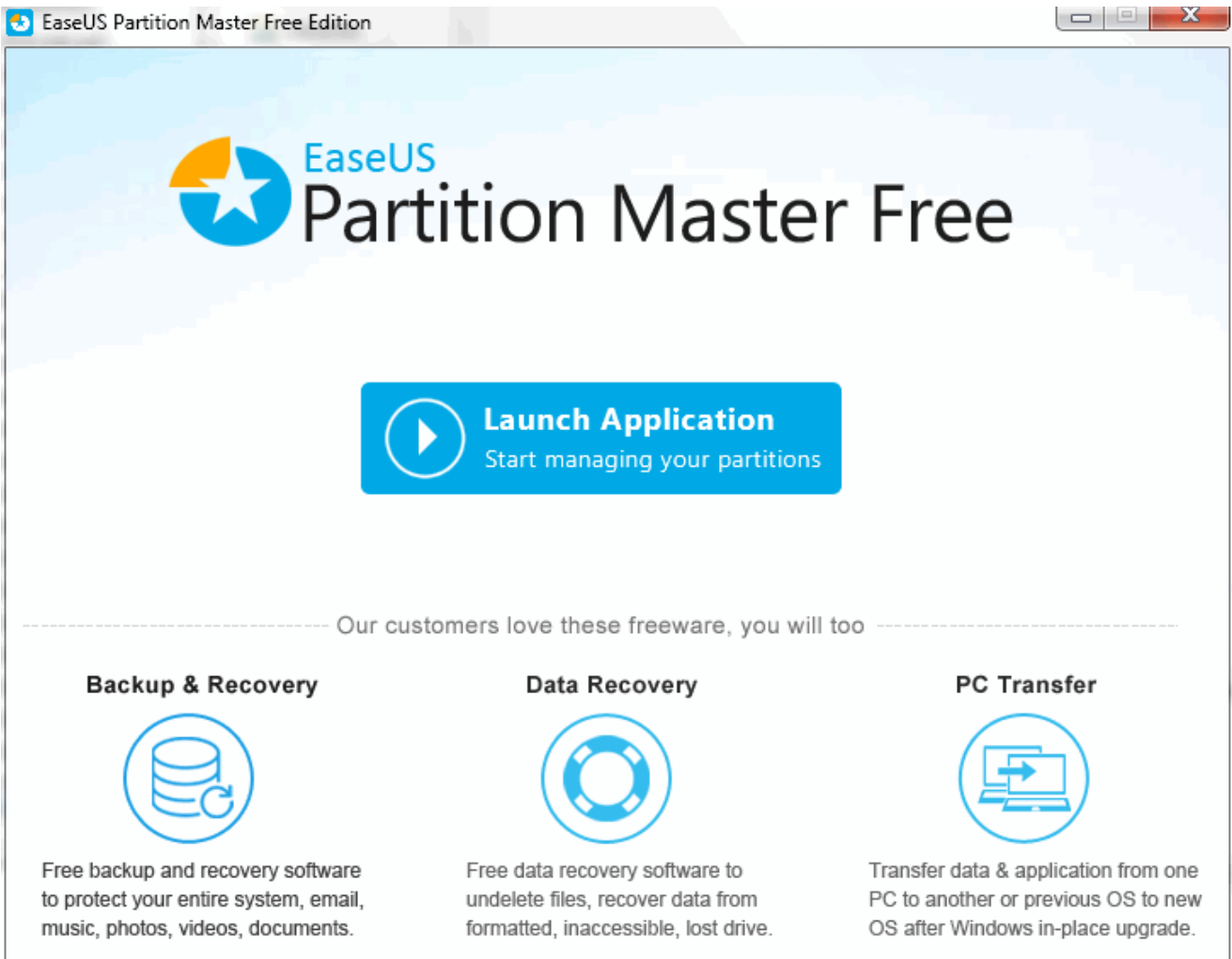
If an EUM Card is already inserted while a backup is transferred to the eWON in order to restore it, the EUM Card will be cleaned of its content.

## Appendix A - EaseUS

As the EUM Card needs to be formatted in the ext3 filesystem, an external tool needs to be used. For example, a Windows software “Partition Master Free 11.9” from [EaseUS](#).

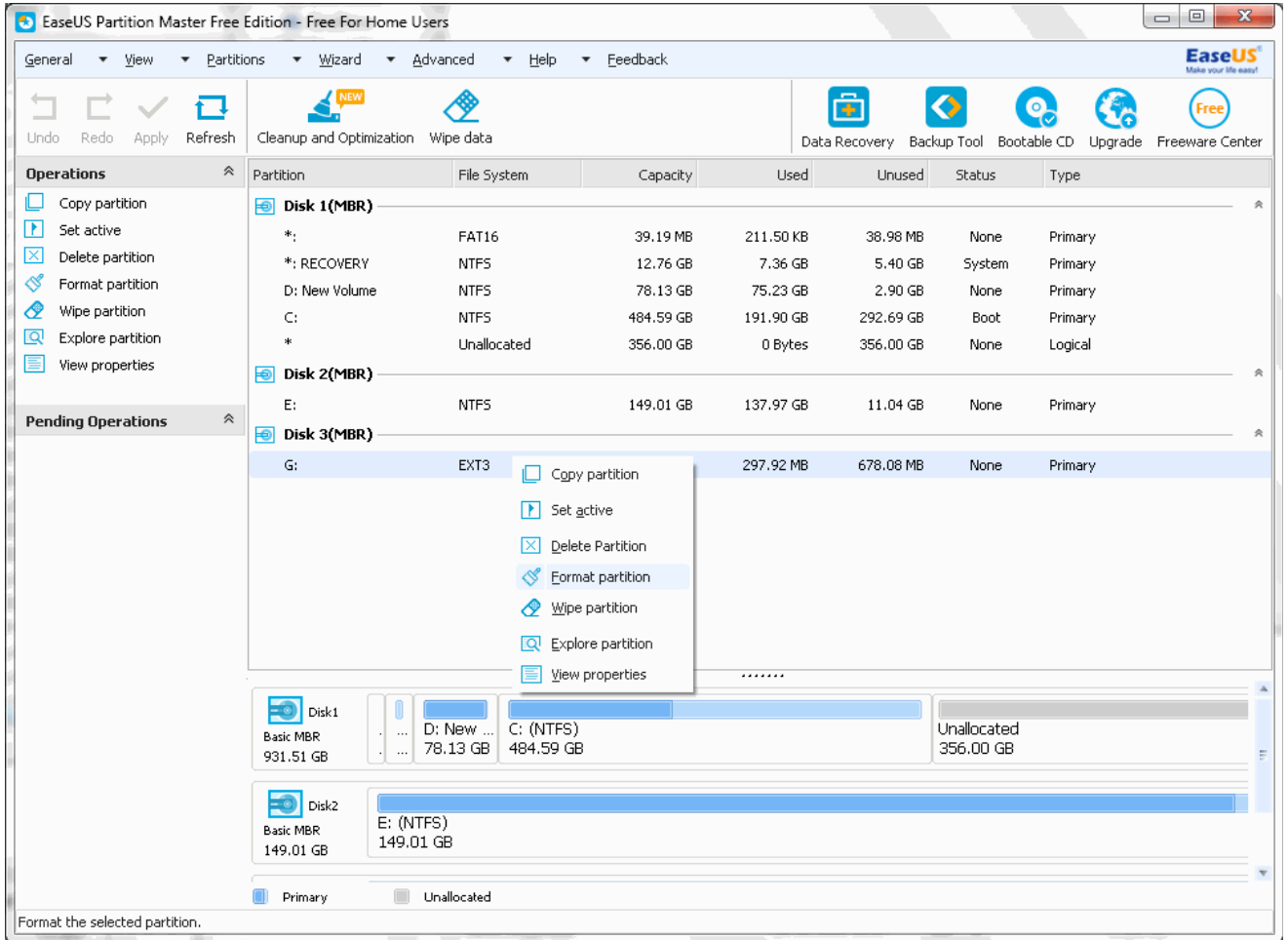
The process to format correctly the EUM Card is explained hereunder:

1. Install and launch the software, click on “Launch application”.



2. Explore and select the partition of your SD-card.

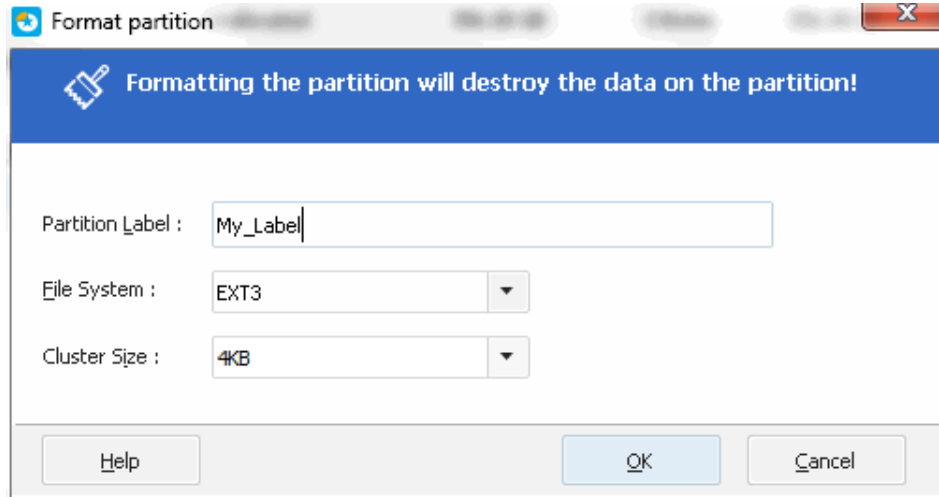
3. To format, right click and select "Format partition".



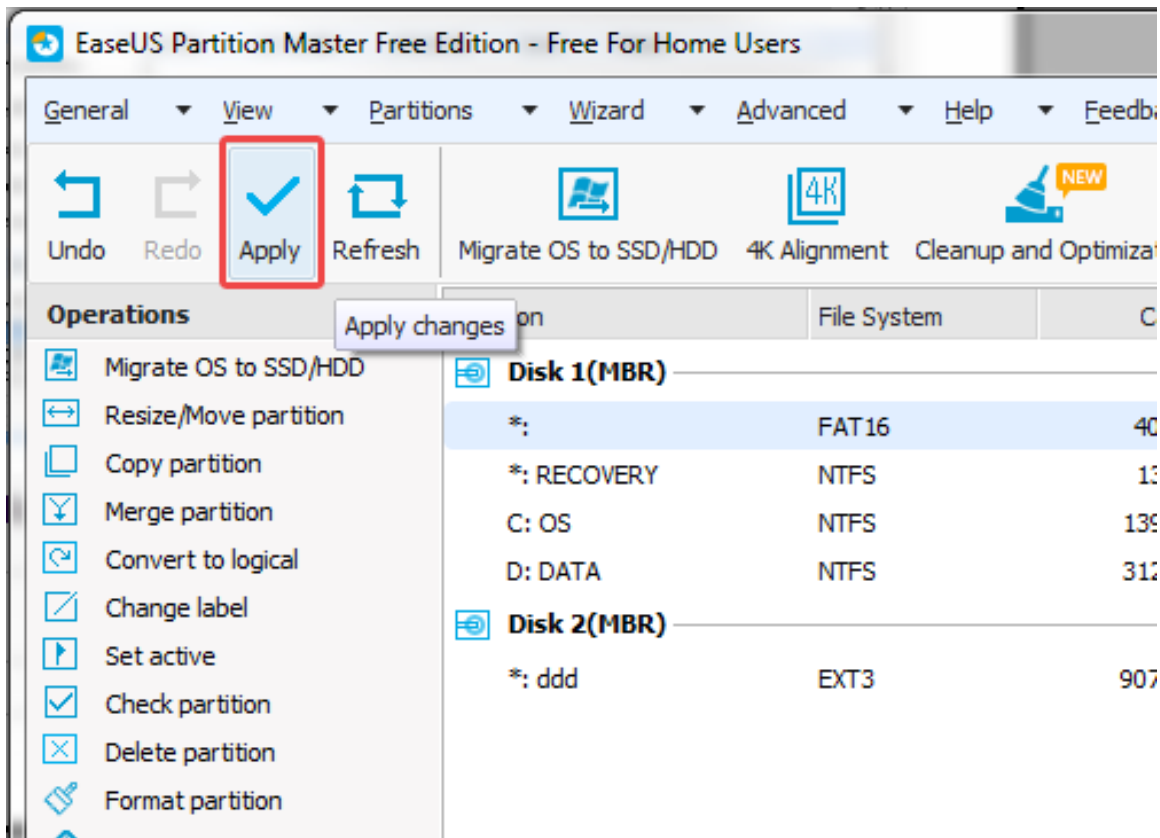
**- Warning -**

*Be sure to select the proper disk which should be the EUM Card before going any further.*

4. Enter the partition label, select “EXT3” as filesystem and click “OK”. It is important to select 4KB as Cluster Size otherwise, the EUM Card will appear as corrupted by the eWON.



5. Once the different settings are done, the final step consists in clicking the “Apply” button to launch the queue process.



## Revision

### Revision History

Revision Level	Date	Description
1.0	27/01/2017	Original Document
1.1	05/09/2017	Added: <i>EUM Autorepair</i> section Changed: <i>Logs</i> content

### Document build number: 55

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