2023

User manual for ML2000 Display Unit

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Display Unit

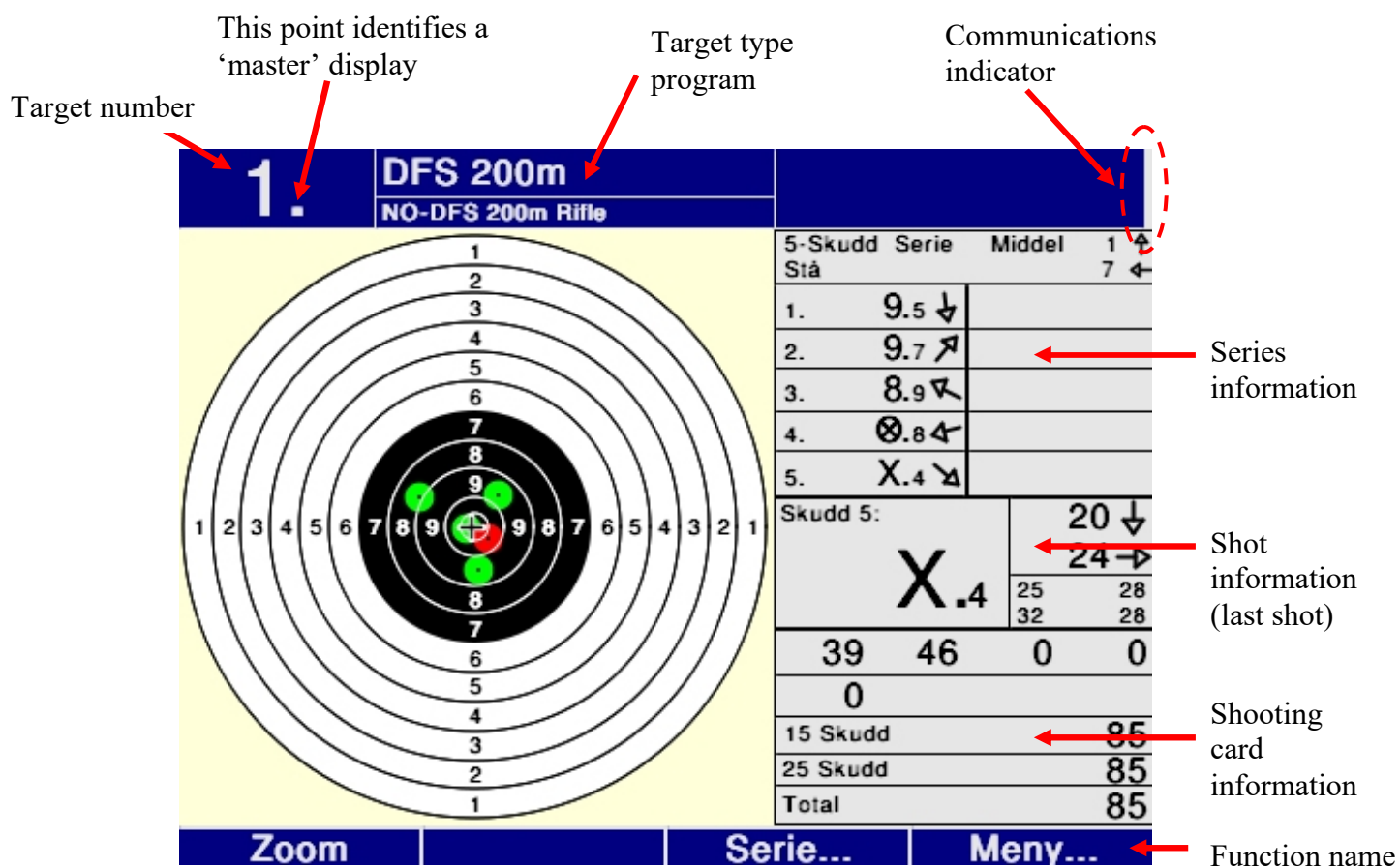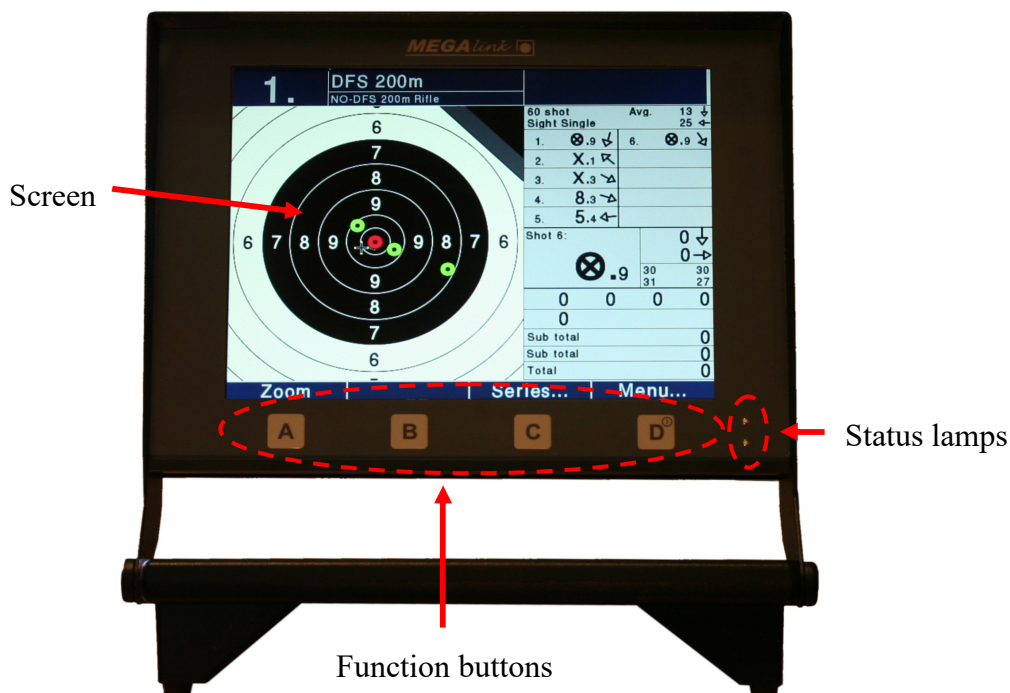## Table of Contents

1 General Information

1.1 About Megalinks Display Unit

This monitor is specially designed for use at shooting ranges. It is constructed around a 10.4" color LCD screen and is built to withstand hot and cold climate conditions. The monitor contains all the circuitry and software needed to communicate with the target and to register and display the position of each hit. The monitor controls are comprised of four (4) buttons mounted under the screen on the front panel which controls the displayed menu. The monitor requires only a single cable (carries both power and data) which is connected to a receptacle located at the firing position. Monitors may be serially connected to form a chain of two or more units (this is called a *segment*).

The monitor has been constructed in such a way as to be freely placed on the ground or on a stand. When the monitor is folded to a closed position the LCD screen is well protected.

The monitor requires a 12 volt power supply and each unit consumes a maximum of 0.7 amperes with full background lighting. The power needs of the unit make it very easy to run the whole firing position system with a 12V car battery if a fixed power source is not available.

1.2 Overview

Screen

Status lamps

Function buttons

This point identifies a 'master' display

Target type program

Communications indicator

Target number

Series information

Shot information (last shot)

Shooting card information

Function name

1.3 Buttons and Menus

Directly over each button on the front panel (marked A, B, C, D) are the screen function names. These names will change as different views are displayed on the screen.

For example:

Pressing button **D** in the screen opens the main menu. *See picture*

Buttons **A** and **B** can then be used to navigate up and down in the displayed menu. Button **C** is then used to make a selection from the menu. Button **D** can then be used again to close the menu and return to the main display.

A	B	C	D
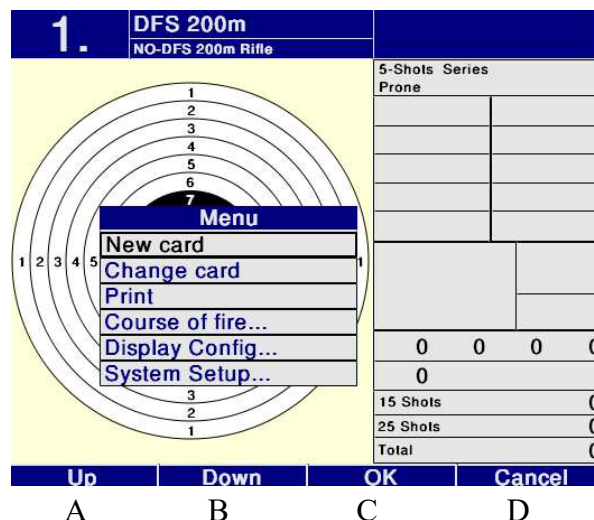
2 Using the monitor

2.1 Training

2.1.1 Select the course of fire or target type

Select **Menu → Course of fire**.

In this menu you can change the following options:

- Course of fire   Shooting program to be used

- Target   Target type to be used.

- Caliber   Caliber type.

- Motor frequency   How many shots before the band is advanced. (Only for targets with automated band advance)

- Motor length   How far to advance the band. (Only for targets with automated band advance)

- Actual distance   Displays the actual range to the target.

- Simulated distance   Displays the simulated range to target. Hit points and values are calculated using this simulated distance.

- Prepare time   Time in seconds between the selection of **Series → Start** until firing can commence.

- Mark delay   Number of seconds between the displaying of each shot.

- Marking auto   Yes / No. Selects whether the display should follow the course of fire or whether the shots are to be displayed continuously.

2.1.2 Fire on command
Select **Series → Start**.

2.1.3 Start Marking
Select **Series → Mark # - #**.

2.1.4 Show series details
Select **Series → Series details**.

2.1.5 Change series
For the next series select **Series → Next ser**.

For the previous series select **Series → Prev. ser**.

2.1.6 Create a new shooting card
Select **Menu → New card**

2.1.7 Select a previous shooting card
Select **Menu → Change card**

2.1.8 Printing a shooting card
Select **Menu → Print**

The monitor must be connected to a PC where the **MLRange** application is running in order to print a shooting card.

2.1.9 Manually run target lift

Select **Menu → System setup… → Lift…**.

The lift can be driven to the positons Prone, Kneeling, Standing and Park independently of selected course of fire.

3 Configuration

3.1 Display settings
Select **Menu → Display Config.**

- Brightness   Background lighting - 0 (min) to 9 (max).

- Language   Change system language.

- Screen style   Change color scheme.

- Power save on   Specify how many minutes of monitor inactivity should pass before the backlighting is shut off. This function helps to conserve power if you are operating the system from a car battery.
  NOTE: Backlighting is automatically turned back on when a new shot is registered. A value of zero (0) turns this function off.

3.2 Communication Settings
Select **Menu → System Settings...→ Comm. Config...**

- Master   Yes / No. Specify a monitor as the 'master'. There can be <u>one</u> (and only one) monitor designated as the master in a serially connected chain (one per serial segment). A small square point displayed after the lane number indicates that a monitor is specified as the master monitor.

- Lane   Specify which lane is connected to the monitor.

- First Lane   Specify which lane is the first lane in a serial segment. (applicable only if a monitor is specified as the master)

- Last Lane   Specify which lane is the last lane in a serial segment. (applicable only if a monitor is specified as the master)

3.3 Target Lift Adjustment
Select **Menu → System Settings...→ Lift adjust**

This menu is used for adjusting and storing target lift positions. From a single monitor all target lift positions can be freely adjusted.

Select **Previous** or **Next** to select a target. Select **Adjust** to move the target up or down. Select **Store** to store the target position. Actual potions are prone, kneel, stand and park.

NB! Only the master monitor can be used to adjust the lifts.

3.4 Advanced Settings
Select **Menu → System Settings...→ Advanced**

A password is required to enter the advanced settings screen. This is to prevent accidental or unauthorized changes to your settings. The password (by default) is the number **3**.

3.4.1 Filter Configuration

Select **Menu → System Settings...→ Advanced → Filter Config...**.

The filter is used to specify which organization, weapon and shooting distance that the monitor will be used for. For example, if organization is set to ISSF then all courses of fire and target types not related to this organization will be removed from all operating menus.

3.4.2 Target Configuration

Select **Menu → System Settings...→ Advanced → Target Config**

This menu is used to change the parameters for the target connected to the monitor. The first screen shows the related parameters.

- Sensor — Specify the sensor type that the target unit is configured to use (Printed on the target).

- Offset X — Specify **horizontal** offset in millimeters (mm).

- Offset Y — Specify **vertical** offset in millimeters (mm).

- Turned sensor — Mirrored target. Can be used if the target is positioned the opposite way (back side).

- Frame sensor — Specify if the frame sensor is to be used. (applicable only for targets that support frame sensors)

- External motor — Specify if the target has a connection to an external motor for band advance. (applicable only for targets that support connection to an external motor)

To change these parameters, select **Config…**. When you are finished making your changes and have selected **Finished**, you then need to select **Send Data** to transfer your changes to the target.

3.4.3 Set Target ID

Select **Menu → System Settings...→ Advanced → Set Target ID**

Select **Select ID** to set the ID for the target.

The master monitor can set target ID for all targets.

IMPORTANT: Make sure that ONLY ONE target is connected when you set the target's ID otherwise all targets will receive the same ID number. They must connected and set one-at-a-time.

3.4.4 Clock

Select **Menu → System Settings...→ Advanced → Clock**

This menu choice is for setting the time and date on the monitor. If you need to set the time and date on several monitors then this may be more easily accomplished using the MLRange application. (From the main menu: *Setup/Monitor/Set DU Clock*) This will set all connected monitors to the PC's current date and time

4 Maintenance

4.1 System Status

Select **Menu → System Settings...→ System status**

In the system status screen you see the following information about the monitor and the connected target;

Display

- Version – Current monitor software version.
- Firmware – Current firmware installed on the monitor.
- Hardware – Hardware version and screen resolution.
    - o DU3 **i**X – IMX monitor
    - o DU3 **a**X – AT monitor
- Time/Date.
- Voltage - Current voltage as well as min and max values since startup.

Target

- Version – current software version of the connected target.
- Sensor – Target sensor type.
- Info – Current target temperature and current voltage
- Shot count – Total shots registered on the target.
- Error count – Sum of detected system anomalies.

4.2 Upgrading Software

NB: There is an error in the following firmware versions: <mark>FW=2.17 and FW=2.19</mark>. If you have either of these software versions on your monitor please read section 4.2.1 before upgrading.

Upgrading is accomplished with any standard USB flash drive.

The files needed for upgrading is automatically copied to the USB flash drive using the System administration dialog in MLRange. *Please see the document **ML2000 Manual 03 – Configuration and Upgrading** for details.*

NB: The filesystem om the USB flash drive must be FAT or FAT32.

Plug the flash drive in one of the available USB sockets on the rear of the monitor.

If the monitor is not connected to the range computer you can manually start the upgrading procedure by selecting **Menu → System Settings...→ Advanced → USB Upgrade**. (Password value = 3).

When the monitor restarts the upgrade is complete. This can take several minutes to finish.

You can upgrade multiple monitors at the same time by using multiple USB flash drives.

4.2.1 Upgrading from firmware versions with error (FW=2.17 and FW=2.19).

Because of an error in the firmware versions FW=2.17 and FW=2.19 special procedure must be followed when upgrading. You must upgrade to software version 14.50 before continuing to the newest software version. **Do not attempt to upgrade close to any mayor events.** If the upgrade from one of these versions fails, please see section 4.3 Factory reset / software recovery.

1. Check what firmware currently is present in your monitor(s). This can be done by in the system status screen.
2. Delete all content on the monitor. **Menu → Select Scorecard → Menu → Delete All → OK.**
3. Use System administration in MLRange to generate an USB flash drive with the software version 14.50. *Make sure to delete all data on, or format, the flash drive first!*
   a. If the current FW present is version 2.17, please select and copy the version 14.50 (FW.2.17) to the USB flash drive.
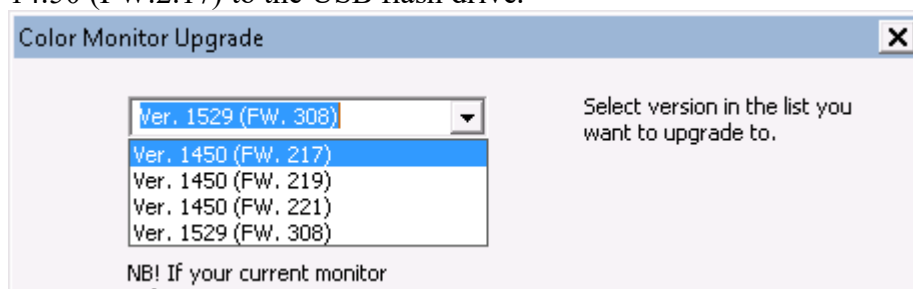
b. If the current FW present is version 2.19, please select and copy the version 14.50 (FW.2.19) to the USB flash drive.
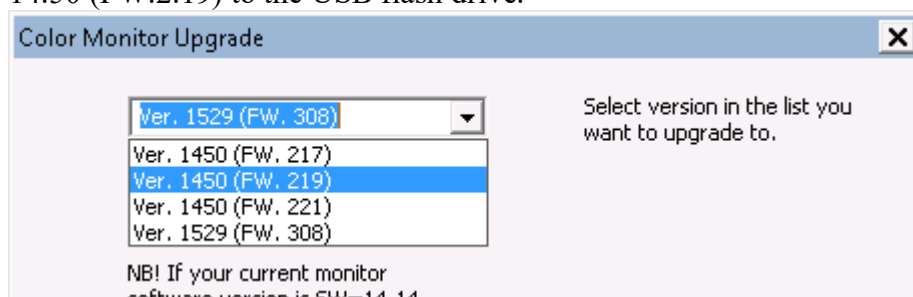
4. Plug the flash drive in one of the available USB sockets on the rear of the monitor.
5. If the monitor is not connected to the range computer you can manually start the upgrading procedure by selecting **Menu → System Settings...→ Advanced → USB Upgrade**. (Password value = 3).
6. If the monitor has not restarted after five minutes, toggle the power off/on by removing the power cord.
7. Check the system status screen that version 14.50 with FW=2.17 or FW=2.19 is present. If not, repeat step 3 – 7.
8. You are now ready to update to the newest version.

4.3 Factory reset / software recovery

If the monitor is not responding you will need to factory reset the software. Contact Megalink to get access to a downloadable zip file with recovery data.

There are two different types of Megalink color monitor. The previous type is called AT and the current is called IMX. Monitors purchased before 2016 are probably of type AT.

You can decide what type of monitor you are using:
- IMX have the text DU3-IMX on the serial number label.
- The system status screen will have the line *Hardware = DU3 i* if type IMX.
- The system status screen will have the line *Hardware = DU3 a* if type AT. If this information is missing it will be an AT.

4.3.1 Factory reset of monitor type AT

4.3.1.1 Monitors with software 15.x and newer

- Download the file ML-DU3-USB-RECOVER-XXXX-XXXXXX.zip from www.megalink.no/login.
- Unzip the file and copy the content into a USB flash drive. Remember to use Windows Safe Removal of devices before removing the drive.
- Turn off the power (or remove the power cable).
- Insert the USB drive in the right (seen from front) USB sockets on the rear of the monitor.
- Press and hold the A button while power on the monitor for at least 10 seconds.
- Release the A button and wait for the monitor to copy software from the flash drive.
- The screen will turn green and the monitor will restart when the copying has completed.

### 4.3.1.2 Monitors with software 14.x and older (or if section 4.3.1.1 failed)

- Download the file ML-DU3-USB-RECOVER-XXXX-XXXXXX.zip from www.megalink.no/login.
- Unzip the file and copy the content into a FAT formated SD card (Must be an SD card. Not SDHC/SDXC or similar). Remember to use Windows Safe Removal of devices before removing the card.
- Remove the power cable.
- Open the monitor. *See section ☐.*
- Insert the SD card in the SD slot. *Se section 4.5.*
- Power up the monitor. The screen will turn red.
- **The screen will turn green when the copying from the SD card has completed.**
- Turn off the monitor by removing the power cable.
- Remove the SD card.
- Power up the monitor.

4.3.2 Factory reset of monitor type IMX

- Download the file ML-DU3-SD-XXXX-XXXXXX.img.zip from www.megalink.no/login.
- Unzip the image file.
- Use the program Etcher to flash the image to an SD card. Download Etcher from www.etcher.io.
- Remove the power cable.
- Open the monitor. *See section ☐.*
- Insert the SD card in the SD slot. *Se section 4.5.*
- Power up the monitor.
- Wait for the message *Upgrade finished* on the screen. This may take several minutes.
- Turn off the monitor by removing the power cable.
- Remove the SD card.
- Power up the monitor.

- Opening the Monitor

If you need to open the monitor then it should be done in the following manner:
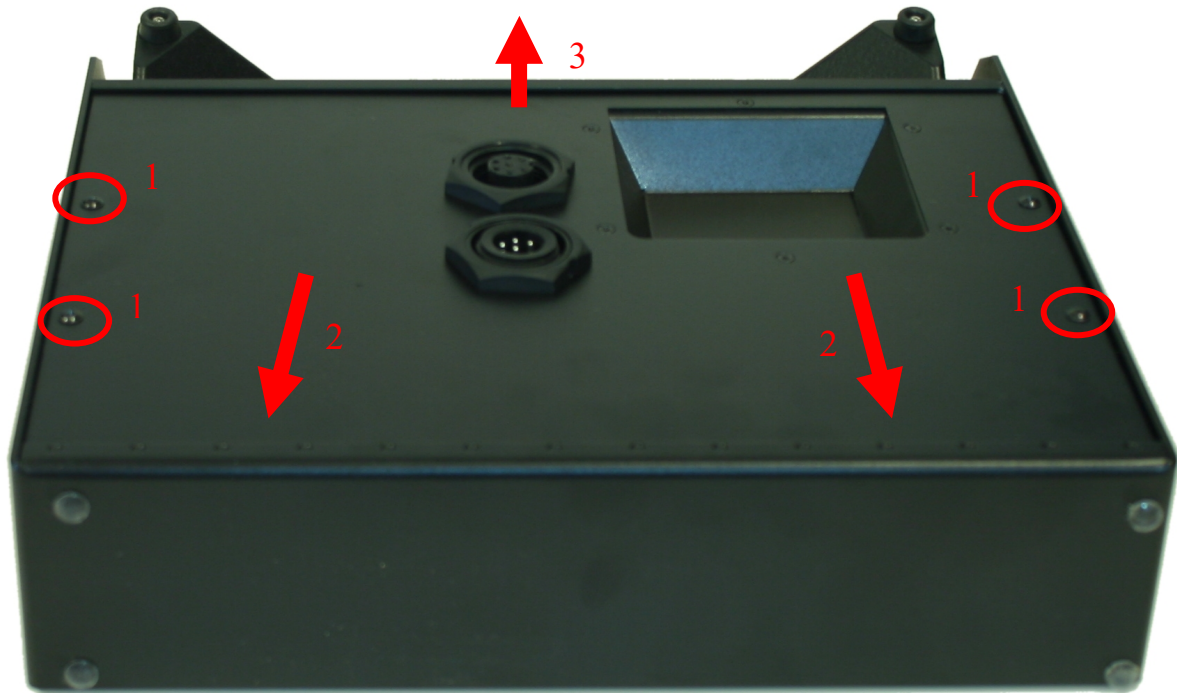
1. Remove the four screws indicated above.
2. Slide the back cover toward you.
3. <u>Gently</u> lift the back cover up to expose the internals.
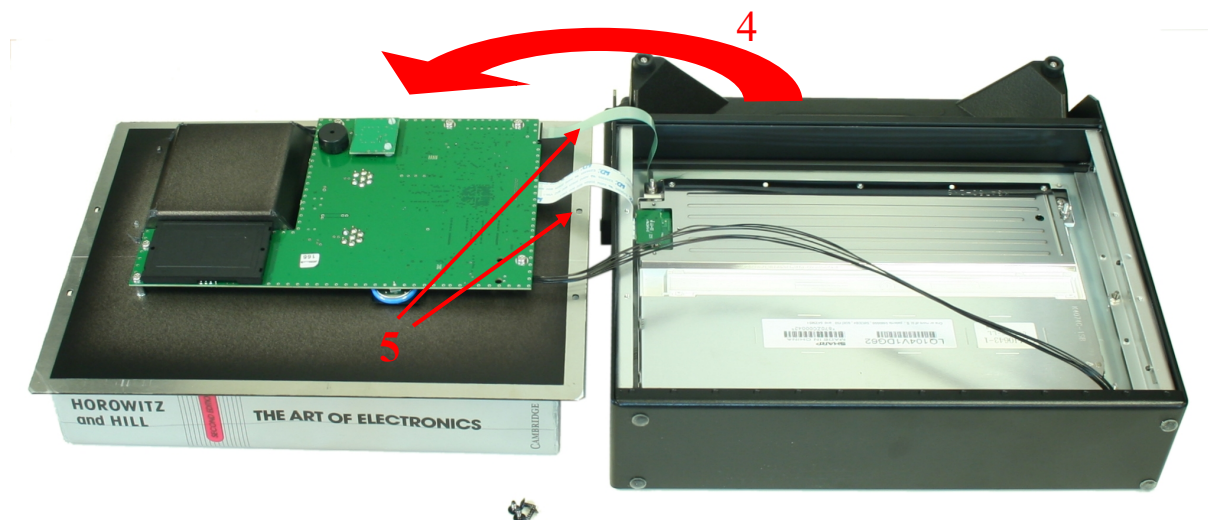
4. <u>Gently</u> lay the back cover over (preferable support by a book to avoid stretching the internal cables).
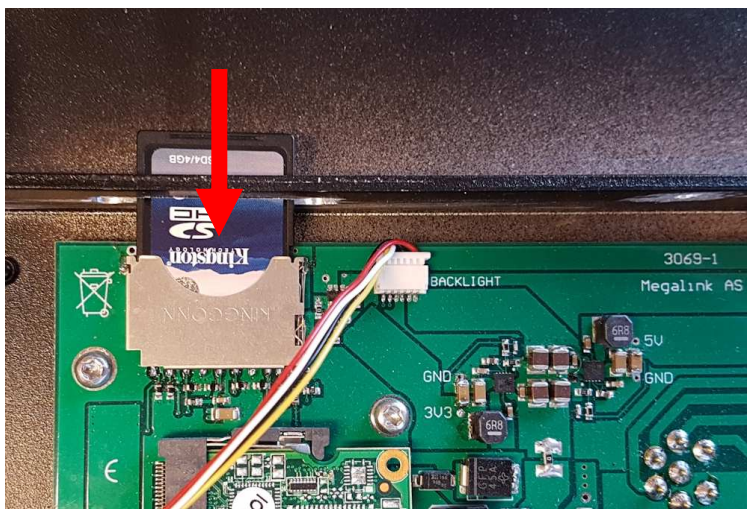5. Ensure that the cables are not pinched or stretched in any way.

4.4 SD Card slot

If you need to insert an SD card the SD slot is located between the cables as shown in the following images.

4.4.1 SD Card slot monitor type AT
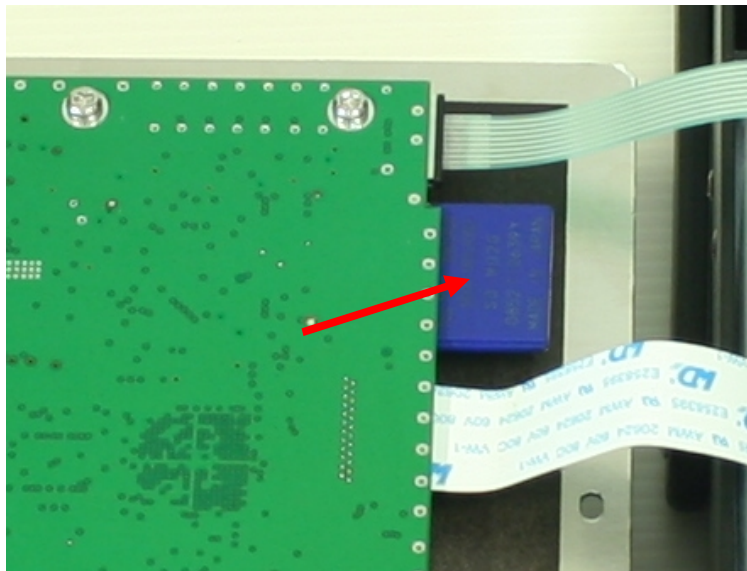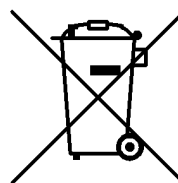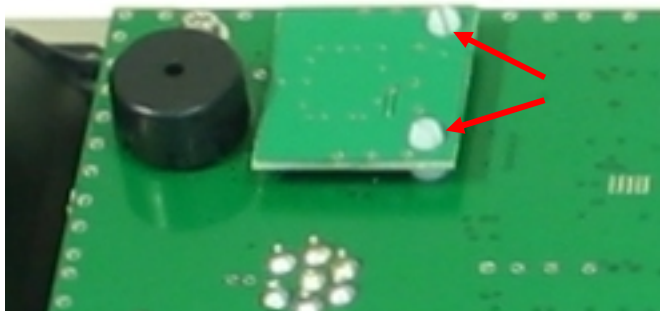

4.4.2 SD Card slot monitor type IMX


4.5 Replacing the Communications Circuit

If the communications circuit (Art.nr.5974) is damaged by lightning or other phenomenon it can easily be replaced (no soldering iron required).
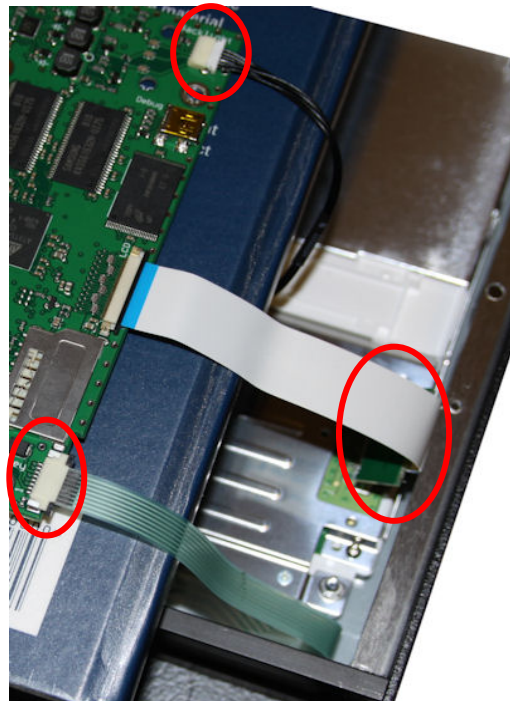
Use fine pliers to gently squeeze the white card holder so that you can lift up the circuit board. *Circuit boards should never be thrown in the trash. They are hazardous to the environment and should be disposed of in an appropriate manner.*
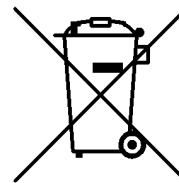
4.6 Replacing the main Circuit

The main circuit can be replaced if a new one is provided by Megalink.
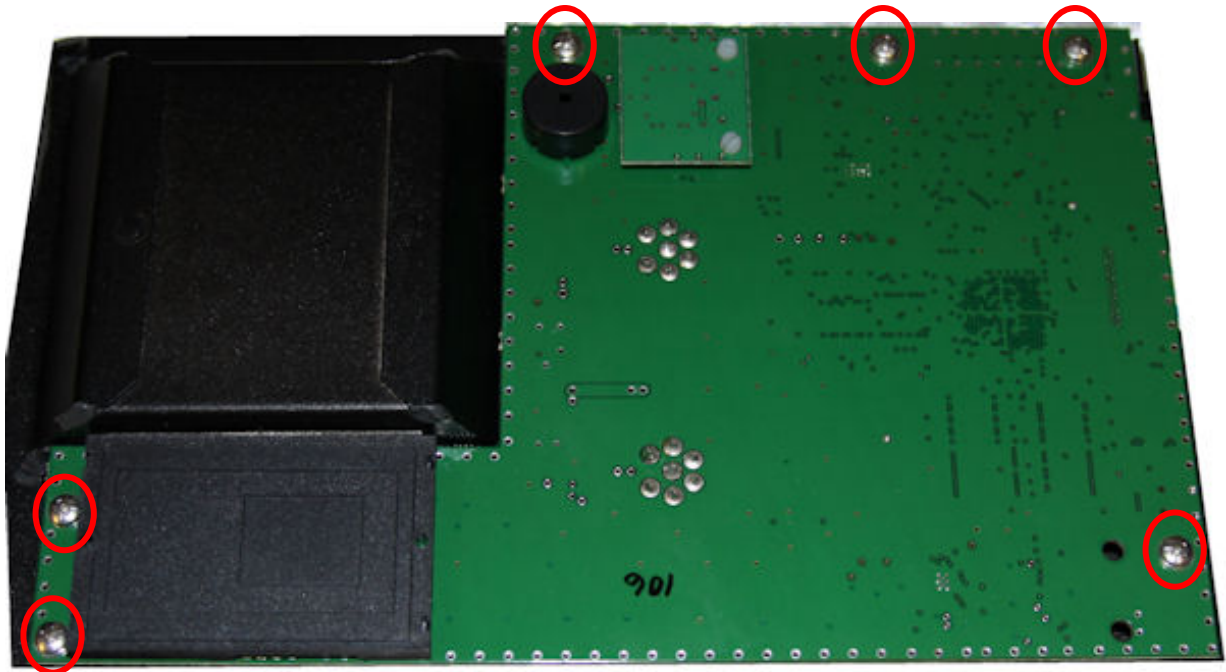
1. Remove the four screws indicated above.

2. Carefully remove these three connections.
3. Replace the new main circuit with the old one.

Circuit boards should never be thrown in the trash. They are hazardous to the environment and should be disposed of in an appropriate manner.