CCpilot XM and CrossCore XM

Software guide

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Revision history

Rev	Date	Comments
P1.0	2011-07-06	-
P1.1	2012-02-17	xx
P1.2	2012-03-30	Update for new windows and Linux system images. Licensing and 3rd party SW annotations added.
P1.3	2012-04-04	Small fixes and layout changes
P1.4	2012-11-27	A-I + CrossCore XM
P1.5	2012-12-03	Update after review
P1.6	2013-06-17	Small clarification for WLAN settings in networking for Linux. Company name change.

1. Introduction

This software guide contains information on how to start using the CC Pilot XM and CrossCore XM products and how to access Service functionality.

XM devices are available with both Windows and Linux operating system. This guide is applicable for both operating systems. Operating system specific information is pointed out in the text or addressed in the respective operating system sections. Windows may refer to Windows XP Tablet PC Edition, Windows Embedded Standard 7 or other versions of Windows. Unless otherwise stated, the information is applicable to all versions of Windows.

The reader should be familiar with the respective operating system and computer usage to fully benefit from this material.

1.1. Conventions and defines

CCpilot XM and CrossCore XM are in most cases identical in functionality and usage. The following definition is used to separate unit specific details. The observe symbol is also used to highlight such difference.

Defines	Use
CCpilot XM	Information that is specific for CCpilot XM
CrossCore XM	Information that is specific for CrossCore XM
XM device	Information that applies to both CCpilot XM and CrossCore XM

🔍 The observe symbol is used to highligt information in this document, such as differences between product CCpilot and CrossCore product models.

A The A symbol is used to highlight information specific for CCpilot XM All-Integrated and CrossCore XM All-Integrated.

⚠ The exclamation symbol is used to highlight important information.

Text formats used in this document.

Format	Use
Italics	Paths, filenames, definitions.
Bold	Command names and important information

1.2. Identification

On the side of the XM device there is a label with version and serial numbers which identify your unique computer. Take note of them. During service and other contact with the supplier it is important to be able to provide these numbers.

1.3. References

For further information on the XM device and the available APIs see the following references.

[1] CCpilot XM and CrossCore XM – Programmers Guide

[2] SocketCAN in Linux kernel, http://lxr.linux.no/linux+v2.6.31.14/Documentation/networking/can.txt

[3] CCAux API documentation (CC AUX x.x.x.x, available in the CC AUX SDK)

[4] CAN Interface Description (available within the Windows SDK)

[5] CCpilot XM and CrossCore XM – Technical Manual

[6] Embedded Write filer documentation (MSDN), http://msdn.microsoft.com/en-us/library/bb521449%28v=winembedded.51%29.aspx

[7] File based write filter (FBWF) documentation, (MSDN), http://msdn.microsoft.com/en-us/library/ee832762.aspx

[8] Hibernate once resume many (HORM) documentation (MSDN), http://msdn.microsoft.com/en-us/library/bb521614%28v=WinEmbedded.51%29.aspx

[9] CCpilot XM and CrossCore XM – Performing Operating System Recovery

[10]CCpilot XM and CrossCore XM – Performing Firmware Updates

2. Basic operation

This section provides an overall description on basic usage of XM device.

2.1. Login and passwords

By default auto login is enabled and no passwords are required to start using XM device.

The root/administrators passwords are as follows

- Under Linux there is one user per default. The user is **ccs** and the password is **default**. This user has administrator rights by using the sudo approach.
- Under Windows there are two users per default. The Windows default administrator user **Administrator** with the password **CCpilotXM** and the user **Operator** which does not have any password. The Operator user has administrator rights and automatic login enabled by default.
- Custom users can be added with the tools from respective operating system.

2.1.1. Serial console login (Linux)

By default, the serial port can be used as a login terminal for headless access to the XM device. This service can however be disabled, if a peripheral connection on serial port is desired. This is specifically covered in chapter 8.5 Changing serial port settings.

Login service is using the same credentials as mentioned above for serial port terminal access.

2.2. Using the touch screen

Navigate the desktop or any application using the touch screen with a stylus or finger.

- Tap the screen to perform the equality of a mouse click.
- Double click is performed similar to using an external pointing device. Tap the screen twice in the same place.
- Tap and hold the on the touch screen to perform the equivalent to a right click.
- There are two available USB profiles for the touch screen; mouse profile and touch profile. The profile can be changed in *CCsettings* or through the CCAux API.

Besides the touch screen, keyboard and mouse connected via USB can also be used.

Touch screen functionality is only available in CCpilot XM product versions.

2.3. Keyboard

There is a virtual keyboard available to input letters and symbols using the touch screen. The virtual keyboard can be used either via the mouse or the touch screen.

The icon to enable the virtual keyboard looks like this:

in Windows

in Linux

2.4. Calibrating the touch screen

To calibrate the touch screen, open *CCsettings*. Select *Touch* and then *Calibrate Now*. Then follow the step by step sequence to calibrate the display.

It is also possible to launch the calibration application explicitly from any custom application by calling the *TouchCalibrator* application (naming convention applicable per operating system). This application also take additional arguments to configure the calibration method, such as number of calibration points (5, 9 or 13 points) and edge distance settings of the calibration points. The 5 point calibration is the default method. The 13 point calibration can be used if the results of the 5 point calibration are not satisfactory. The available command line options can be seen with the `--h` or `--help` option flags.

Touch screen functionality is only available in CCpilot XM product versions.

2.5. Software deployment

There are several methods to add your own software to the device. The standard methods to transfer software to XM device are to either copy files using the network connection or to use USB storage devices. To install the software, follow the instructions for the respective software.

Additionally, software can be deployed with remote access functions, see the operating system specific parts in this document for more information.

3. Device start-up behaviour

At power on, the XM device has an internal microcontroller that monitors the power supply and performs start-up configurations and power settings. It then supplies the main computer board with power; from there the device execution begins, starting with the BIOS.

3.1. BIOS

The BIOS is XM device specific BIOS, which performs the initial setup of the main processor and its on-board peripherals. Once finished, the operating system execution takes over.

During BIOS operation different startup options can be accessed, the BIOS can for instance be used to occasionally boot from USB attached storage media by pressing the key **F11**. If other non-standard BIOS settings are desired, access the BIOS Settings menu by pressing the **DEL** key during BIOS startup. BIOS settings changes should normally not be needed and can be affecting specific functions within the system, so any changes must be careful considered before applying.

3.2. Windows system start-up specifics

Once the Windows operating system is started, normal operating system steps are performed. The Windows operating system is fully available as standard, with installed device drivers for all hardware peripherals available.

3.3. Linux system start-up specifics

The Linux operating system, an Ubuntu LTS derivate, has two start-up modes, the normal mode and the recovery mode. In the normal mode the root file system is write protected, meaning that any run time settings normally done by the user are discarded after a power cycle.

To be able to perform system settings, the Linux system must be restarted into recovery mode. This is done with the shell command:

```
# sudo reboot-rescue.sh
```

This recovery mode enables the write back mode of the root file system; in this mode a user can perform settings that are kept permanent and the system works as the standard Ubuntu system.

The device can also be started into the recovery mode directly, if a keyboard is attached. Keep the <*SHIFT*> key pressed while booting the device normally, then choose the recovery system from the menu that appears.

⚠ The recovery system may be more error prone to file system corruption, it is recommended to limit the use of this mode. Be careful and perform controlled shutdown and restart operations while in recovery mode, as well as making sure the device has a steady supply power.

3.4. Status LED indication

This section describes the basic default status LED behavior. The LED is located in different locations depending on the device type, see *Technical Manual* for details. Note that the status LED behavior can be disabled totally and/or overridden by user software through the CCAux API.

3.4.1. Start-up sequence

During startup, the LED indications are as follows:

1. Flashing YELLOW at 1 Hz. Pre-heating is activated and in effect, start-up is delayed while the device is heated.
2. Flashing YELLOW at 2 Hz. Device start-up phase begins.
3. Operating system is then started, and specific service software begins to execute.
4. Static GREEN. System is operational.

3.4.2. Shutdown sequence

Once shutdown or reboot is initiated:

1. Static YELLOW. Shutting down, rebooting or entering suspended mode.
2. LED OFF. Device is off

3.4.3. Suspend/resume sequence

Once suspend is initiated:

1. Flashing YELLOW at 0.2 Hz. In suspend mode
2. Flashing YELLOW at 2 Hz. Resuming operation
3. Static GREEN. System is operational.

3.4.4. Error indication

There are two different types of error indications available from the status LED:

- Flashing RED – An occasional three RED blinks during startup indicates an internal error that is recoverable, i.e. the system can continue its execution and normal operation. Error code can be retrieved trough the CCAux API, since the status LED will follow its normal status indication scheme.
- Flashing BLUE – The device becomes non-operational, and seems to be dead, despite powered on. A number of BLUE LED blinks should be displayed. Record the number of blinks, as this can be useful in an eventual support contact.

Reason for BLUE LED blinking could be voltage levels out of range, temperature related problems or internal hardware errors. First steps should be to let device cool off, and verify it has correct power supply attached, before starting the device again.

4. Accessing and using the interfaces of XM device

This section covers basic usage and access of the XM device hardware. Most of the hardware is accessed using the default Windows or Linux interfaces but some XM device specific interfaces, such as CAN and Digital In, require additional software and/or interfaces to be accessed. See the *CCpilot XM and CrossCore XM – Programmers guide* documentation for general information regarding software development using XM device interfaces.

Depending on product model, all interfaces may not be present on your specific model. There may also be additional methods to access XM device than the ones described herein, depending on operating system and additional installed software.

4.1. CF/HDD

XM device uses a compact flash based storage. The storage is identified to the system as an IDE-device, i.e. a normal hard disk drive.

⚠ The Compact Flash module is industrial grade classified and has both static and dynamic wear levelling to prevent a premature aging and to ensure the longest lifetime, still Compact Flash drives has a limited number of write cycles. It is recommended that the amounts of writing to storage are limited within the application. Rather keep information in RAM memory and write larger blocks at one time instead of frequently writing smaller pieces.

Additional details about CF usage recommendations can be found in *CCpilot XM and CrossCore XM – Programmers guide.*

4.1.1. Windows

In the maximatecc Windows images, measures have been taken to reduce the number of write accesses during normal operation. These measures include disabling of file access timestamps and disabling of prefetching services. Note that the page file is disabled by default; this is to enhance the life time of the Compact Flash card and reduce the system reserved storage media space. Further configuration to reduce flash write cycles can be set up by the customer: See chapter 9 Windows system specifics, for information about the EWF, FBWF and HORM technologies.

4.1.2. Linux

In Linux, the Compact Flash card is partitioned into one root file system, which is write protected, and one user file system area, which is write enabled by default. The latter area is the preferred location for user software installations. See chapter 8.3 Installing new drivers, applications and system packages.

4.2. CAN

XM device has four CAN interfaces with user configurable baud rate and frame type accessible from the CCsettings application or from registry and/or standard file system settings.

The CAN interfaces can also be accessed in Windows using the proprietary CAN API, further described in the *CAN Interface Description*, or with the Linux operating system standard API *SocketCAN*. More information can be found in *CCpilot XM and CrossCore XM – Programmers Guide.*

4.3. Ethernet

Two Ethernet ports are available on XM device, thus enabling simultaneously connection with two physical network infrastructures. XM device is per default set up to use DHCP for IP address retrieval. The network connection settings can be changed within the operating system settings.

Be aware that connecting XM device to a network environment can impose a security threat if not taking the required security measures.

4.4. USB

Via the USB port, a multitude of devices can be connected to XM device. For some devices, drivers compatible with the operating system must be installed in order for the device to function. Follow the instruction from the device supplier for the respective operating system.

4.5. RS232 Serial access

Select *COM1* in Windows to access the serial port of XM device.

In Linux the serial port is accessed from *dev/ttyS0* and when communicating with the targets, the settings for serial port to use are *115200-8-N-1*. By default the serial port is set up as a login console, but this can be disabled to allow connection of peripheral accessories. This is specifically covered in chapter 8.5 Changing serial port settings.

The Serial port in XM device follows RS232 signalling levels, but with a limited set of signals. For more information see the Technical manual.

Note that the serial port should not be used by any software when performing upgrades of internal microcontroller firmware. The internals of the device needs to have undisturbed access to the serial port during this operation.

4.6. Video in

The video in signals can be viewed by the *CCvideo* application, further described in chapter 6 CCvideo. The video in signals can also be accessed and controlled using the CCAux API.

4.7. Audio In / Out

Audio in and audio out is controlled using the normal operating system functionality. The audio device is identified as *Cirrus Logic HD Audio*. Note that the audio input is muted per default.

4.7.1. Linux audio settings

Audio input and output settings can be found from menu *System › Preferences › Sound*.

For any changes to be persistent they need to be made while the system is in rescue mode.

4.7.2. Windows audio settings

The sound settings can be managed using normal operating system procedures accessible via the control panel.

In Windows XP the Cirrus Logic audio driver supports the below listed combinations of frequency/resolutions for playback and recording. If other settings are used, the audio may be distorted or not audible.

Frequency	Resolution
8Khz	8bit mono 8bit stereo 16bit stereo
12KHz	8bit mono 8bit stereo 16bit mono 16bit stereo
16KHz	8bit mono 8bit stereo 16bit stereo
32KHz	8bit mono 8bit stereo 16bit stereo
44.1KHz	44.1KHz 8bit mono 44.1KHz 8bit stereo 44.1KHz 16bit stereo
48 KHz	48KHz 8bit mono 48KHz 8bit stereo 48KHz 16bit stereo

4.8. Digital Input

The digital input signals are available for software developers using the CCAux API. The digital input status can be viewed within CCsettings for test purposes.

4.9. Status LED

The status LED in the XM device is used by the computer itself and by the operating system to indicate different states or to present warnings, as described in 3.4 Status LED indication. The status LED can also be controlled by the applications running on XM device using the CCAux API. The blinking frequency and colour of the LED can be controlled. The latest status LED instruction is always used. The status LED can also be disabled which means that only hardware error codes and user application behaviour is enabled. Yellow blinking at start-up and static green in operational mode are turned off.

4.10. Backlight

The XM device has an adjustable backlight intensity level. In addition to the backlight control buttons on the CCpilot XM front, the backlight functionality can also be controlled from *CCsettings* and via software using the CCAux API. The most recent setting is always used. The backlight buttons are dedicated for backlight adjustment only.

Together with the ambient light sensor it is possible to make a custom, fully automatic, backlight control. Such an automatic backlight control function is included in CCpilot XM, but it is not enabled by default. It can be set up in *CCsettings* or through the CCAux API.

For CrossCore XM, the backlight and ambient light sensor is not available.

4.11. Ambient light sensor

The ambient light sensor measures light levels in front of CCpilot XM; for example it's used for automatic backlight control. The ambient light sensor is accessed through the CCAux API. It can also be accessed for diagnostic through *CCsettings*.

4.12. Buzzer

In addition to the audio In/Out signals, CCpilot XM is also equipped with a buzzer that can play tones in various frequency and intensity levels. The buzzer is accessed through the CCAux API. It can also be accessed for diagnostic through *CCsettings*.

For CrossCore XM, the buzzer is not available.

4.13. EEPROM

A user accessible EEPROM is available in the device, if such storage is required. It's not normally needed since a device of this type can store persistent settings in ordinary files in the file system instead. The EEPROM is accessed via the JIDA interface.

4.14. Hardware watchdog functionality

There is a watchdog available making it possible for the hardware to monitor an application so it does not stall the system. The exact behaviour is up to the application software to handle and configure. This functionality is available using the JIDA interface.

4.15. Temperature sensors

There are several temperature sensors placed internally in the device. Thus it is possible for an application to retrieve temperature information from the temperatures sensors through the CCAux API or the JIDA interface, depending on temperature sensor placement.

4.16. GPS

The internal GPS receiver in XM device All-Integrated follows NMEA-0183 standards. To access the GPS receiver data, you should open up a serial connection to /dev/ttyUSB1 (Linux) or COM4 (Windows), with 8-N-1-9600 settings. Note that the GPS receiver needs to be power on to be able to operate. This is done with the CCSettings program or through the CC AUX API.

On Linux, the output of the GPS device can be verified with the following command:

```
# stty -F /dev/ttyUSB1 ispeed 9600 && cat </dev/ttyUSB1
```

For Windows, similar serial terminal programs can be used for verification.

Once initiated with an initial read operation, the GPS receiver will start to output NMEA-0183 formatted messages on the serial connection, containing GPS information. It is possible to add extra GPS software that can format this data and provide a more user-friendly approach to it. The functionality of the GPS receiver together with the open-source implementation *GPSD* has been verified. For more information, see http://gpsd.berlios.de/

NMEA also allows the GPS device to be configured, for more details; locate *Fastrax iSuite*™ NMEA manual. It is also possible to use CCSettings for initial verification of GPS receiver functionality, see more in section 5.16.

4.17. GPRS/GSM

XM device All-Integrated has a GPRS modem for data connections. To access the GPRS/GSM modem, you should open up a serial connection to /dev/ttyUSB0 (Linux) or COM3 (Windows), with 8-N-1-57600 settings. Note that the GPRS/GSM modem needs to be power on to be able to operate. This is done with the CCSettings program or through the CC AUX API.

The GPRS modem supports the standard set of AT commands, so any software that supports the standard AT command specification using serial communication can be used. For instance, the current power status is available via the AT command (on Linux):

```
# chat TIMEOUT 2 '' AT | microcom -t 5000 /dev/ttyUSB0
```

For Windows, similar serial terminal programs can be used for the same type of simple verification. It is also possible to use CCSettings for initial verification of modem functionality, see more in section 5.16.

4.18. WLAN

XM device All-Integrated supports WLAN, interoperable with the standard 802.11 b/g networks. Note that the WLAN module needs to be power on to be able to operate. This is done with the CCSettings program or through the CC AUX API.

In Linux, the wireless tools that are installed on the device can be used for setting up the actual network. Such tools include the **iwconfig**, **iwlist**, **iwspy**, **iwpriv**, **wpa_supplicant** and **wpa_cli** commands. Additionally, the network interfaces file can be used for configuring WLAN settings.

In Windows, the standard operating system network connections can be used for setting up a wireless connection using the WLAN module.

4.19. Bluetooth

XM devices with All-Integrated options have HCI Bluetooth support. HCI stands for Host Controller Interface and provides a uniform interface method for accessing Bluetooth hardware capabilities. The Bluetooth module complies with the Bluetooth 2.1 standard. Note that the Bluetooth module needs to be power on to be able to operate. This is done with the CCSettings program or through the CC AUX API.

In Windows, the Microsoft Bluetooth stack is used for communication with Bluetooth devices. In Windows 7, Bluetooth device settings have been moved to *Devices and Printers* from the Control Panel applet. Please see the Microsoft documentation for specific Bluetooth usage.

In Linux, the official Linux Bluetooth protocol stack Bluez is supported, and can be used for communication with Bluetooth devices. Please see the Bluez documentation for more specific Bluetooth usage.

5. CCsettings

CCsettings is used for viewing and adjusting XM device specific features and information. Through the *CCsettings* main window, the different settings pages are reached, each containing different areas of settings and information.

All functionality and settings accessed using *CCsettings* is also available through the CCAux API to enable integration of settings and functionality within any additional user application, or from the command line with the tool *ccsettingsconsole*. For details about this, please see the API documentation or *ccsettingsconsole --help*.

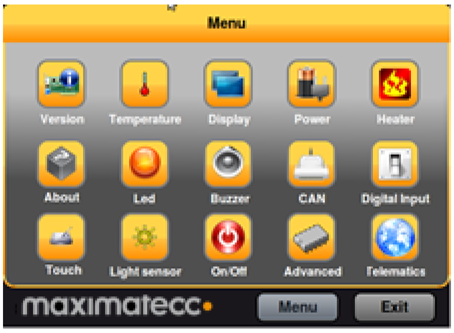
Start *CCsettings* from its menu item or optional desktop shortcut. In Windows, *CCsettings* can also be started from the Control Panel.

5.1. Main menu

The main screen of *CCsettings* show the available settings pages.

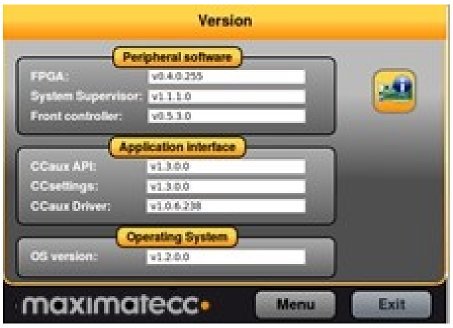
Click on the respective icons to enter its settings page.

It is always possible to revert to the main menu by pressing the *Menu* button. If a keyboard is in use, the Escape key can also be used to revert to the main menu.



5.2. Version

The version page displays the XM device internal software versions, as well as application interface version and the version of *CCsettings* itself.



Peripheral software

FPGA: v0.4.0.255
System Supervisor: v1.1.1.0
Front controller: v0.5.3.0

Application interface

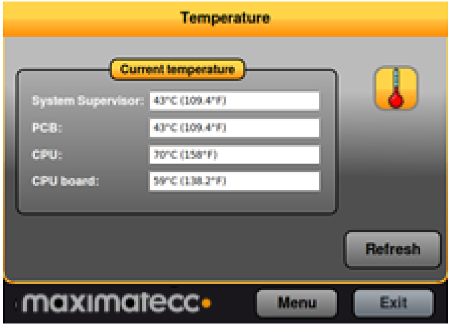
CCaux API: v1.3.0.0
CCsettings: v1.3.0.0
CCaux Driver: v1.0.6.238

Operating System

OS version: v1.2.0.0

5.3. Temperature

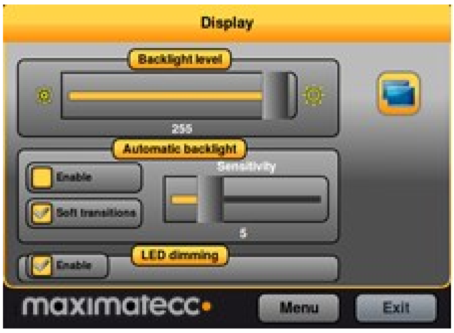
XM device's internal temperature sensors can be viewed from the temperature page.



Current temperature

System Supervisor: 43°C (109.4°F)
PCB: 43°C (109.4°F)
CPU: 70°C (158°F)
CPU board: 59°C (138.2°F)

5.4. Display



Use the display page to alter the XM device backlight functionality.

Adjust the backlight of the display by dragging the *Backlight level* slider.

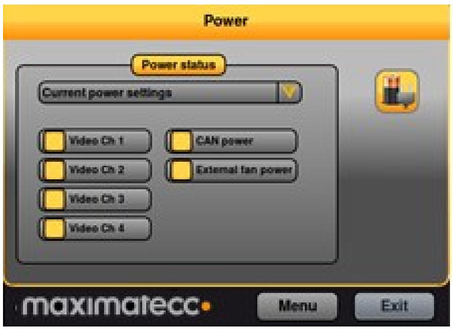
Enable automatic backlight using the *Enable* checkbox. The display brightness is then adjusted using CCpilot XM's light sensor. *Soft transitions* enable smoother adjustment of the backlight.

The *Sensitivity* slider adjusts the level and phase of backlight adjustment depending on the surrounding light.

The Status LED can be automatically dimmed according to the backlight setting if LED dimming is enabled. Note that this may not work if a custom color is used or if a blink sequence is set up by user applications.

For CrossCore XM, the Display option is not available in CCSettings.

5.5. Power

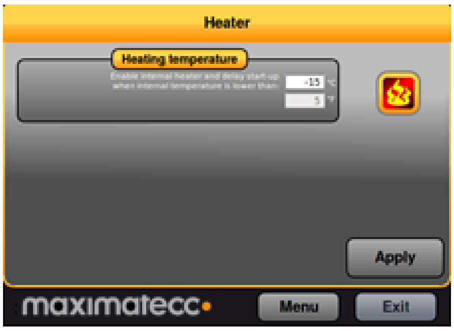


The power page is used to enable or disable the built in power controls in XM device.

Enable power by checking the respective check box.

Using the *Power status* drop down box it is possible to adjust the current setup or the default setup during system start-up.

5.6. Heater


Heater
Heating temperature
Enable internal heater and delay start-up when internal temperature is lower than:
-15 °C
5 °F
Apply
maximatecc
Menu
Exit

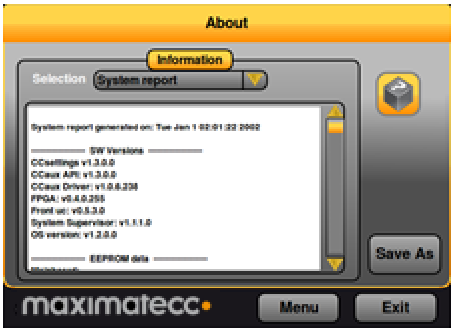
The heater page is used to adjust the starting temperature of the internal heater.

Adjust the temperature and activate the setting by pressing the *Apply* button

5.7. About

The about page displays device specific information and status information. Select what type of information to display using the *Selection* drop down box.

Select *System report* drop down to generate a full device information report, which can be saved to file. This report can be very useful for service and support questions.



Selection: System report

System report generated on: Tue Jan 1 02:01:22 2002

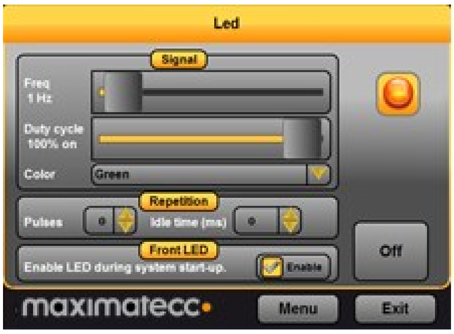
——— SW Versions ———
CCsettings v1.3.0.0
CCaux API: v1.3.0.0
CCaux Driver: v1.0.6.238
FPGA: v0.4.0.255
Front uc: v0.5.3.0
System Supervisor: v1.1.1.0
OS version: v1.2.0.0

——— EEPROM data ———

5.8. LED

The LED page is used to view the possible LED indication types and to adjust the LED behavior during startup.

Enable or disable the status LED indication during startup of XM device using the *Enable* checkbox.



Freq 1 Hz
Duty cycle 100% on
Color: Green
Pulses: 0
Idle time (ms): 0
Enable LED during system start-up. ☑ Enable

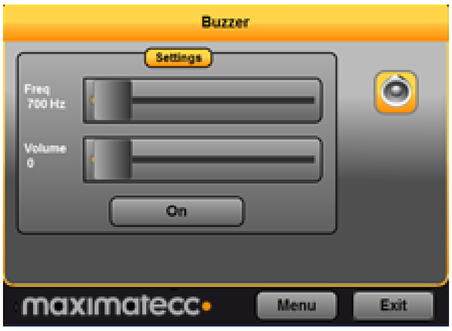
5.9. Buzzer

The Buzzer page is used to analyze the possible audio output from the Buzzer.

Adjust the frequency and volume of the built in buzzer using the sliders.

Test the buzzer sound by pressing the *On* button. Press it again to turn off the buzzer.

For CrossCore XM, the Buzzer is not available in CCSettings.

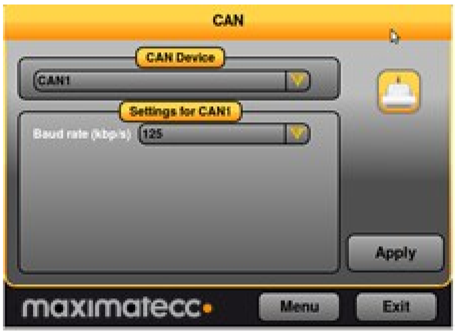


Freq 700 Hz
Volume 0

5.10. CAN

CAN is normally used and configured directly from the controlling software. But from *CCsettings* it is possible to adjust the default *Baud rate* and CAN *Frame type*.

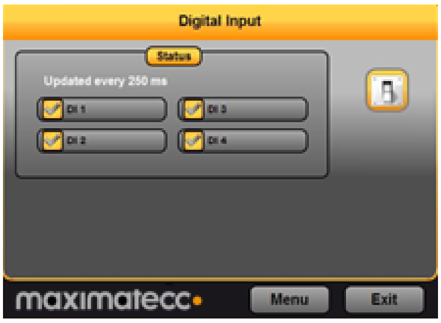
The *Device* drop down box is used to select the CAN device to adjust.



CAN1
Baud rate (kbp/s): 125

5.11. Digital Input

The digital input page displays the status of the digital input ports on XM device.



Digital Input

Status

Updated every 250 ms

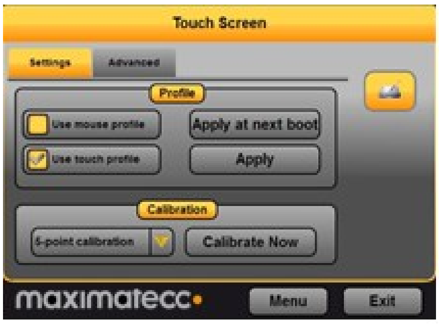
☑ DI 1
☑ DI 3
☑ DI 2
☑ DI 4

5.12. Touch screen

The touch screen page is used to select whether the touch display shall be identified to the operating system as a touch screen or as a mouse.

Select *Use touch profile* to identify the touch screen as a touch screen, this is the default and preferred setting.

Select *Use mouse profile* to identify the touch screen as a mouse, this setting is required for Windows XP-based installations without the tablet PC component.



Touch Screen

Settings | Advanced

Profile

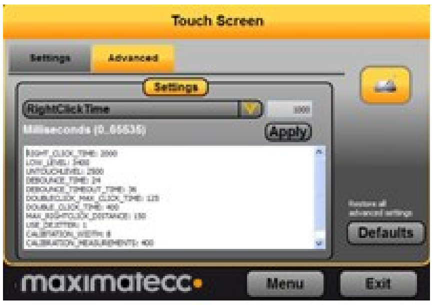
□ Use mouse profile
☑ Use touch profile

Calibration

5-point calibration

If the touch screen if the pointing precision seems low it is possible to make a calibration. Start the calibration sequence by selecting *Calibrate Now* and follow the step by step sequence. Different calibration methods can be chosen to perform more precise calibration.

In the *Advanced* tab, additional touch and calibration settings can be made. For instance, by entering a time at *Right click time* and pressing *Apply* it is possible to adjust the time needed until pressing on the touch screen will result in a right click action. See the CCAux API documentation for further information on the advanced settings.



Touch Screen

Settings | Advanced

Settings

RightClickTime 1000

Milliseconds (0..65535)

```
RIGHT_CLICK_TIME: 2000
LOW_LEVEL: 3400
UNTOUCHLEVEL: 2500
DEBOUNCE_TIME: 24
DEBOUNCE_TIMEOUT_TIME: 36
DOUBLECLICK_MAX_CLICK_TIME: 125
DOUBLE_CLICK_TIME: 400
MAX_RIGHTCLICK_DISTANCE: 150
USE_DEJITTER: 1
CALIBRATION_WIDTH: 8
CALIBRATION_MEASUREMENTS: 400
```

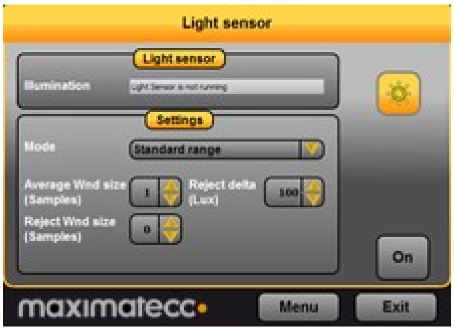
Restore all advanced settings

For CrossCore XM, the Touch Screen option is not available in CCSettings.

5.13. Light sensor

The light sensor page is used for Light sensor evaluation. This access is for evaluation, no settings are stored when leaving the light sensor page.

For CrossCore XM, the Light Sensor option is not available in CCSettings.


Light sensor

Light sensor
Illumination: Light Sensor is not running

Settings
Mode: Standard range
Average Wnd size (Samples): 1
Reject delta (Lux): 100
Reject Wnd size (Samples): 0

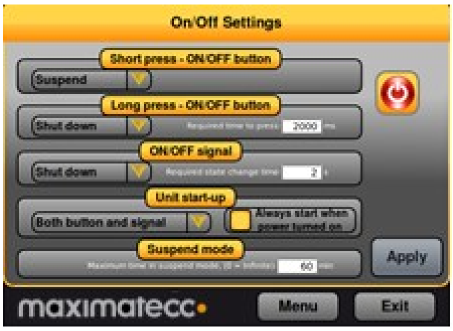
5.14. On/Off

The On/Off page is used to adjust the startup and shut down settings of XM device.

Any altered setting must be activated using the *Apply* button.

Short press - ON/OFF button - adjust the unit behavior when making a quick press and release of the on/off button.

Long press - ON/OFF button - adjust the unit behavior when pressing and holding the On/Off button.


On/Off Settings

Short press - ON/OFF button
Suspend

Long press - ON/OFF button
Shut down
Required time to press: 2000 ms

ON/OFF signal
Shut down
Required state change time: 2 s

Unit start-up
Both button and signal
□ Always start when power turned on

Suspend mode
Maximum time in suspend mode, (0 = Infinite): 60 min

ON/OFF signal - adjust the behavior of the On/off signal through the power connector. The time settings adjust how long the signal must stay low before XM device reacts to the signal.

Unit start-up makes it possible to select if the unit shall respond to start-up from both the on/off button and/or the on/off signal in the power connector, or if it shall be configured to start up directly when supply voltage is applied.

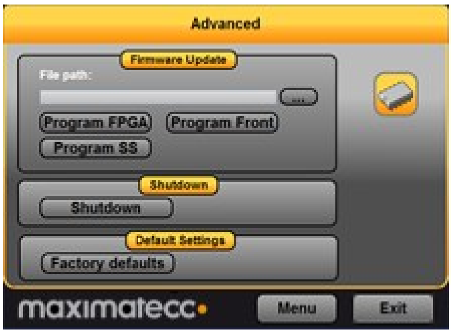
Suspend mode is used for activating automatic transition from suspend mode to shut down of the computer. The time defines the amount of minutes XM device shall remain in suspend mode before shutting down. Setting the time value to 0 disables the shut-down feature; XM device will stay in suspended mode indefinitely, until started or until power is removed.

5.15. Advanced

The Advanced page is used for loading new firmware into XM device and to restore settings to factory defaults.

To update the respective firmware, make sure the firmware file is located on the device. Browse for the appropriate file, then press the corresponding upgrade button and wait for the firmware update to complete.

Note that no other software can use the serial port of the device while upgrading the *SS* or *Front* controller. This includes the serial console usage under Linux, and thus an upgrade must disable this prior to starting the upgrade.



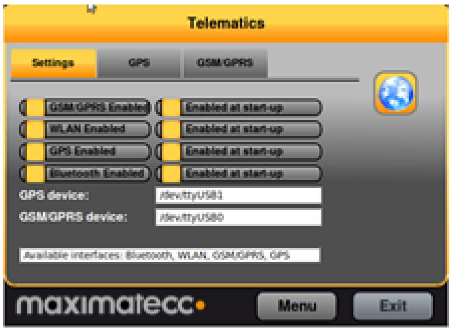
For detailed information about how to upgrade the firmware, please see [10] CCpilot XM and CrossCore XM – Performing Firmware Updates.

5.16. Telematics

The Telematics page is used for control of All Integrated functionality such as the GPRS modem, the GPS received, the Bluetooth module and the WLAN chip.

You can control when to apply power to the specific peripheral and thus enabling the specific functionality, either as one time power on or off operation, or as permanent startup setting.

Additionally, the GPS receiver and the GSM/GPRS modem have additional status information and command possibilities in their specific tabs.



GPS device: /dev/ttyUSB1
GSM/GPRS device: /dev/ttyUSB0

Available interfaces: Bluetooth, WLAN, GSM/GPRS, GPS

6. CCvideo

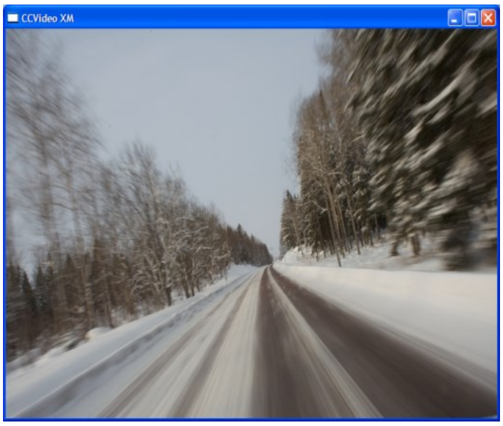
CCvideo is a pre-loaded application for viewing the CCpilot XM video in signals. Two video signals can be simultaneously displayed, using any of the four input channels.

All functionality and settings accessed using *CCvideo* is also available through the CCAux API to enable integration of settings and functionality within any additional user application.

Video functionality viewing is not applicable for the CrossCore XM.

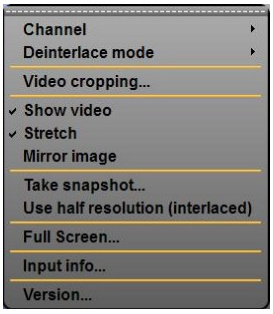
6.1. CCvideo main window

When starting *CCvideo* the main window will be shown. This window displays the currently selected video signal.



6.2. Selection menu

The selection menu is activated by right clicking within the *CCvideo* window.

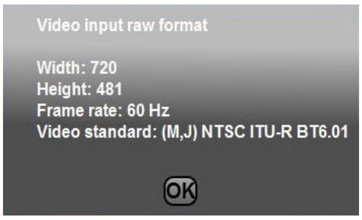


- ---- - Lock the menu visible.
- *Channel* - Select the video in signal to display.
- *Deinterlace mode* - Select deinterlace mode for video generation.
- *Video cropping* - Opens the Video cropping dialog.
- *Show video* - Enables/disables the video in feed to be displayed.
- *Stretch* - Enables/disables stretching of the video image to fit the size of the *CCvideo* application window.
- *Mirror image* - Enables/disables video image mirroring.
- *Take snapshot* – Take a snapshot of the video image. The image will be saved to disk and the user will be asked if he wants to view the image in the OS default image viewer.
- *Use half resolution (interlaced)* – Setting for the snapshot function. If enabled, the snapshot image will only use half of the original video resolution. This function is intended to be used by custom applications if disk/memory usage and performance of capturing images are critical.
- *Full Screen* – View video in full screen mode.
- *Input info* - Displays input information for the currently viewed video in feed.
- *Version* – Display the software version of *CCvideo*.

6.3. Input info

The input info dialog displays information for the currently used video in feed.

- *With* - Native with of the signal in pixels.
- *Height* - Native height of the signal in pixels.
- *Frame rate* - Current frame rate of the video signal.
- *Video standard* – The detected video standard of the video signal.



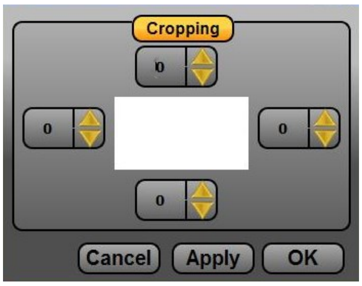
Video input raw format

Width: 720
Height: 481
Frame rate: 60 Hz
Video standard: (M,J) NTSC ITU-R BT6.01

6.4. Video cropping

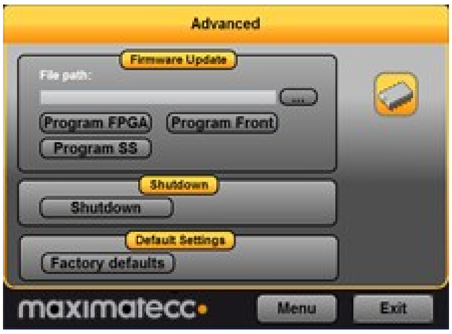
Use the video format settings to adjust the video being shown.

- *Cropping* - Removes black or unwanted parts of the video signal. The video feed is cropped by the number of lines set for each part of the picture.



7. Software update and recovery

7.1. Restore firmware settings



CCsettings can be used to reset the firmware settings to the factory default settings, if needed. Start *CCsettings* and press the *Factory defaults* button from the *Advanced* page.

7.2. Updating firmware components

The XM device has three different firmware components; The System Supervisor is a microcontroller that controls the power configuration within the device. The Front microcontroller controls the functionality available in the front, including LED, Buzzer and touch screen handling. The FPGA implements different communication controller interfaces internally in the device.

Each of these firmware components can be updated, either individually or batched. The preferred method to perform the update is by using the *CCSettings* program, as briefly mention in section 5.15. It is also possible to use the command line based application *ccsettingsconsole*, or from your own program using the CC AUX API functions.

For specific details on how to perform firmware component updates, please see [10] CCpilot XM and CrossCore XM – Performing Firmware Updates.

7.3. Updating system components

Updated system components can be installed in XM device to enable new features or provide enhancement on existing functionalities.

- XM device specific drivers, interfaces and applications are updated using updated software packages available from maximatecc or your sales contact. These packages contain installation instructions or such instructions are available separately.
- Firmware for XM device internal functionality is mainly updated through *CCsettings*.
- General operating system updates are added using the operating system update methods, such as installers and software packages

7.4. Reinstalling the operating system

If the operating system needs to be reinstalled it is advised to use the custom XM device operating system images, available through maximatecc's on-line support pages or your support contact. These operating system images have the same content as the pre-installed operating system. There is a separate operating system recovery manual that can be followed, see [9] CCpilot XM and CrossCore XM – Performing Operating System Recovery for a more thorough description.

⚠ When re-installing XM device, all stored material such as user saved data and computer configuration will be lost. Backup all necessary information before re-installing the operating system.

8. Linux specifics

This section describes specific details for systems running Linux.

8.1. Linux system content

The Linux operating system is an Ubuntu LTS (lucid) derivate, using customized desktop and slimmed contents with limitations in package management, together with a real-time kernel and interfaces to access the XM device specific hardware and functionality.

Additionally, the file system is changed to a union file system, making the real root file system write protected where all system changes are normally only valid for one session.

To see which software packages are installed in the XM device Linux system, list them with the following command:

```
# dpkg -l
```

For general Ubuntu setup and system configuration, please see the Ubuntu documentation.

8.1.1. Linux drivers

Dated 2012-03-01, the Linux driver content is as follows, i.e. this specifies the 3rd party software that is used in XM device:

Usage	Provider	Driver
Graphics	Intel	EMGD v 1.5.1742

8.2. Updating system software

System software can be updated either writing complete new disk image or install updated packages. The preferred method is to use package based updates.

8.2.1. Image based update

With this method all the user modifications to the system will be erased. Device will be set to same state as it would be when left from factory. This method can be used to recover devices that for some reason have corrupted system software. This is also simplified with the tools mentioned in [9].

Boot the device from Linux LiveCD – image, for example Ubuntu LiveCD. If an update LiveCD – image, containing update system image, is provided, use it instead. USB – boot device is needed to be selected during boot up at BIOS screen by pressing F11 key.

After device has done booting the Live Linux system, start terminal from menu Applications › Accessories › Terminal. Use the following command in terminal to write image from network. In this example version 1.2.0.0 is used, but it should be replaced to match current version, as well as replacing the correct path to the actual image file.

```
# ssh user@computer ‘cat path/to/image/ccp-xm-linux-
v1.2.0.0.gz’ | gzip -d | sudo dd of=/dev/sda bs=100M
```

After that command, the system will ask for a password and then start writing the image. Image writing takes a few minutes in which time nothing will be printed on screen. After image writing is complete, the unit should be shutdown. Take out the USB-memory stick and start the device.

For a LiveCD with update image, use following command. Also here the v1.2.0.0 is used as an example only.

```
# cat ccp-xm-linux-v1.2.0.0.gz | gzip -d | sudo dd of=/dev/sda
bs=100M
```

8.2.2. Package based update

With this method user modifications won’t be erased. Updates should be done one step a time and no version should be skipped. Only single version step update is supported, and OS version must be 1.1.0.0 or higher to support the package based update process.

To update device with this method first it needs to be booted to rescue-mode. That can be done either pressing shift-key during boot to get grub-menu and select Recovery-kernel. Another way is to open a terminal and execute the following command.

```
# sudo reboot-rescue.sh
```

Once the device is in recovery-mode, transfer the update-package to the device. Open a terminal and execute the following commands. Version 1.2.0.0 is used as an example only.

```
# tar xf <package-name>
# cd ccp-xm-update-v1.2.0.0
# sudo install-ccp-xm-upgrade.sh
```

After the installation has finished, the update-package and ccp-xm-update-v1.2.0.0 – directory can be removed. Reboot the device.

8.3. Installing new drivers, applications and system packages

All additional software or user files should normally be installed and stored under the user partition */opt/*, which is mounted read-write. Under */opt*, a limited set of standard directories are found which are always writable, those directories are */opt/etc*, */opt/bin, /opt/lib*, and */opt/sbin*.

Package manager can be used for adding, removing and updating applications. This requires the recovery system to be running, if the package manager needs to track the added packages after a reboot. It is still recommended to install extra software to the user partition.

To perform updates to the system, reboot the system into recovery mode using the command below. Normal software installations to /opt parts does not require usage of the recovery system.

```
# sudo reboot-rescue.sh
```

8.3.1. Remounting file system in read-write mode

It is possible to temporarily mount the file system writeable, to allow edit of protected files, using the following commands.

```
# sudo mount -o remount,rw /ro
```

Important, remember to use the following command to remount the file system as write protected again, before shutting down or restarting the device.

```
# sudo mount -o remount,ro /ro
```

8.3.2. Text editor

The text editor g*edit* is available per default for text editing. The console text editors *vi* and *nano* are also available.

8.3.3. User libraries

To install additional shared libraries, install the library files into */opt/lib/*. Then, update the used library cache file by executing the following command:

```
~# sudo ldconfig -C /opt/etc/ld.so.cache
```

If additional library file locations are needed, the paths of these can be added to above command as parameters. The environment variable *$LD_LIBRARY_PATH* can also be used for finding library files not in the cache.

Library cache file is never automatically updated. But if the file does not exist at system start-up, it is re-created with default version containing information only about the standard libraries.

8.3.4. User binaries

Additional binaries such as customer application software or additional open-source solutions are preferably installed to */opt/bin/* or */opt/sbin/*. These directories are available in the standard path, adding binaries to these locations does not require an update to the *$PATH* environment variable.

If additional levels of binaries are required, the *$PATH* environment variable must be updated through a start-up script.

8.3.5. Start-up scripts

The user has the possibility to start applications and scripts by modifying or adding start-up scripts. When the kernel is started, the start-up script *rc* located in */etc/init.d/* is executed. Normally, this script reads start-up scripts under */etc/rcX.d/,* depending on the actual run level *X*.

The default run level is 2, so applications should at least have startup scripts for this run level. The *rc* script has been modified to parse additionally start-up scripts found in */opt/etc/rcX.d/* as well as standard system scripts. The parsing is done in a temporary directory, so scripts from each source location are interleaved depending on their respective names as described below.

To start applications in run level 2, create a script located in */opt/etc/rc2.d/* that starts the desired applications. This is the default run level. Each script must be named *SXXname*, where XX is two digits and corresponds to the order of the script execution. Also note that these scripts are usually sourced, so no exit should be performed within these scripts.

The scripts should follow the correct format for the start-stop daemon to work correctly. For more information on how the scripts should be created, see the Ubuntu standard documentation.

Run level 6 is dedicated for shutdown. When device is shutting down the scripts from */etc/rc6.d/* and */opt/etc/rc6.d/* are executed to perform last clean-up actions. Required naming and execution order rules comply with start-up level 2, but kill scripts are normally named *KXXname* instead.

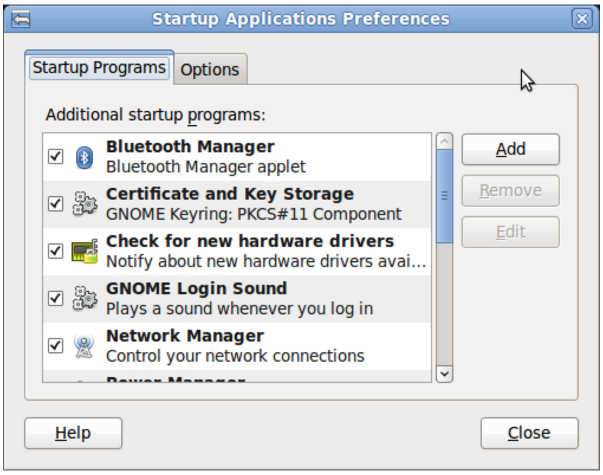
Note that for graphical applications to be started using start-up scripts, some actions such as waiting for the graphics system startup must be considered in these scripts. A good example is to wait for gnome-sessions and use *$DISPLAY=:0.0* environment variable in the scripts.

8.3.6. Gnome auto-start

Specific gnome-autostart configuration can be also used for automatic application startup.

Note that this method does not provide the correct application signaling that could be required when a device is powered off. For that reason, if any application data needs to be saved, application started with this method needs to handle a SIGKILL signal within a very short time frame.

The gnome-autostart congiguration is accessed through the menu: *System > Preferences > Startup Applications*. Add your application using the dialog Add button.


Startup Applications Preferences
Startup Programs
Options
Additional startup programs:
Add
Remove
Edit
Help
Close

☑ **Bluetooth Manager**
Bluetooth Manager applet

☑ **Certificate and Key Storage**
GNOME Keyring: PKCS#11 Component

☑ **Check for new hardware drivers**
Notify about new hardware drivers avai...

☑ **GNOME Login Sound**
Plays a sound whenever you log in

☑ **Network Manager**
Control your network connections

8.3.7. Upstart jobs

Upstart is an event-based replacement for the /sbin/init daemon which handles starting of tasks and services during boot, stopping them during shutdown and supervising them while the system is running.

The XM device Linux system also uses upstart to be able to schedule applications starting correctly. It is a stable way of adding automatically started applications, which is an improvement compared to the standard start up scripts. The drawback is that you are required to perform your additions in the recovery mode, but the benefit is the stability for applications receiving proper startup and shutdown signals from the operating system framework.

Detailed instructions on how to use upstart can be found at http://upstart.ubuntu.com/cookbook/.

8.4. IP address configuration

There are several ways of setting the IP address of a device. The default method is DHCP, but a static IP address can also be used. This can be done either or through the network interfaces configuration file.

8.4.1. GUI method for IP address configuration

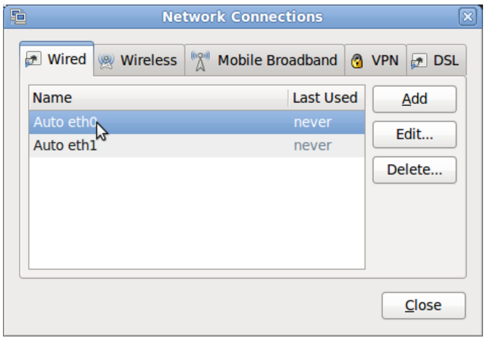
Open the network connection settings using:

System -> *Preferences* -> *Network Connections* -> *Wired* (or other)

Once there, open the corresponding port with the Edit command and perform the settings. See screenshot for a sample configuration.

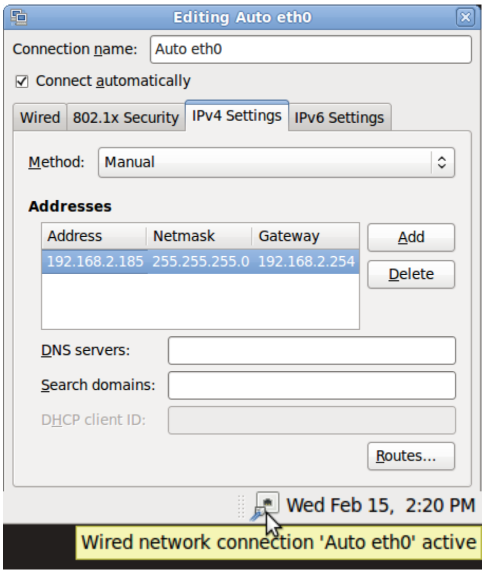
Once the Apply button is pressed the dialogs can be closed and the IP address should be set up. The network interfaces might require a reset for the changes to effect, either restart the device or press the top menu networking icon to toggle a network interfaces reset.

The network manager should also be used when configuring the WLAN connection details, but the interface name will be different then.



Network Connections

Name	Last Used
Auto eth0	never
Auto eth1	never



Editing Auto eth0

Connection name: Auto eth0

☑ Connect automatically

Method: Manual

Addresses

Address	Netmask	Gateway
192.168.2.185	255.255.255.0	192.168.2.254

DNS servers:

Search domains:

DHCP client ID:

Wed Feb 15, 2:20 PM

Wired network connection 'Auto eth0' active

8.4.2. File method for IP address configuration

The network interfaces file is located in writable storage, but the edit process has been made transparent to that fact. This method requires knowledge about the interfaces file format, but a sample is given below.

```
# sudo gedit /etc/network/interfaces
```

Sample of interfaces file setting same static address as the graphical method above.

```
auto lo
iface lo inet loopback

auto eth0
iface eth0 inet static
address 192.168.2.185
netmask 255.255.255.0
gateway 192.168.2.254
```

Once the file has been edited, it is recommended to either reboot the device, or to bring the network interfaces down and up again, for the IP address configuration to take effect.

```
# sudo ifconfig eth0 down
# sudo ifconfig eth0 up
```

8.5. Changing serial port settings

By default the serial port is set up as a console, but this can be disabled to allow connection of peripheral accessories, or to allow firmware components upgrade. The serial port is accessed from *dev/ttyS0* and when used as a serial console, the settings for serial port are *115200-8-N-1*.
To disable the serial console do the following:

```
# sudo disable-serial-console.sh
```

Use the following command to enable it again

```
# sudo enable-serial-console.sh
```

When the serial port is not used as a serial console, i.e. disabled, the settings can be changed to fit your connection requirements with standard serial port operations.

8.6. Remote access

The methods described in this chapter require an IP address being assigned to the XM device.

8.6.1. SSH

To connect to the XM device, issue the following command (and give password when asked):

```
# ssh ccs@X.X.X.X
```

To connect to a host from the XM device, issue the following command:

```
~# ssh Username@X.X.X.X
```

Above X.X.X.X is known as an SSH server IP address, with username *Username*. A password might be necessary.

8.6.2. SCP

To copy a file to target use the following command (and give password when asked):

```
# scp File1 ccs@X.X.X.X:/opt/File
```

To copy a file from target use the following command (and give password when asked):

```
# scp ccs@X.X.X.X:/opt/File File
```

To copy a file from a host while on a XM device to a host, use the following command:

```
~# scp File Username@X.X.X.X:File
```

To copy a file from the XM device to a host, use the following command:

```
~# scp Username@X.X.X.X:File File
```

Above X.X.X.X is known as an SSH server IP address, username *Username*. A password might be necessary.

8.6.3. Password-free login for SSH and SCP

Even though the *ccs* user has password, SSH-connections can be configured to connect without password, using identity files. This method is mainly useful for remotely executed scripts or alike.

On connecting host (not the target XM device), execute the command below and enter an empty passphrase when prompted.

```
~$ ssh-keygen -t rsa -f xm1_rsa
```

Copy (or append) the created *xm1_rsa.pub* file into target XM device as a */etc/ssh/authorized_keys* -file. Note, this method needs to be done in recovery mode.

Move the *xm1_rsa* file to a usable location (e.g. *~/.ssh/*)

Either configure the id-file into use in *ssh_config* or assign it when executing **ssh** or **scp**.

```
~$ ssh -i ~/.ssh/xm1_rsa ccs@xm-linux
```

8.6.4. Remote command execution

After password-free login is enabled, any commands can be started remotely without login.

```
~$ ssh ccs@xm-linux "ls -al /opt/"
```

If starting services or background tasks, append "&" to command between quotes.

8.6.5. VNC

The XM device Linux version also has a VNC server enabled, so that the GUI desktop can be accessed remotely, for instance when using CrossCore XM headless devices.

To access the device via VNC, you will need to use a VCN viewer application and enter the IP address of the XM device, along with the password when prompted for.

8.7. Serial Number Broadcast configuration

The XM device Linux version can identify itself over the IP network by sending out its serial number as a broadcast IP packet. The Serial Number Broadcast (SNB) service is started by default at device boot-up and will broadcast a specific identification message to the local network every fifth second. The message send frequency can be modified and the service can be completely disabled using the configuration file */opt/etc/ccsnb.conf*. This file does not exist by default. Default values are used if any value is unset or the file does not exist.

```
# Serial Number Broadcast – configuration.
# Lines beginning with ‘#’ are comments.  Unnecessary options
can be omitted.

# Message send interval in seconds
INTERVAL=10

# Service disable switch (DISABLE|OFF|0)
#ACTIVE=DISABLE

# Advanced features only. Use with discretion.
#
# Firmware-field is auto discovered, but can be overwritten.
String value
#FIRMWARE=1.0.0
#
# UnitType-field is TBD, if unset '0' is used. String value
#UNITTYPE=XA
```

8.8. Splash screen image replacement

During start up and shut down, a default splash screen image with the maximatecc logotype is displayed. This image can be replaced with the following steps:

Restart the system into rescue mode, as described in 3.3, or with the following command:

```
~$ sudo reboot-rescue.sh
```

Once the system is restarted, make sure you have created the replacement file and made it available on the target system. The replacement splash image file needs to be of Portable Network Graphics, png type. Then perform the following commands:

```
~$ sudo cp /opt/MyReplacementSplashImage.png
/lib/plymouth/themes/xm-startup-logo/xm-startup-logo.png
~$ sudo update-initramfs -u
~$ sudo shutdown -h now
```

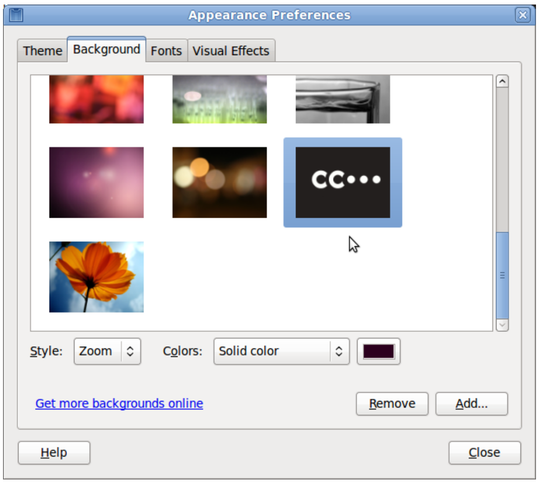
Make sure the file name *xm-startup-logo.png* is written correctly since this is the file name used by the system, i.e. the file that we overwrite with the new splash screen image file. Also make sure that the device is shut down, not just restarted. Shutdown can also be made through the top menu command. Once the device is started again, the splash screen image should have been changed.

8.9. Desktop background image replacement

The desktop image that is shown as default image can be replaced. Follow these steps to replace it with an image of your own:

Restart the system into rescue mode and then open the menu *System* > *preferences* > *Appearance*. Use the configuration menu to replace the desktop image. Make sure the replacement image is made available on target device.

Choose your sample image as desired from the Background tab. Once configured, reboot the device into normal mode again.



Style: Zoom
Colors: Solid color

8.10. USB memory installer

If a USB memory is inserted during start up, it is possible to activate a run time hook to enable automatic software execution. For instance, this function is suitable for production time installers, or automated SW updates.

If you add a script (executable file) that's called **autorun** (only that) in the root of a USB memory, it will be executed during device startup. The USB memory can be a FAT-formatted one or with other suitable file system, so there is no specific requirement there.

9. Windows system specifics

This section describes specific details for system running Windows. The XM Windows images are adapted with additional drivers and software to access XM device specific hardware and functionality.

9.1. Windows system content

To preserve file system size the Windows images have a limited set of components. For example, only the English language support is pre-installed. Customer specific images may be created if specific software or component configuration is needed.

9.1.1. Windows drivers

Dated 2012-03-01, the Windows driver content is as follows, i.e. this specifies the 3rd party software that is used in XM device:

Usage	XM Version	Provider	Driver
Audio	Win XP	Cirrus Logic	CS4207_WinXP_1-0-0-38
	Win 7		CS4207_WinVista_Win7_32-64-bit_6-6001-1-30
Chipset	All	Intel	Intel_Inf_Update_Utility_AllOS_v8.8.0.1014
Ethernet	Win 7	Intel	Intel® PROSet 16.8.1
	Win XP	Intel	Intel® PROSet 16.8.1
Graphic	Win 7	Intel	Intel Graphics Media Accelerator 500 Driver Release 5.0.0.2030
	Win XP	Intel	Intel_GMA500_Graphics_Media_Accelerator_WinXP_v3.3.0
Jida	All	Kontron	JIDA32_Win_R118
Virtual COM	All	Future Technology Devices International	CDM20814_WHQL_Certified

9.2. File system layout

The default file system is NTFS and the compact flash is set up with one partition *C:\*.

9.3. Installing new drivers, applications and system packages

When installing third party software use the installation guidelines provided by the software provider.

9.4. Remote access

There are a couple of remote access software programs installed in the XM device with Windows. Those are SSH server, VNC server and serial number broadcaster service.

9.4.1. SSH

It is possible to connect to the XM device with SSH access even when its operating system is Windows. This provides a means to remote copy files to the XM device over the network in analogy to how it’s done with the Linux system. It also provides terminal access to the Windows system from a remote location.

9.4.2. VNC

The XM device also has a VNC server enabled, so that the GUI desktop can be accessed remotely, for instance when using CrossCore XM headless devices. The VNC server requires a password, and it's set to "default".

To access the device via VNC, you will need to use a VCN viewer application and enter the IP address of the XM device, along with the password when prompted for.

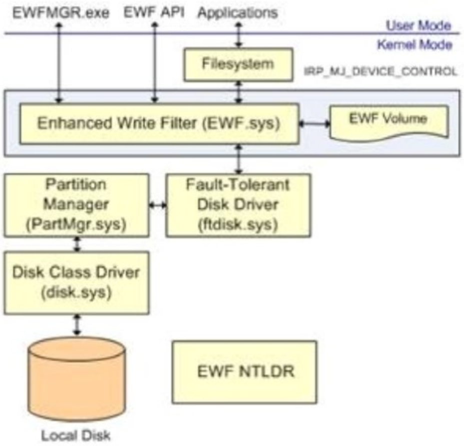
9.4.3. Serial Number Broadcaster

The XM device Windows version can identify itself over the IP network by sending out its serial number as a broadcast IP packet. The **CCSnbService** service is started by default at device boot-up and will broadcast a specific identification message to the local network every fifth second. This service is part of the CC AUX installation package, and can be disables as any normal operating system service.

9.5. Embedded write filter

The maximatecc Windows Embedded 7 (WES7) image uses the Embedded Write Filter (EWF) to reduce wear on the compact flash disk.

EWF is primarily intended to write protect a run-time image. For Compact flash based devices it can also be used to extend the lifespan of the media by limiting the number of disk writes. In WES7, EWF can work only in RAM mode. This means that EWF works as a RAM overlay enabling the OS to act as normal, but no changes are committed to disk until the user triggers a commit. EWF commits includes all changes to the partition.


EWFMGR.exe
EWF API
Applications
User Mode
Kernel Mode
Filesystem
IRP_MJ_DEVICE_CONTROL
Enhanced Write Filter (EWF.sys)
EWF Volume
Partition Manager (PartMgr.sys)
Fault-Tolerant Disk Driver (ftdisk.sys)
Disk Class Driver (disk.sys)
Local Disk
EWF NTLDR

Follow these steps to enable EWF RAM reg mode on a partition:

```
1. Enable EWF on partition:
> ewfmgr <partition> -enable
      e.g. > ewfmgr C: -enable
2. Reboot for EWF settings to take effect.
```

Please refer to the Microsoft EWF documentation, [6], for more information on how to set up and use EWF.

9.6. File based write filter

In addition to the Embedded Write Filter, maximatecc Windows Embedded 7 (WES7) image also includes File Based Write Filter (FBWF).

One disadvantage with EWF is that it only works on a sector level and is unaware of the file structure which makes it hard to implement single file commits. Therefore a file based write filter is available which operates on a file level. Using FBWF you can set up a list of write through files which are persistent and keep the rest in the RAM overlay reducing the number of writes to disk.

Using FBWF it is also possible to perform file level commits. The normal usage scenario for EWF and FBWF is that EWF is used to protect the partition with the run-time image and FBWF is used on a data partition to enable file operations.

Follow these steps to enable FBWF on a WES7 image:

```
1. Enable FBWF
>fbwfmgr.exe /enable
2. Add a volume to protect
>fbwmgr.exe /addvolume C:
3. Add a directory to exclude (add to write-through list)
>fbwmgr.exe /addexclusion C:\Personal
4. Check the status
>fbwmgr.exe
5. Reboot for changes to occur.
```

Please refer to the Microsoft FBWF documentation, [7], on how to set up and use FBWF.

9.7. Hibernate once resume many

Hibernate once resume many (HORM) is a feature available in the maximatecc Windows Embedded 7 (WES7) image.

HORM enables a robust boot scenario using a one-time created hibernation file from which the system always boots. This enables the creation of very fast booting as well as robust devices. Even after power failures these systems come up quick and without damages to the file system. HORM requires RAM or RAM (Reg) overlay and can only be configured using EWF. HORM can be activated and deactivated using a command line tool. HORM has a requirement that all volumes must either be protected with EWF or be in unmounted state when the Hibernate Once occurs. This is to prevent state synchronization problems. Each Resume from hibernation expects the entire system to be in exactly the same state as when the Hibernate Once occurred.

Follow these steps to enable HORM on a WES7 image:

```
1. Enable hibernation
> powercfg.exe /h ON
2. Disable false bootstat warnings
> bcdedit.exe /set {current} bootstatuspolicy ignoreallfailures
3. Enable EWF on all partitions
> ewfmgr.exe /all /enable
4. Restart to have the command take effect
> shutdown.exe /r /t 0
5. Activate HORM
> ewfmgr.exe C: /activatehorm
6. Capture the HORM state by hibernating the machine once
> shutdown.exe /h
7. Resume the machine and start using HORM. At this point each
restart should result in a resume from the state captured in
the previous step
8. To change the hibernation file state you simply set the
computer in the state you want (start applications etc.), press
WIN+R and execute command “shutdown –h” to create a new
hibernation file.
```

Please refer to the Microsoft HORM documentation, [8], on how to set up and use HORM.

Operating system licensing

OS	OS Version	Licensing
Linux	Ubuntu LTS Derivate	Ubuntu is distributed under the GNU General Public License (GPL) licence. http://www.ubuntu.com/
Windows	Microsoft Windows Embedded Standard 7	maximatecc's standard WES7 image for XM device requires the WS7P SKU (licence); the tablet PC package included in the image requires this license. www.microsoft.com/windowsembedded
Windows	Microsoft Windows XP Tablet PC Edition	maximatecc's Windows XP Tablet PC edition image for XM device requires a Windows XP Pro for embedded systems licence.
Windows	Microsoft Windows XP Embedded	maximatecc does not provide a standard Windows XP image, but a board Support Package is available for XM device. A Windows XP Embedded license is required.

For specific versions of 3rd party software, please see each operating systems system contents chapter above.

Technical support

Contact your reseller or supplier for help with possible problems with your XM device. In order to get the best help, you should have access to your XM device and be prepared with the following information before you contact support.

- The part number and serial number of the device, which you find on the brand label.
- Date of purchase, which is found on the invoice.
- The conditions and circumstances under which the problem arises.
- LED indicator flash patterns.
- Prepare a system report on the device, from within *CCsettings* (if possible).
- Detailed description of all external equipment connected to the unit (when relevant to the problem).

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