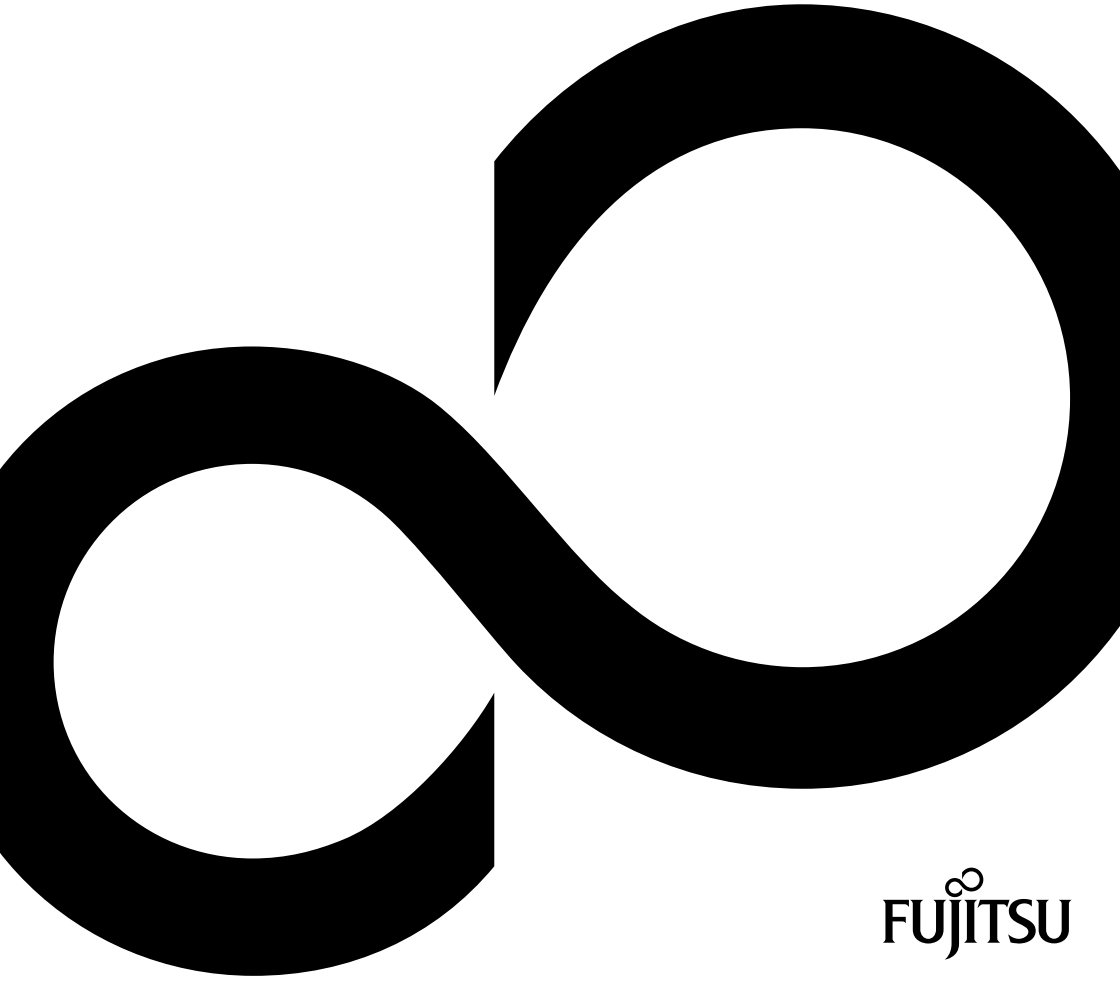
FUJITSU LIFEBOOK T937



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You can find driver updates at: "http://support.ts.fujitsu.com/download"

Should you have any technical questions, please contact:

- our Hotline/Service Desk ("http://support.ts.fujitsu.com/contact/servicedesk")
- Your sales partner
- Your sales office

We hope you enjoy working with your new Fujitsu system!

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FUJITSU LIFEBOOK T937

Operating manual

Remarks

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Contents

Innovative technology

... and ergonomic design make your device a reliable and convenient companion.

The device boots very quickly, is ready for immediate use and offers a particularly long operating time because of its high capacity battery.

With the user-friendly "BIOS Setup Utility" you can control your notebook's hardware and better protect your system against unauthorised access by using the powerful password properties.

Information on the connections and user components of your notebook can be found in "Ports and controls", Page 9.

Further information

The Windows drivers for your device can be found on our Internet site. The factory installation of your device does not support any other operating system. Fujitsu Technology Solutions accepts no liability whatsoever if any other operating system is used.

Software oriented components of these instructions refer to Microsoft products, if they come within the scope of the delivery.

If you install other software products, pay attention to the operating instructions of the manufacturer.

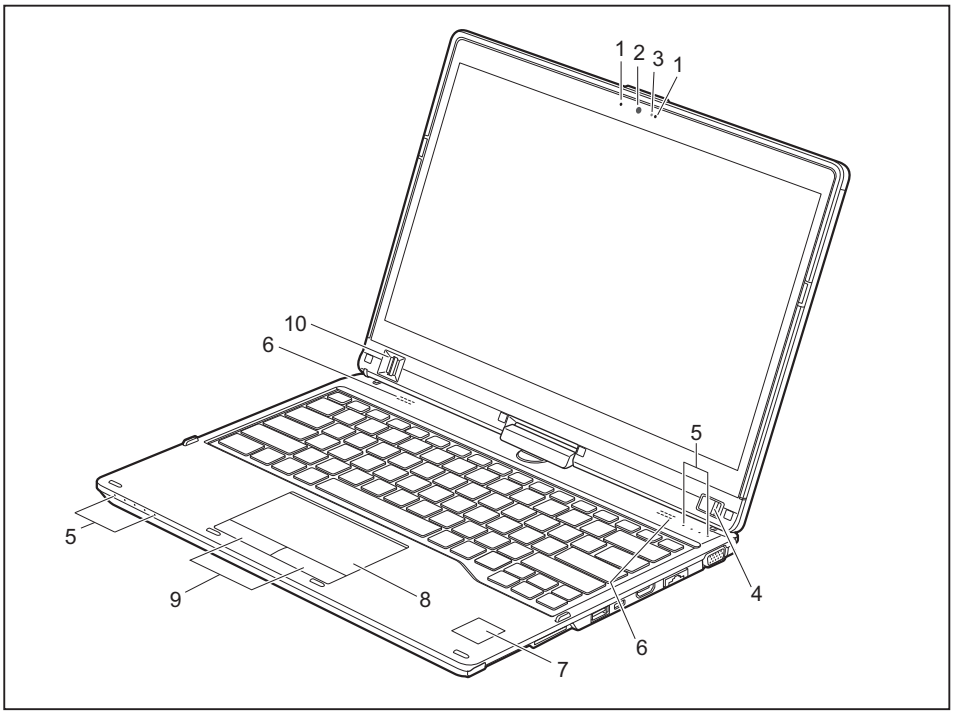
Notational conventions

	Pay particular attention to text marked with this symbol. Failure to observe these warnings could pose a risk to health, damage the device or lead to loss of data. The warranty will be invalidated if the device becomes defective through failure to observe these warnings.
	Indicates important information for the proper use of the device.
►	Indicates an activity that must be performed
↳	Indicates a result
`This font`	indicates data entered using the keyboard in a program dialogue or at the command line, e.g. your password (**`Name123`**) or a command used to start a program (**`start.exe`**)
`This font`	indicates information that is displayed on the screen by a program, e.g.: `Installation is complete.`
This font	indicates • terms and texts used in a software interface, e.g.: Click on *Save* • names of programs or files, e.g. *Windows* or *setup.exe*.
"This font"	indicates • cross-references to another section, e.g. "Safety information" • cross-references to an external source, e.g. a web address: For more information, go to "http://www.fujitsu.com/fts/" • Names of CDs, DVDs and titles or designations for other materials, e.g.: "CD/DVD Drivers & Utilities" or "Safety/Regulations" manual
Key	indicates a key on the keyboard, e.g: F10
This font	indicates terms and texts that are emphasised or highlighted, e.g.: **Do not switch off the device**

Ports and controls

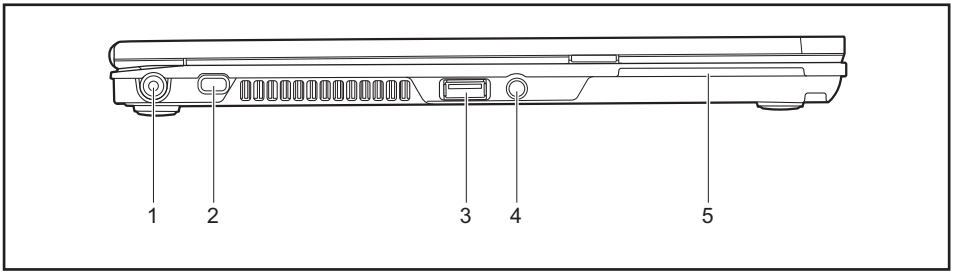
This chapter presents the individual hardware components of your device. It gives you an overview of the device's indicators and connections. Please familiarise yourself with these components before you start to work with the device.

Notebook open



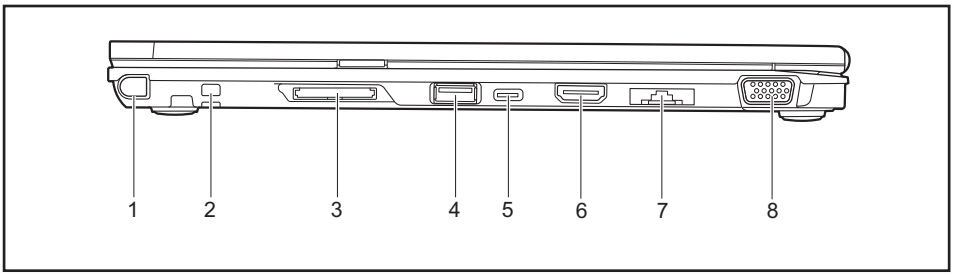
1 = Microphone
2 = Camera (depending on the configuration)
3 = Camera LED (depending on the configuration)
4 = ON/OFF button
5 = Status display
6 = Loudspeakers
7 = Palm vein scanner (depending on the configuration)
8 = Touchpad
9 = Touchpad keys
10 = Fingerprint scanner (depending on the configuration)

Left panel



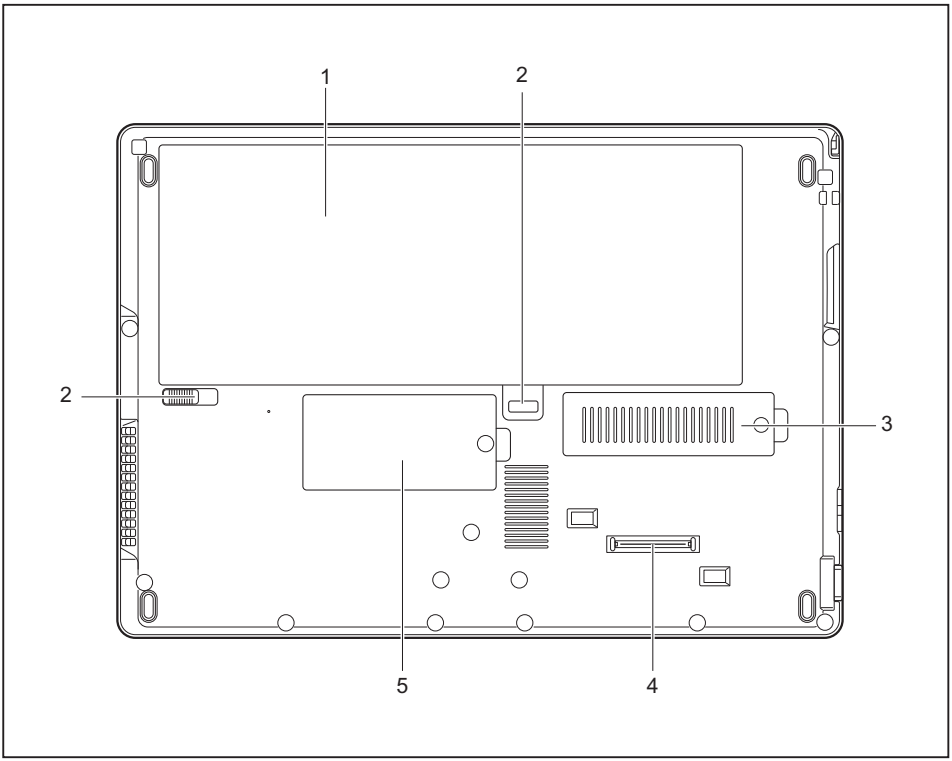
1 = DC input connector (DC IN)
2 = Security Lock device
3 = USB connection 3.0
4 = Combined headset / microphone connection
5 = SmartCard reader

Right-hand side



1 = Pen slot
2 = Eyelet for the optional pen tether
3 = Memory card slot
4 = USB port 3.0 with charging function (Anytime USB charge)
5 = USB connection 3.0 with a charging function (USB Type-C™)
6 = HDMI port
7 = LAN connector (removable)
8 = VGA (video graphics array) screen connection

Underside



1 = Battery compartment with SIM card slot under the battery
2 = Battery release
3 = Service compartment for the M.2 module
4 = Port for port replicator
5 = Service compartment for the memory

Important notes

This chapter contains essential safety information which must be followed when working with your notebook. Other notes also provide useful information which will help you with your notebook.

Safety notes

Please follow the safety notes provided in the "Safety/Regulations" manual as well as the safety notes given below.

Please pay special attention to the sections in the manual marked with the symbol on the left.

When connecting and disconnecting cables, observe the relevant notes in this operating manual.

Read the information on the ambient conditions in the "Technical data", Page 108 and "First-time setup of your device", Page 16 before preparing your notebook for use and switching it on for the first time.

When cleaning the device, please observe the relevant notes in the section "Cleaning the notebook", Page 15.

Pay attention to the additional safety notes for devices with wireless components provided in the "Safety/Regulations" manual.

Please refer to the notes in the chapter "Removing and installing components during servicing", Page 87.

This notebook complies with the relevant safety regulations for data processing equipment. If you have questions about using your notebook in a particular area, please contact your sales outlet or our Hotline/Service Desk.

Additional safety notes for devices with radio components

If a radio component (Wireless LAN, Bluetooth, LTE) is integrated in your notebook, you must be sure to observe the following safety notes when using your notebook:

- Switch off the radio components when you are in an aircraft or driving in a car.
- Switch off the radio components when you are in a hospital, an operating room or near a medical electronics system. The transmitted radio waves can impair the operation of medical devices.
- Switch off the radio components when you let the device get near flammable gases or into hazardous environments (e.g. petrol station, paintshops), as the transmitted radio waves can cause an explosion or a fire.

For information on how to switch radio components on and off, see chapter "Switching the wireless components on and off", Page 53.

Energy saving

Switch the notebook off when it is not in use. Switch off external, connected devices if you are not using them. If you use the energy saving functions, the notebook uses less energy. You will then be able to work for longer before having to recharge the battery.

Energy efficiency is increased and the environmental impact is reduced. You save money while protecting the environment.

Energy saving under Windows

► Make use of the power management features (see "'Using the power-management features', Page 48").

Travelling with your notebook

Please observe the points listed below when travelling with your notebook.

Before you travel

- ► Back up important data stored on your hard disk.
- ► Switch off the wireless component for data security reasons. With data traffic via a wireless connection, it is also possible for unauthorised third parties to receive data.

Information on activating data encryption is provided in the documentation for your wireless component.

- ► If you wish to use your notebook during a flight, first check with the flight attendants if it is OK to do so.

When travelling in other countries

- ► If you are travelling abroad, check that the mains adapter can be operated with the local mains voltage. If this is not the case, obtain the appropriate mains adapter for your notebook. Do not use any other voltage converter!
- ► Check whether the local mains voltage and the power cable are compatible. If this is not the case, buy a power cable that matches the local conditions.
- ► Enquire with the corresponding government office of the country you will be travelling in as to whether you may operate the wireless component integrated in your notebook there (see also "CE marking", Page 113).

Notebook: transporting

Protect the notebook from severe shocks and extreme temperatures (e.g. direct sunlight in a car).

- ► If your device has an optical drive, remove all data media (e.g. CD, DVD) from the drives.
- ► Switch the notebook off.
- ► Unplug the mains adapter and all external devices from the power socket.
- ► Disconnect the mains adapter cable and the data cables for all external devices.
- ► Close the LCD screen.
- ► To protect against damaging jolts and bumps, use a notebook carrying case to transport your notebook.

Cleaning the notebook

Do not clean any interior parts yourself; leave this job to a service technician.

Only use cleaning products designed for computers. Normal household cleaners and polishes can damage the markings on the keyboard and the device, the paintwork or the notebook itself.

Ensure that no liquid enters the notebook.

The LCD screen very sensitive to scratches. Only clean the display surface with a very soft, slightly damp cloth.

► Switch the notebook off.

► In order to prevent accidentially switching the device on, remove the power cable from the mains adaptor and remove the battery (see "Removing and installing the battery", Page 45).

↳ The surface can be cleaned with a dry cloth. If particularly dirty, use a cloth which has been moistened in mild domestic detergent and then carefully wrung out.

You can use disinfectant wipes to clean the keyboard and the touchpad.

Ensure that no liquid enters the device.

First-time setup of your device

Please read the chapter "Important notes", Page 12.

If your device is equipped with a Windows operating system, the necessary hardware drivers and supplied software are already pre-installed.

Before you switch on the device for the first time, connect it to the mains voltage using the mains adapter, see "Mains adapter connecting", Page 17. The mains adapter must be connected during the entire installation process.

A system test is performed when your device is first switched on. Various messages can appear. The display may remain dark for a short time or may flicker.

Please follow the instructions on the screen.

NEVER switch off your device during the first-time setup process.

When the device is delivered, the battery is located in the battery compartment. The battery must be charged if you want to operate your device using the battery.

When used on the move, the built-in battery provides the device with the necessary power. You can increase the operating time by using the available energy-saving functions.

For instructions on how to connect external devices (e.g. mouse, printer) to your device, please refer to the operating manual for your device.

Unpacking and checking the device

Should you discover any damage that occurred during transportation, notify your local sales outlet immediately!

- ► Unpack all the individual parts.
- ► Check your device for any visible damage which may have occurred during transportation.

You may need the packaging in the future, if you need to transport your device.

Selecting a location

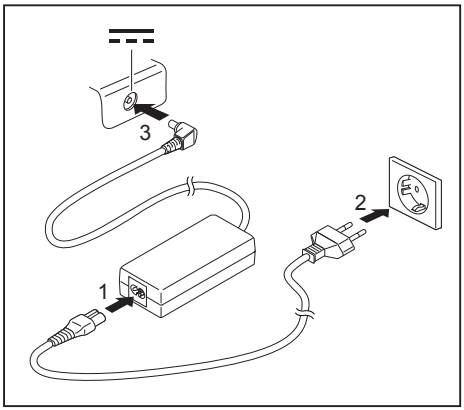
Select a suitable location for the device before setting it up. Follow the instructions below when doing so:

- Never place the device or the mains adapter on a heat-sensitive surface. The surface could be damaged as a result.
- Never place the device on a soft surface (e.g. carpeting, upholstered furniture, bed). This can block the air vents and cause overheating and damage.
- The underside of the device heats up during normal operation. Prolonged contact with the skin may become unpleasant or even result in burns.
- Place the device on a stable, flat, non-slippery surface. Please note that the rubber feet of the device may mark certain types of delicate surfaces.
- Keep other objects at least 100 mm / 3.97" away from the device and its mains adapter to ensure adequate ventilation.
- Never cover the ventilation slots of the device.
- Do not expose the device to extreme environmental conditions. Protect the device from dust, humidity, and heat.

Mains adapter connecting

Observe the safety notes in the enclosed "Safety/Regulations" manual.

The supplied power cable conforms to the requirements of the country in which you purchased your device. Make sure that the power cable is approved for use in the country in which you intend to use it.



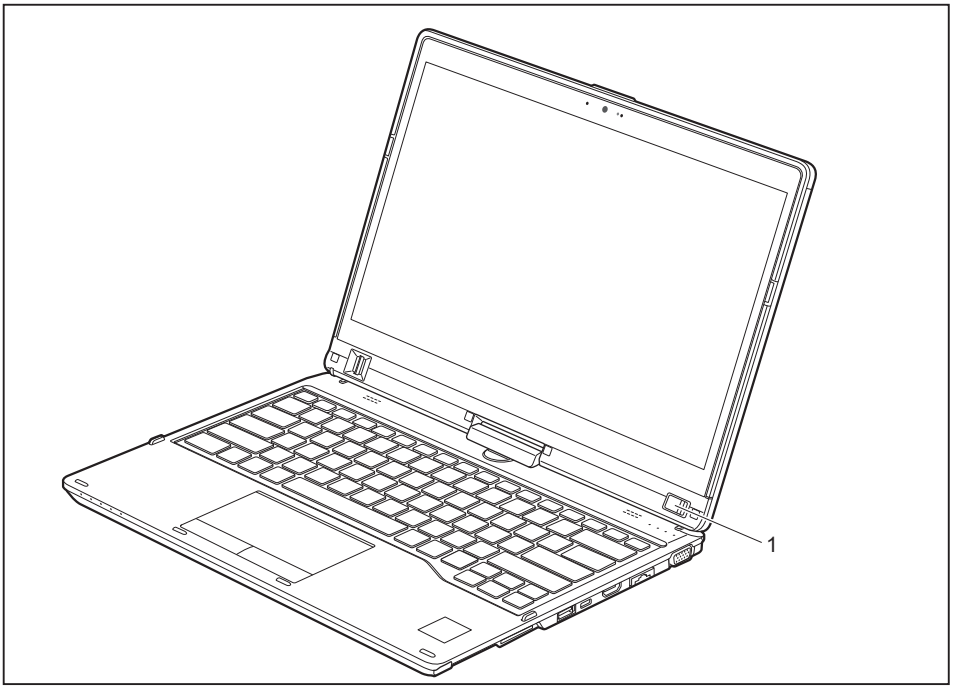
- ► Connect the power cable (1) to the mains adapter.
- ► Plug the mains cable (2) into a mains outlet.
- ► Connect the mains adapter cable (3) to the DC jack (DC IN) of the device.

Switching on the device for the first time

When you switch on the device for the first time, the supplied software is installed and configured. Because this procedure must not be interrupted, you should set aside enough time for it to be fully completed and connect the device to the mains using the mains adapter.

During the installation process, DO NOT restart the device unless you are requested to do so!

To make it easier to use your device for the first time, the operating system is pre-installed on the hard disk.



► Slide the ON/OFF switch (1) to the right to switch on the notebook.
↳ The ON/OFF button returns automatically to its original position.
► During installation, follow the instructions on screen.

If a Windows operating system is installed on your device, you will find more information on the system and drivers, help programmes, updates, manuals etc. on the device or on the Internet under "http://www.fujitsu.com/fts/support/".

You can find information and help on the Windows operating system functions on the Internet at "http://windows.microsoft.com".

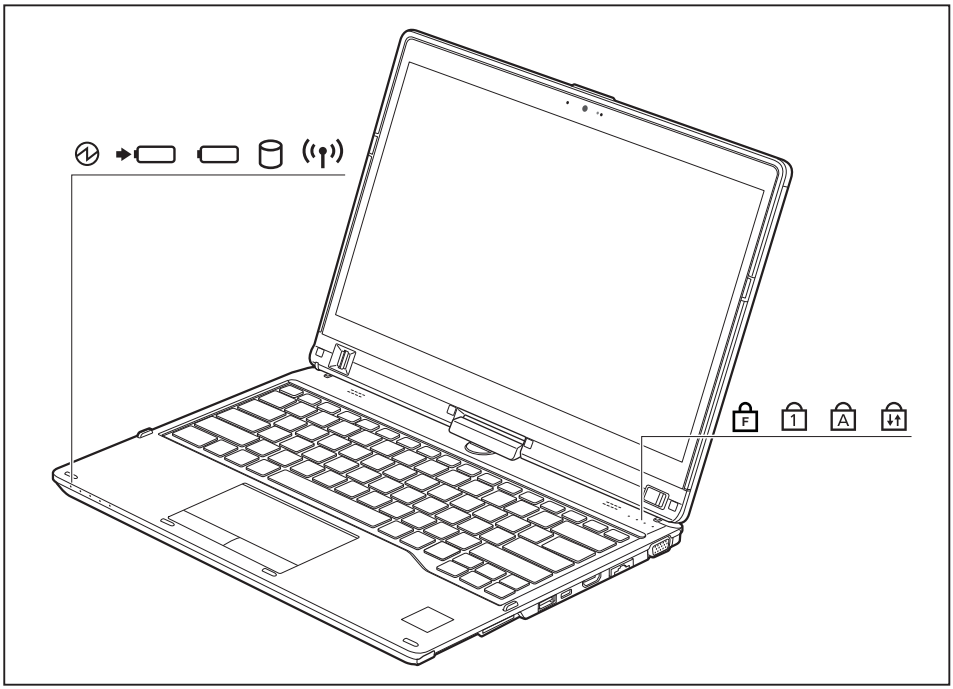
Working with the notebook

This chapter describes the basics for operating your notebook. Please read the chapter entitled "Connecting external devices", Page 81 for instructions on how to connect devices such as a mouse and a printer to the notebook.

Please refer to the notes in "Important notes", Page 12.

Status indicators

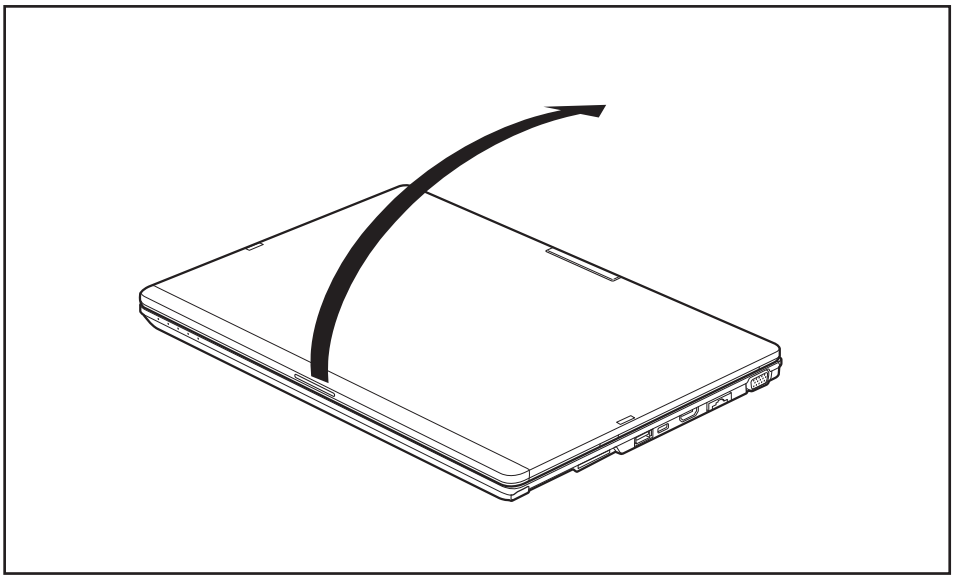
The status indicators provide information about the status of the power supply, the drives and the keyboard functions etc.



Status displays	Description
	**Power-on indicator** • Indicator is illuminated: The notebook is switched on. • Indicator flashes: The notebook is in sleep mode (Save-to-RAM). • The indicator is not illuminated: The notebook is switched off or in Save-to-Disk mode.
	**Battery charging indicator/power connector** The state of charge of the battery is shown by the battery indicator. With mains adapter connected: • The indicator lights up white: The battery is fully charged. • The indicator lights up orange: The battery is being charged. • The indicator flashes orange: The mains adapter is connected but the battery cannot be charged as the battery is too hot or too cold for charging. The charging process is continued as soon as the battery has reached a permissible temperature again. • The indicator is not lit: The battery is not being charged (the battery is already more than 90% charged or the mains adapter is not connected).
	**Battery indicator** The battery indicator shows the state of charge of the installed batteries. • The indicator lights up white: The battery is between 51% and 100% charged. • The indicator is lit orange: The battery is between 13 % and 50 % charged. • The indicator is lit red: The battery is between 0 % and 12 % charged. • The indicator flashes orange: The battery state of charge is being checked (for four seconds after battery installation). • The indicator flashes red: The battery is faulty. • The indicator is not lit: There is no battery installed.
	**Drive indicator** The indicator is illuminated: The hard disk drive is being accessed.
	**Radio components indicator** • The indicator is illuminated: The radio components are switched on. • The indicator is not lit: The radio components are switched off.
	**F-Lock (function lock) indicator** The indicator lights up: The key combination Fn +  (Fn: function key) has been pressed. The special functions of the Fn (function) keys (see section "Key combinations", Page 42) can be executed by pressing the keys directly, without having to press the Fn key.
	**Num Lock indicator** Indicator is lit: The Num key has been pressed. The virtual numerical keypad is activated. You can output the characters indicated on the upper right of the keys.

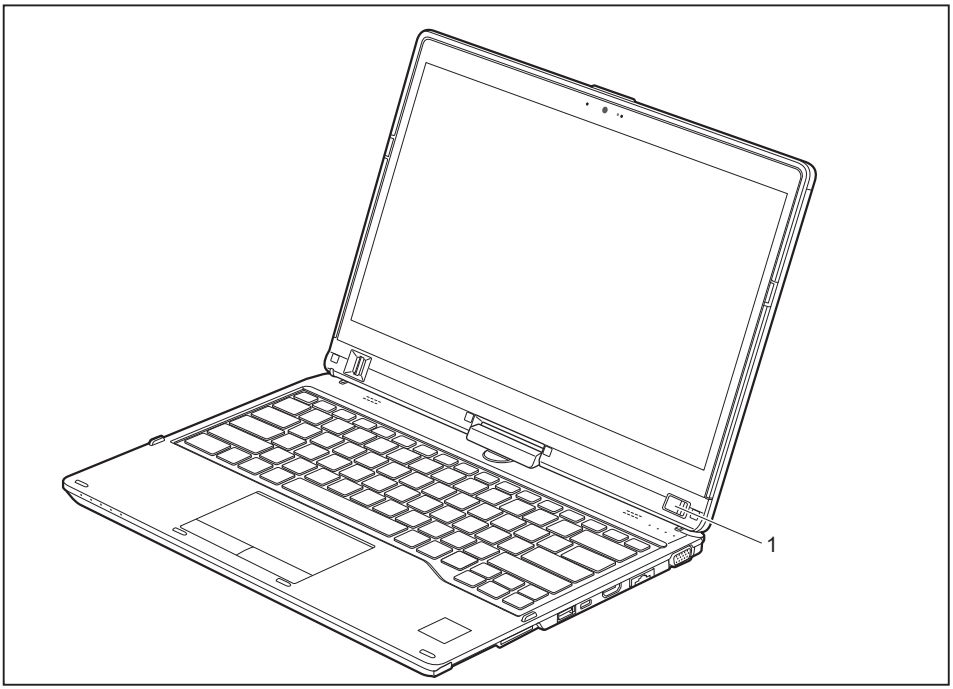
Status displays	Description
	**Caps Lock indicator** Indicator is lit: The Caps Lock key has been pressed. All letters will be output as uppercase letters. In the case of keys labelled several times, the character printed on the upper left of the key will appear when that key is pressed.
	**Scroll Lock indicator** Indicator is lit: The key combination Fn + Scr has been pressed. The effect that this key has varies between applications.

Opening the notebook



► Open the LCD screen.

Switching on the notebook



► Slide the ON/OFF button (1) to the right to switch on the notebook.
↳ The ON/OFF button returns automatically to its original position.
The ON/OFF button (1) is lit while the system is switched on.

Programming the ON/OFF button

You can program the ON/OFF button:

Operating system	Menu
Windows 10	*Control Panel - Hardware and Sound - Power Options*

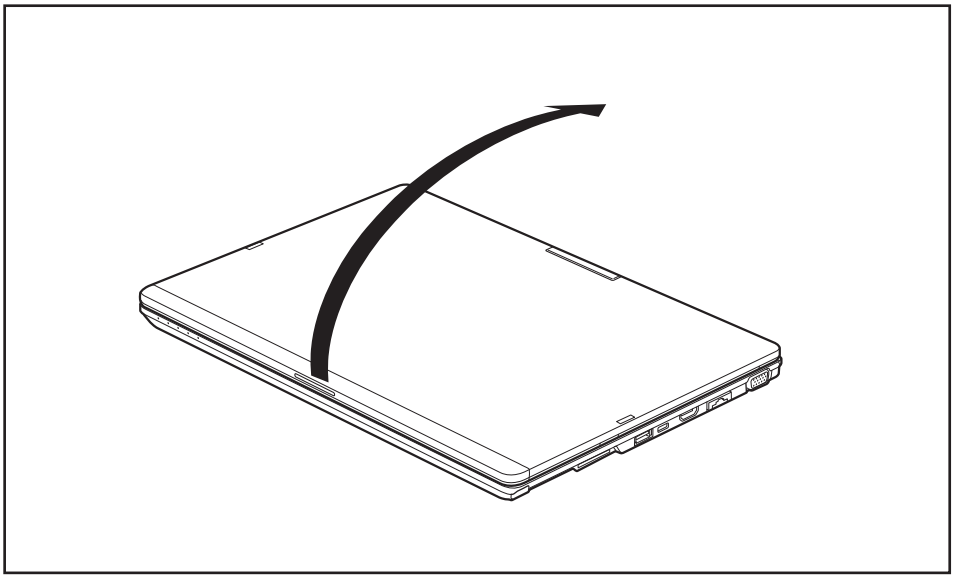
If you have assigned a password, you must enter this when requested to do so, in order to start the operating system. Detailed information can be found in the chapter "Security functions", Page 60.

Different ways to use your notebook

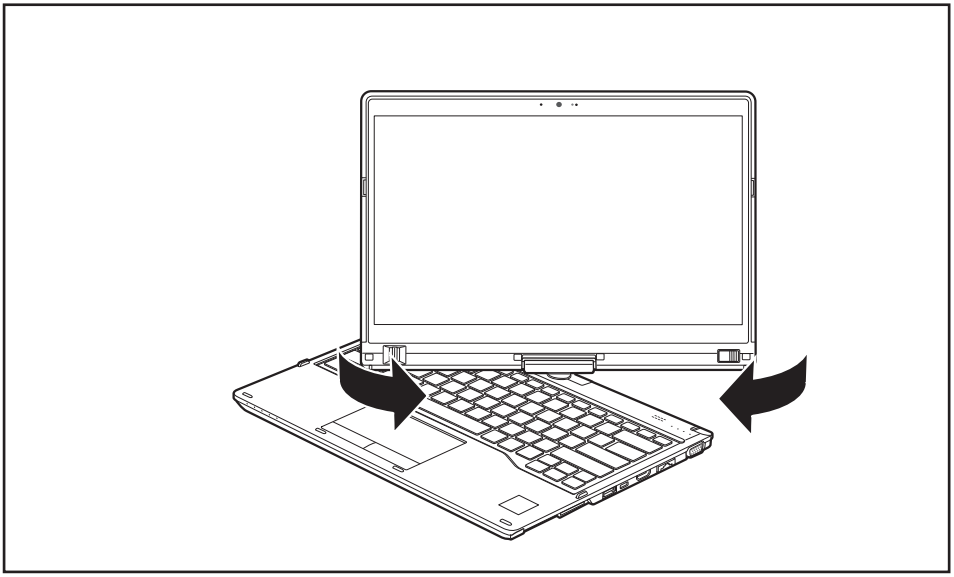
During your daily work, you can use your notebook as a Tablet PC or as a notebook, just as you wish.

Please note that the display cannot be turned completely on its own axis! Stop turning the display as soon as you feel resistance. No guarantee services can be provided for damage caused due to incorrect turning.

From notebook to Tablet PC

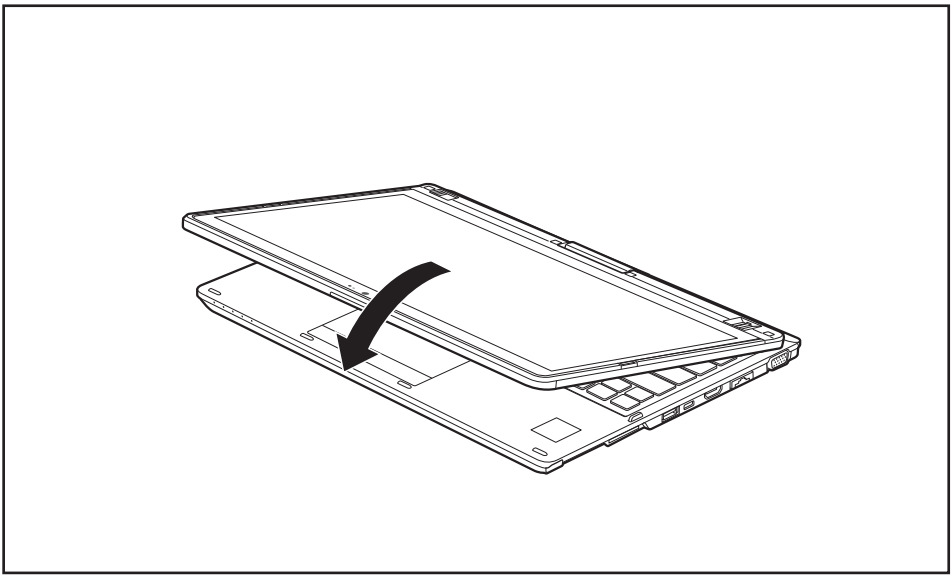


► Raise the LCD display into a vertical position.



► Hold the screen as low as possible on both sides. Turn the screen to the left or right in the direction of the arrow. At first you will feel some slight resistance, then it will turn easily and without friction.

► Turn the display further until it has turned 180° and the hinge latches in.



► Now fold the screen down until the back of the screen is flat on top of the keyboard.
↳ The screen is now secured in the tablet position.

Select display orientation (portrait or landscape orientation)

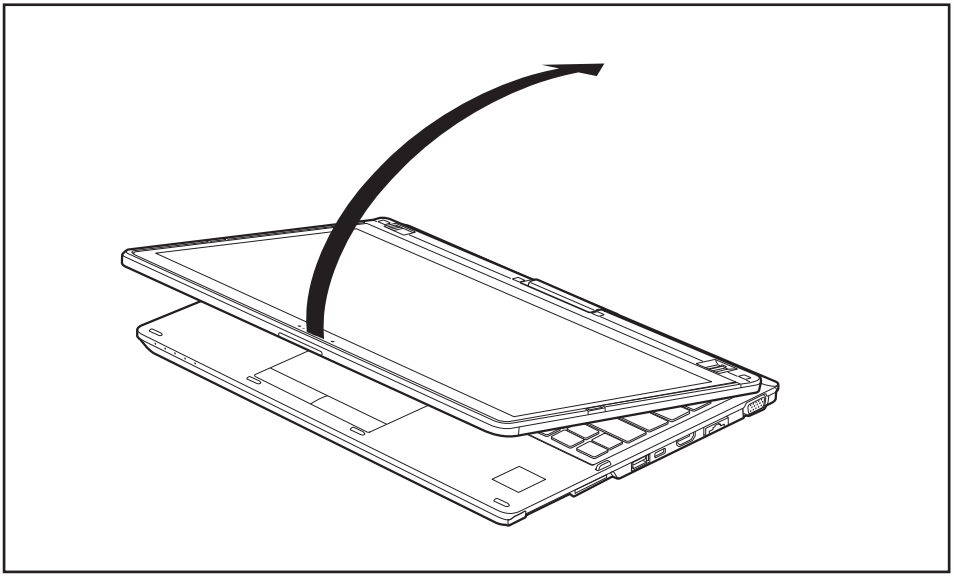
You can choose to use either portrait or landscape orientation for the display, or whether the display orientation should automatically adapt to the orientation of the Tablet PC.

You can change these settings under *Control Panel - Hardware and Sound - Windows Mobility Center / Rotate screen*.

In the settings there are profiles saved for operation with different screen orientations. These profiles have preset standard configurations that can be modified as desired.

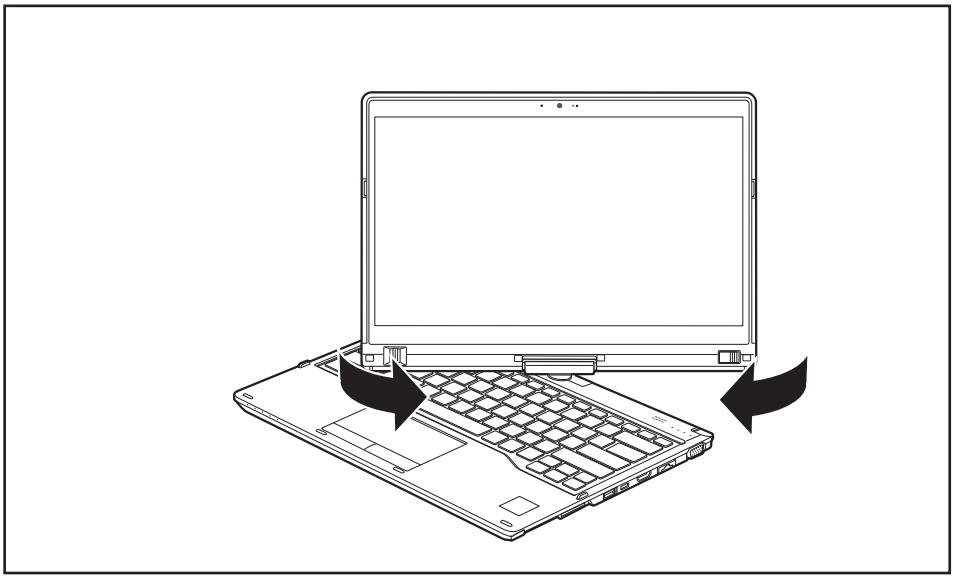
These settings do not just affect the monitor settings on the tablet PC, but also on any external monitors that may be connected.

From Tablet PC to notebook



► Raise the LCD screen into a vertical position.

Please note that the display cannot be turned completely on its own axis! Stop turning the display as soon as you feel resistance. No guarantee services can be provided for damage caused due to incorrect turning.



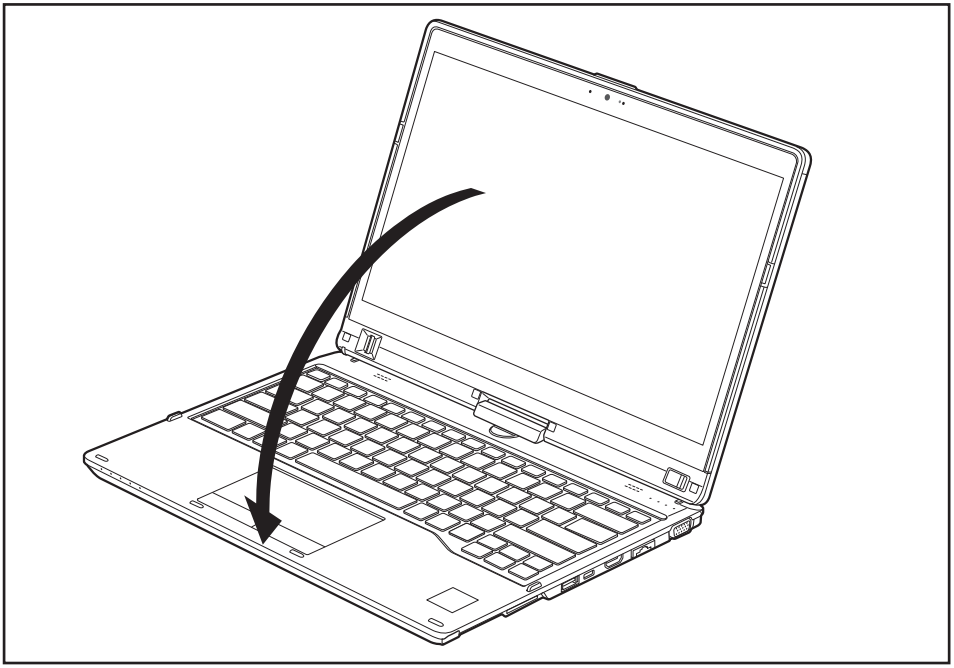
► Hold the display on both sides as far down as possible and then turn the display. It will turn easily and without resistance.

► Turn or move the display further until it has turned 180° and the hinge latches in.

Switching off the notebook

► Close all applications and then shut down the operating system (please see the "Operating System Manual").

Closing the notebook



► Fold the LCD screen down onto the lower part of the notebook until you feel it lock into place.

Handwriting recognition

For detailed information on handwriting recognition, see the documentation on your operating system.

At present, handwriting recognition under Windows supports the following languages:

English, German, French, Italian, Japanese, Korean, Chinese (traditional and simplified), Dutch, Portuguese, Spanish, Brazilian, Norwegian (Bokmål and Nynorsk), Swedish, Finnish, Danish, Polish, Rumanian, Serbian (Cyrillic and Latin script), Catalan, Russian, Czech and Croatian.

Under Windows you can set the required language under *Control Panel – Time, Language and Region – Language*.

LCD screen

Fujitsu notebooks have high-quality LCD monitors (TFT). For technical reasons, these monitors are manufactured for a specific resolution. An optimal, clear picture can only be ensured with the resolution intended for the relevant monitor. A resolution which differs from the specification can result in an unclear picture.

The resolution of your notebook's monitor is optimally set at the factory.

With the present standards of production technology, absolutely flawless screen images cannot be guaranteed. There may be a few constantly light or dark pixels (picture elements) on the screen. The maximum permitted number of such faulty pixels is specified in the international standard ISO 9241-307 (Class II).

Example:

A screen with an HD resolution of 1366 x 768 has 1366 x 768 = 1049088 pixels. Each pixel consists of three subpixels (red, green and blue), making a total of about 3 million subpixels. According to ISO 9241-307 (class II), a maximum of 2 light and 2 dark pixels and in addition 5 light or 10 dark subpixels or an equivalent mix (1 light subpixel counts as 2 dark subpixels) are allowed to be defective.

At a resolution of 1600 x 900 = 1440000 pixels, a maximum of 3 light and 3 dark pixels and in addition 7 light or 14 dark subpixels are allowed to be defective.

Pixel	A pixel consists of 3 subpixels, normally red, green and blue. A pixel is the smallest element that can be generated by complete functionality of the display.
Subpixel	A subpixel is a separately addressable internal structure within a pixel that enhances the pixel function.
Cluster	A cluster contains two or more defective pixels or subpixels in a 5 x 5 pixel block.

Background lighting

LCD monitors are operated with background lighting. The luminosity of the background lighting can decrease during the period of use of the notebook. However, you can set the brightness of your monitor individually.

Synchronising the display on the LCD screen and an external monitor

For more information, please refer to the chapter "Key combinations", Page 42 under "Display output, switch between".

Using the device as a Tablet PC

You can execute commands as follows:

- using the stylus pen (supplied with your device).
- using your fingers

Using fingers

You can execute certain commands by using your finger tip on the touchscreen of your device.

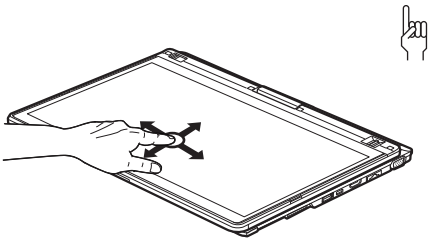
Everything which you can select or activate using your finger tip can also be selected or activated using the pen.

Calibrate the Dual Digitizer for finger-based operation of the device

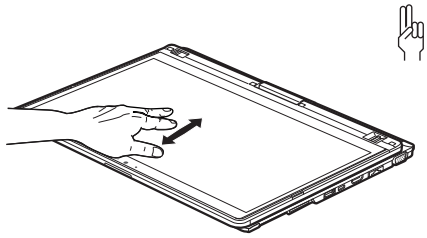
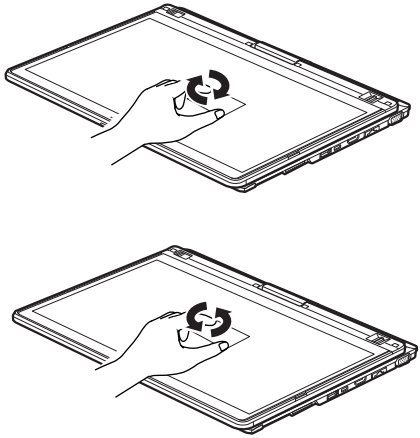
For instructions on how to calibrate your device to use Dual Digitizer Technology, please refer to chapter "Calibrating the pen", Page 35.

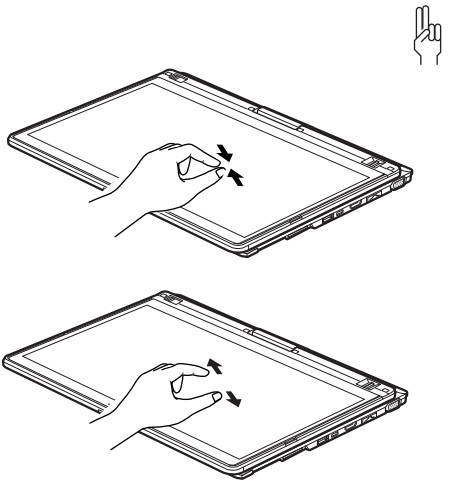
Please note: There are separate calibration programs available for calibrating the stylus pen and for calibrating finger-based operation. Do not use the calibration tool for the stylus pen to calibrate finger-based operation.

Actions with one finger

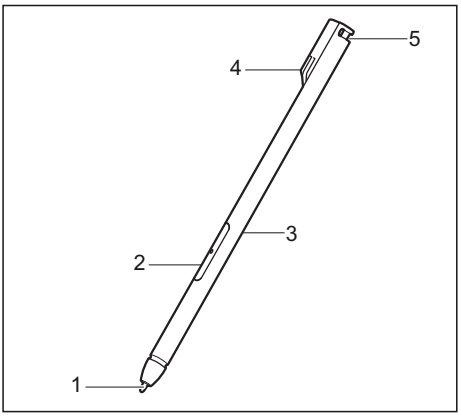
Action	Description
Selecting objects (click with the left mouse button)	► With your finger, tap once briefly on the object.
Starting programs (double-click with the left mouse button)	► With your finger, tap twice briefly in quick succssion on the program icon.
Moving objects/windows (drag with left mouse button pressed, Drag & Drop)	 ► Place a finger directly on the object/window, hold the finger pressed against the touchscreen and move the desired object/window.
Opening a context menu (click with the right mouse button)	► Touch the desired item once with your finger tip. Keep the finger tip pressed against the touchscreen. The context menu appears.
Moving the cursor	► Position one finger on the touchscreen and move the finger in the desired direction.

Actions with two fingers

Action	Description
Scrolling	 ► Position two fingers on the touchscreen. ► Move your fingers upwards to scroll up. or ► Move your fingers downwards to scroll down.
Rotating	 ► Position the thumb on the touchscreen, then turn the picture clockwise or counter-clockwise using your index finger.

Action	Description
Increasing or decreasing the view	 ► Position two fingers on the touchscreen and move them apart to increase the view. or ► Position two fingers on the touchscreen and move them together to decrease the view.
Blocking context-sensitive menus	► With two fingers, tap twice briefly in quick succession on the touchscreen.

Using the stylus pen



1 = pen tip
2 = pen button (= delete function)
3 = pen button (= right mouse button)
4 = charging contacts
5 = eyelet for optional pen strap

You can use the pen on your Tablet PC as an electronic writing implement to select items, and to navigate through programs on it. Programs that support handwriting recognition also allow you to write characters directly on the screen with the pen. You can also use the pen as a drawing tool.

A pen tether is available as an optional extra and you can use this to tie the eyelet on the pen to the eyelet on the Tablet PC.

Use only the pen provided with your Tablet PC. Do not use substitutes that were not designed for your Tablet PC. Replace the stylus tip if it is worn. The warranty does not cover a scratched screen.

While writing, you should take care not to scratch the surface of the display (e.g. with a wristwatch or bracelet).

To prevent the pen becoming jammed in its slot, make sure that you always insert the pen into its slot the correct way round (the charging contacts on the pen point towards the rear side of the Tablet PC).

The Tablet PC's pen is an electronic instrument that can be damaged if used improperly. Handle the pen with care.

The following list contains guidelines for proper pen handling:

- Do not gesture with the pen.
- Do not use the pen as a pointer.
- Do not use the pen on surfaces other than the screen of the Tablet PC.
- Do not try to turn the thumb grip on the pen. The grip is used to place the pen in its slot or to remove it from the slot.
- Never store the pen with the tip bearing the weight of the pen (e.g. with the tip down in a pen holder). If the pen is stored with the tip pointing down, this may have an adverse effect on the pen mechanism (particularly at high temperatures). In this case the pen tip may react as though it is constantly being pressed down. To avoid damage, the pen should be stored in the slot when not in use.

The pen can be influenced by electromagnetic fields (cursor quivers or jumps). There may be a few areas on the screen where the cursor quivers slightly in spite of pressing the pen down firmly.

The screen responds to entries made with the tip of the finger or the pen when the tip of the finger or the pen is in direct contact with the screen.

You can use the pen to run all functions for which you would otherwise use a mouse.

Handling	Mouse	Pen
Selecting menu items	Click with the left-hand mouse button.	Touch the menu entry with the pen tip.
Starting programs	Double click with the left-hand mouse button.	Briefly touch the program icon twice with the pen tip.
Moving an object/window	Drag with the left-hand mouse button held pressed.	Place the pen tip directly on the object/window. Hold the pen tip pressed against the screen. Move the desired object/window.
Opening a context menu	Click with the right-hand mouse button.	Place the pen directly on the required element and hold the pen pressed against the screen.
Moving the cursor	-	Place the pen tip directly on the screen.

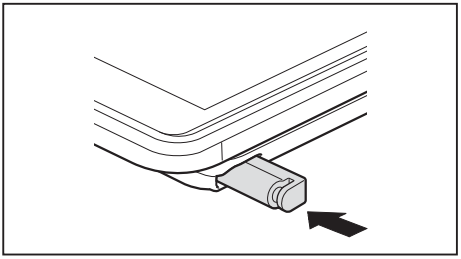
Energy saving functions of the pen

To save energy, the pen automatically switches off after 10 minutes of inactivity and is then in power saving mode.

The pen automatically returns to normal operating mode after the next contact with the pen tip.

Charging the pen battery

The pen contains an integrated battery, which is automatically charged when the pen is fully inserted into its slot. The pen is also charged when the notebook is in power saving mode or is switched off. A charging time of approximately 15 seconds is sufficient to enable to pen to be used for 90 minutes again.



► Insert the pen fully in the slot.

↳ After a charging period of approximately 5 minutes, the pen battery is fully charged.

Setting the pen

Operating system	Menu
Windows 10	You can make various settings for the pen under *System Control - Hardware and Sound - Pen and Touch*.

Calibrating the pen

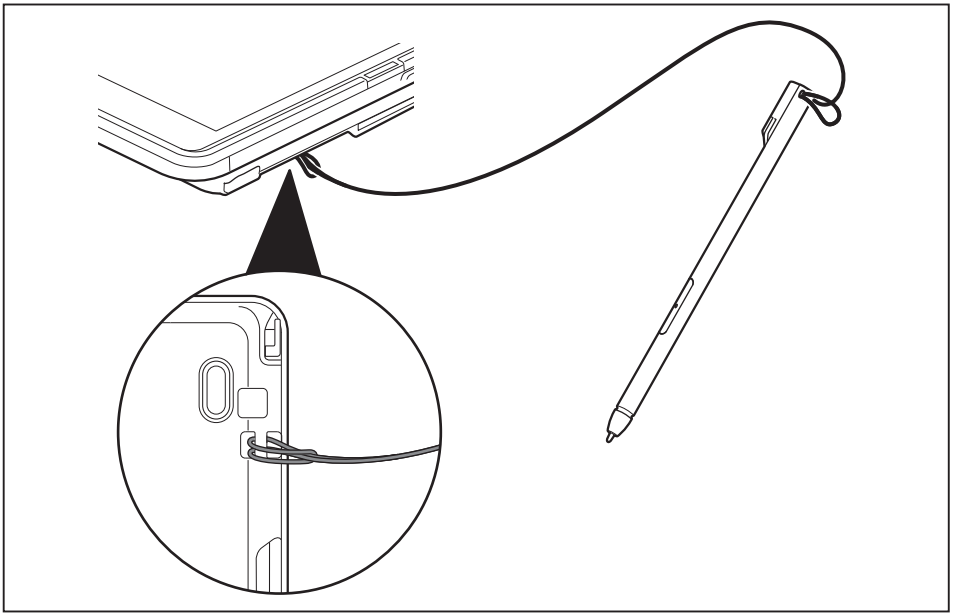
Via the operating system, you must calibrate your tablet PC before first use with the pen, so that it recognises the pen as accurately as possible.

You should also always repeat the calibration if the co-ordination between the pen and cursor movement deteriorates.

Operating system	Menu
Windows 10	To calibrate, call up the *Hardware and Sound / Tablet PC Settings* function in the Control Panel. You need to calibrate both portrait and landscape formats.

Attach the pen tether (optional)

You can attach the pen with a pen tether (available as an option) to prevent it being dropped or becoming lost.



► Secure one end of the pen tether to the pen and the other end of the pen tether to the notebook.

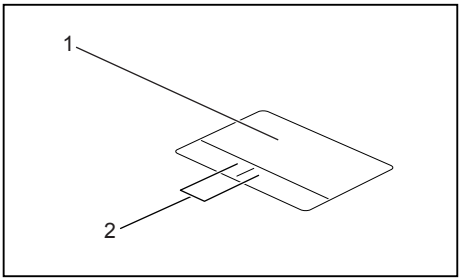
Using the device as a notebook

Touchpad and touchpad buttons

Keep the touchpad clean. Protect it from dirt, liquids and grease.

Never use the touchpad if your fingers are dirty.

Do not rest heavy objects (e.g. books) on the touchpad or the touchpad buttons.



1 = Touchpad

2 = Touchpad buttons

You can move the cursor using the touchpad.

The touchpad buttons allow you to select and execute commands. They correspond to the buttons on a conventional mouse.

You can also deactivate the touchpad using a keyboard shortcut, so that you cannot move the cursor unintentionally (see chapter "Key combinations", Page 42).

Moving the pointer

► Move your finger on the touchpad.

↳ The pointer will move.

Selecting an item

► Move the pointer to the item you wish to select.

► Tap the touchpad once or press the left button once.

↳ The item is selected.

Executing commands

► Move the pointer to the field you wish to select.

► Tap the touchpad twice or press the left button twice.

↳ The command is executed.

Dragging items

- ► Select the desired item.
- ► Press and hold the left button and, with your finger on the touchpad, drag the item to the desired position.

↳ The item will be moved.

Switching the Touchpad on and off

You can switch the Touchpad on and off using a key combination, see "Key combinations", Page 42.

Keyboard

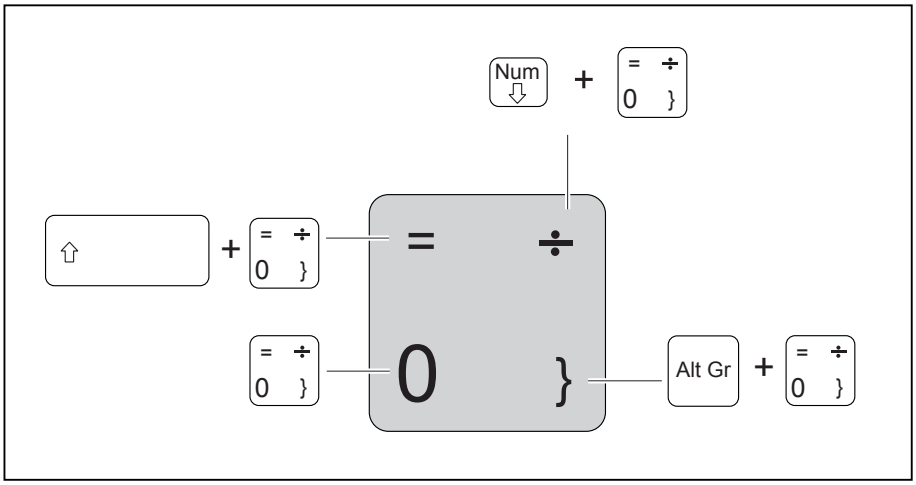
The keyboard of your notebook is subject to continuous wear through normal use. The key markings are especially prone to wear. The key markings are liable to wear away over the life of the notebook.

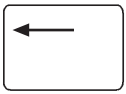
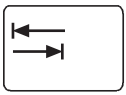
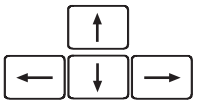
The keyboard has been designed to provide all the functions of an enhanced keyboard. Some enhanced keyboard functions are mapped with key combinations.

The following description of keys refers to Windows. Additional functions supported by the keys are described in the relevant manuals supplied with your application programs.

The figure below shows how to access the different characters on keys with overlaid functions. The example applies when the Caps Lock key has not been activated.

The illustrations shown below may differ from your actual device.

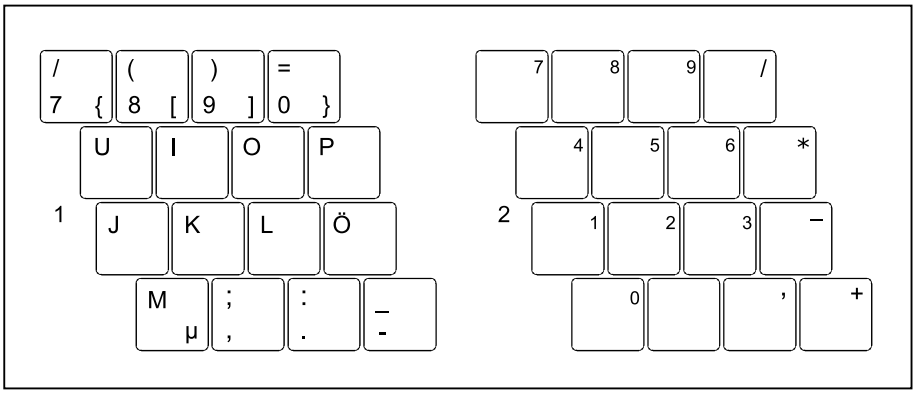


Key	Description
	**Backspace key** The Backspace key deletes the character to the left of the cursor.
	**Tab key** The Tab key moves the cursor to the next tab stop.
	**Enter key (return)** The Enter key terminates a command line. The command you have entered is executed when you press this key.
	**Caps Lock key** The Caps Lock key activates uppercase mode. In Caps Lock mode, all of the characters you type appear in upper case. In the case of overlay keys, the character printed on the upper left of the key will appear when that key is pressed. To cancel the Caps Lock function, simply press the Caps Lock key again.
	**Shift key** The Shift key causes uppercase characters to appear. In the case of overlay keys, the character printed on the upper left of the key appears when that key is pressed.
	**Fn key** The Fn key enables the special functions indicated on overlay keys (see "Key combinations", Page 42).
	**Cursor keys** The cursor keys move the cursor in the direction of the arrow, i.e. up, down, left, or right.
	**Windows key** The Windows key switches between the start screen and the last used application.
	**Menu key** The Menu key opens the menu for the active application.

Virtual numeric keypad

To provide the convenience of a numeric keypad, your keyboard is equipped with a virtual numeric keypad. The special keys of the virtual numeric keypad are recognisable by the numbers and symbols printed in the upper right corner of each key. If you have switched on the virtual numeric keypad, you can output the characters shown on the upper right of the keys.

The keyboard layout shown below may differ from your actual device.



1 = Valid characters when the Num key is not activated

2 = Valid characters when the Num key is activated

Further information about the status indicators can be found in chapter "Status indicators", Page 19.

Country and keyboard settings

► Change the country and keyboard settings as described in the documentation for your operating system.

Key combinations

The following description of key combinations applies to Windows operating systems. Some of the following key combinations may not function in other operating systems or with certain device drivers.

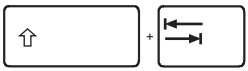
Other key combinations are described in the relevant manuals supplied with your application programs.

Key combinations are entered as follows:

- ► Press the first key in the combination and keep it pressed.
- ► While holding the first key down, press the other key or keys in the combination.

If the key combination Fn + F is pressed: The special functions of the Fn keys can be executed by pressing the keys directly without also having to press the Fn key.

Combination	Description
Fn + F1	**Switching the microphone on/off** This key combination enables and disables the microphone.
Fn + F2	**Switching the loudspeakers on and off** This key combination switches your notebook's loudspeakers off and on.
Fn + F3	**Decrease volume** This key combination reduces the volume of the internal loudspeakers.
Fn + F4	**Increase volume** This key combination increases the volume of the internal loudspeakers.
Fn + F5	**Switching the wireless components on / off** This key combination switches the wireless components off or on.
Fn + F6	**Switching the touchpad and touchpad buttons on/off** This key combination switches the touchpad and the touchpad buttons on or off.
Fn + F7	**Decrease screen brightness** This key combination decreases the brightness of the screen.
Fn + F8	**Increase screen brightness** This key combination increases the brightness of the screen.

Combination	Description
Fn + F9	**Energy saving functions** Use this key combination to activate the power management functions (see chapter "Using the power-management features", Page 48).
Fn + F10	**Toggle output screen** Use this key combination to select which screen(s) is/are used for display if an external monitor is connected. Screen output is possible: • only on the notebook's LCD screen • on the LCD screen of the notebook and the external monitor at the same time • only on the external monitor This setting is useful if you would like a high resolution and a high refresh rate on an external monitor.
Fn + 	**Activate/deactivate keyboard backlight** On backlit keyboards, this key combination activates or deactivates the backlight.
Alt + 	**Switch between open applications** Use this key combination to switch between several open applications.
Ctrl + Alt + Del	**Windows security/Task-Manager** This key combination opens the Windows security/Task-Manager window.
	**Back tab** This key combination moves the cursor back to the previous tab stop.

Key combinations using the Windows keys are detailed in the manual for your operating system.

Camera (dependent on configuration)

Depending on the software used, you can use your camera to take pictures, record video clips or take part in web chats.

The camera has its own status indicator. The status indicator lights up when the camera is active.

- The picture quality depends on the lighting conditions and the software being used.
- You can only use the camera with a particular application (e.g. an Internet telephony program or a video conferencing program which supports a camera).
- When using the camera, the notebook support must not shake.
- The camera automatically adjusts itself to the current light level. For this reason the LCD display may flicker while the light level is adjusted.

Further information on use of the camera and additional settings can be found in the Help function of the program which uses the camera.

Rechargeable battery

During mobile use, the notebook runs on its built-in battery. You can increase the life of the battery by caring for the battery properly. The average battery life is around 800 charge/discharge cycles.

You can extend the battery life by taking advantage of the available energy saving functions.

Charging, caring for and maintaining the battery

The notebook battery can only be charged when the ambient temperature is between 5°C / 41°F and max. 35°C / 95°F.

You can charge the battery by connecting the notebook to the mains adapter (see "Mains adapter connecting", Page 17).

If the mains adapter is connected when the state of charge of the battery is more than 90%, charging will not be started. When the state of charge of the battery is less than 90%, the battery will be charged to 100% as soon as the mains adapter is connected.

If the battery is running low you will hear a warning alarm. If you do not connect the mains adapter within five minutes of the warning alarm described above, your notebook will automatically switch off.

monitoring the battery charging level

Windows also has a "Battery status meter" in the taskbar for monitoring the battery capacity. When you place the mouse pointer on the battery symbol, the system displays the battery status.

Battery storage

Keep the battery pack in a dry environment at between 0°C / 32°F and 30°C / 86°F. The lower the temperature at which the batteries are stored, the lower the rate of self-discharge.

If you will be storing batteries for a longer period (longer than two months), the battery charge level should be approx. 30 %. To prevent exhaustive discharge which would permanently damage the battery, check the level of charge of the battery at regular intervals.

To be able to make use of the optimal charging capacity of the batteries, the battery should be completely discharged and then fully recharged.

If you do not use the batteries for long periods, remove them from the notebook. Never store the batteries in the device.

Removing and installing the battery

Only use batteries approved by Fujitsu for your notebook.

Never use force when fitting or removing a battery.

Make sure that no foreign bodies get into the battery connections.

Never store a battery for long periods in the discharged state. This can make it impossible to recharge.

Removing the battery

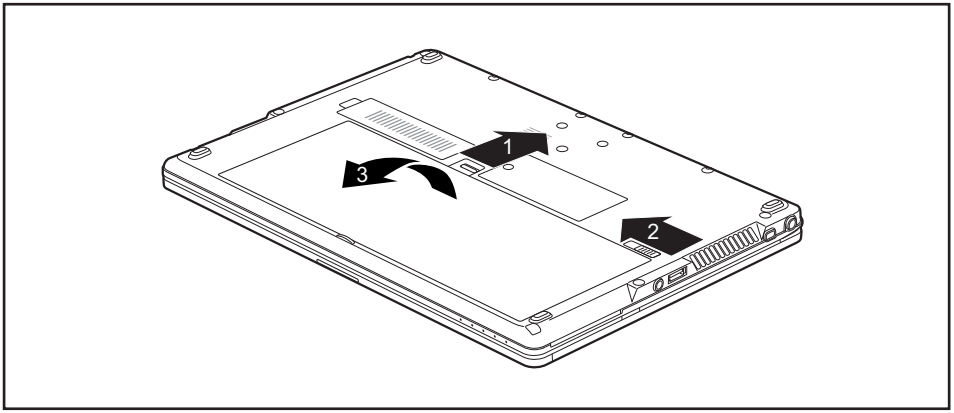
Please observe the safety notes in chapter "Important notes", Page 12.

Remove the power plug from the mains outlet!

► Switch the device off.

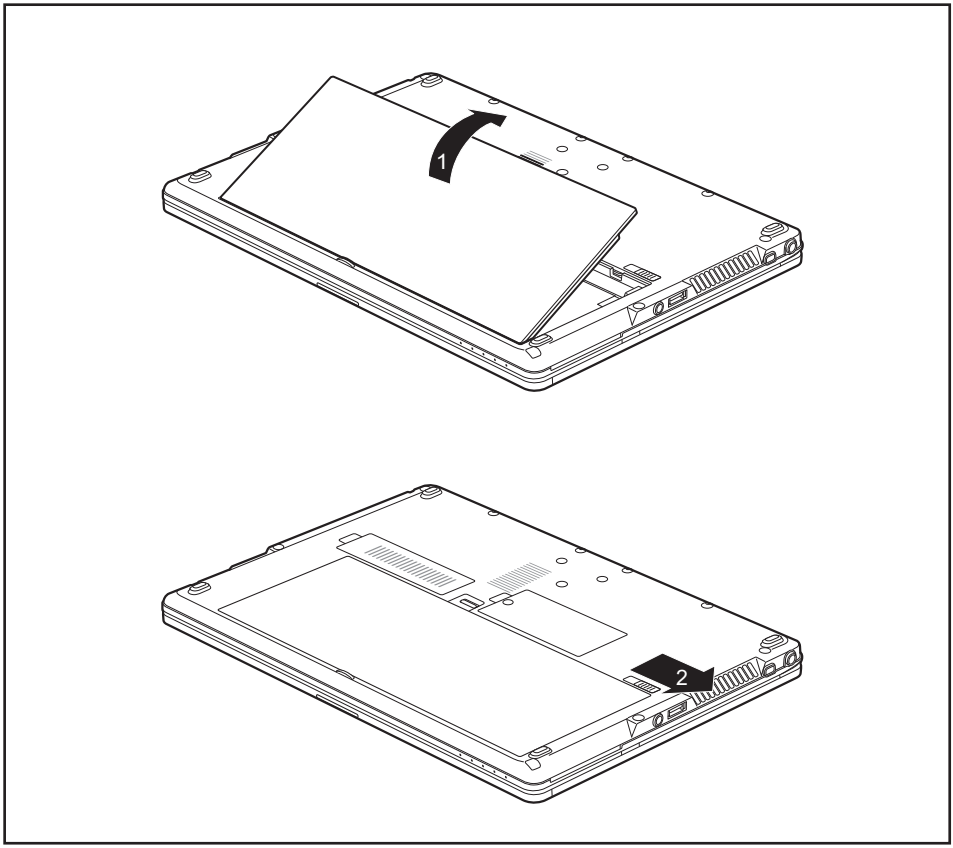
The device must not be in energy-saving mode.

► Close the LCD screen.
► Remove all the cables from the device.
► Turn the device over and place it on a stable, flat and clean surface. If necessary, lay an anti-slip cloth on this surface to prevent the device from being scratched.



► Slide the battery release in the direction of the arrow (1) and hold it in place.
► Slide the battery release in direction of the arrow (2).
► Lift the battery out of the battery compartment (3).

Inserting battery



► Insert the battery in the battery compartment (1).
► Slide the battery release in the direction of the arrow (2).
↳ The battery is now secured in place.
► Turn the notebook the right way up again and place it on a flat surface.
► Reconnect the cables that were previously disconnected.

Using the power-management features

The notebook uses less power when the available power-management features are used. You will then be able to work longer when using the battery before having to recharge it.

Power efficiency is increased and environmental pollution reduced. By choosing the best power options, you can make significant savings and at the same time help protect the environment.

When you close the LCD screen, depending on the setting in Windows, the notebook automatically enters a power saving mode.

The recommended settings for the Windows energy saving functions are predefined as "Fujitsu Computer EcoSettings" in the Power Options of the Control Panel and can be displayed there.

► Select the power management functions in your Control Panel.

If you need further information about an option, you can get help with most settings by pressing F1 to open the Microsoft Help.

When the notebook is in power-saving mode, the following must be remembered:

During power saving mode, open files are held in the main memory or in a swap file on the hard disk.

Never turn off your notebook while it is in a power saving mode. If the built-in battery is nearly empty, close the open files and do not go into power saving mode.

If you do not intend to use your notebook for a long period of time:

► Exit power saving mode if necessary via the mouse or keyboard or by switching on the notebook.

► Close all opened programs and completely shut down the notebook.

Memory cards

Your notebook is equipped with an integrated memory card reader.

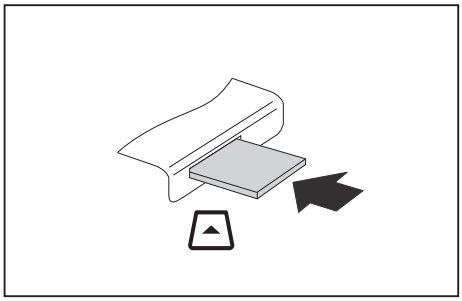
Observe the manufacturer's instructions when handling the memory cards.

Supported formats

Your notebook supports the following formats:

- Secure Digital (SD™ card)
- SDHC
- SDXC

Inserting the memory card

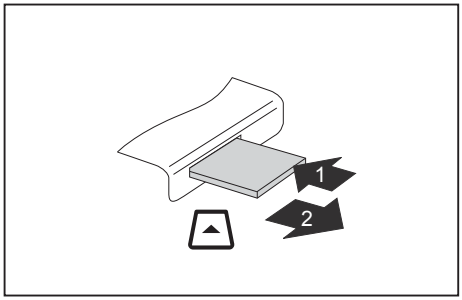


► Carefully push the memory card into the slot until you feel it click into place. The label should be facing upward. Do not apply excessive force, as otherwise the delicate contact surfaces could be damaged.

↳ Depending on the particular type used, the memory card may protrude slightly from the slot.

Removing the memory card

In order to protect your data, always follow the correct procedure for removing the card (see the documentation for your operating system).



► Press on the memory card (1).

↳ The memory card is released and can now be removed.

► Pull the memory card out of the slot (2).

Loudspeakers and microphones

You will find information about the exact position of speakers and microphones in chapter "Ports and controls", Page 9.

Please refer to chapter "Key combinations", Page 42 for information on setting the volume and also enabling/disabling the loudspeakers using key combinations.

If you attach an external microphone, the built-in microphone is disabled.

When you connect headphones or external speakers, the built-in speakers are disabled.

Information on connecting headphones and a microphone can be found in "Connecting external devices", Page 81.

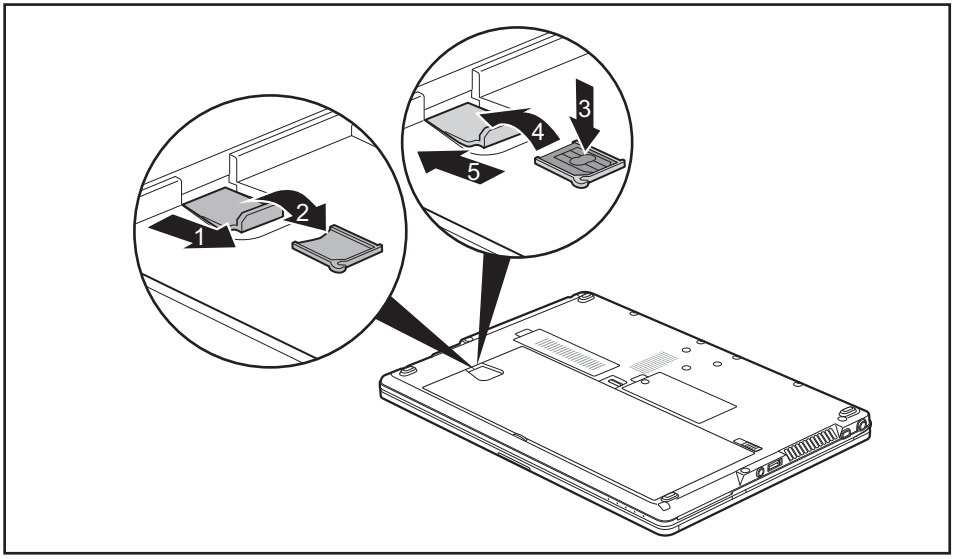
SIM card

A SIM card (Subscriber Identity Module) is a chip card that is inserted into a mobile phone or a Notebook laptop and, together with a built-in LTE (long-term evolution mobile broadband) module, allows access to a mobile network.

When handling SIM cards, follow the instructions supplied by the provider.

Inserting the SIM card

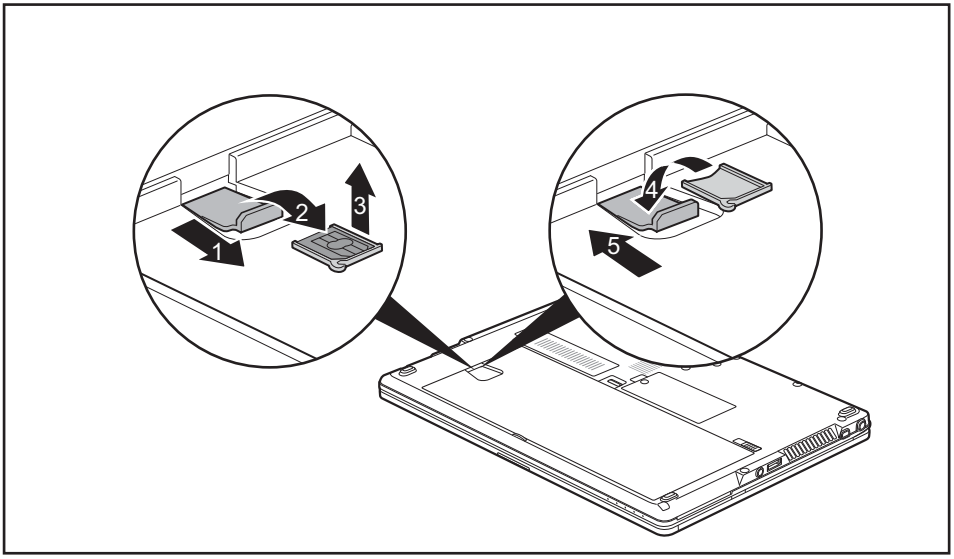
► Remove the battery, see "Removing the battery", Page 46.



► Pull the SIM card holder out of the slot (1).
► Remove the SIM card carrier (2).
► Insert the SIM card as shown in the diagram into the SIM card carrier (3).
► Place the SIM card carrier with the SIM card onto the SIM card holder (4).
► Slide the SIM card holder back into its slot (5).
► Install the battery again, see "Inserting battery", Page 47.

Removing the SIM card

► Remove the battery, see "Removing the battery", Page 46.



► Pull the SIM card holder out of the slot (1).
► Remove the SIM card carrier from the SIM card holder (2).
► Remove the SIM card from the SIM card carrier (3).
► Place the SIM card carrier onto the SIM card holder (4).
► Slide the SIM card holder back into its slot (5).
► Install the battery again, see "Inserting battery", Page 47.

Wireless LAN / Bluetooth / LTE radio components (configuration dependent)

The installation of radio components not approved by Fujitsu will invalidate the certifications issued for this device.

Depending on the device configuration you ordered, your device will be equipped with Wireless LAN, Bluetooth or LTE.

Switching the wireless components on and off

► To switch the radio components on or off, press the key combination Fn + F5.

↳ The wireless component indicator will illuminate when one or more wireless components are switched on.

If you switch off the radio components, the Bluetooth and LTE modules and the wireless LAN transmission unit (antenna) are also switched off.

Pay attention to the additional safety notes for devices with radio components provided in the "Safety/Regulations" manual.

Details on using a Wireless LAN can be found in the online help system included in the Wireless LAN software.

For further information about LTE, please contact your service provider.

Setting up WLAN access

- Requirement: A WLAN must be available and you must have the corresponding access information.

Information on configuring the WLAN access can be found in the documentation for your operating system.

Access via LTE (configuration dependent)

If you ordered an integrated LTE module with your system, you can enjoy optimum reception and maximum energy efficiency without awkward cables or antennas. An installed LTE module is ready for immediate use.

If you did not order an LTE module, you can purchase the accessories for LTE reception from your retailer or your Fujitsu Technology Solutions dealer.

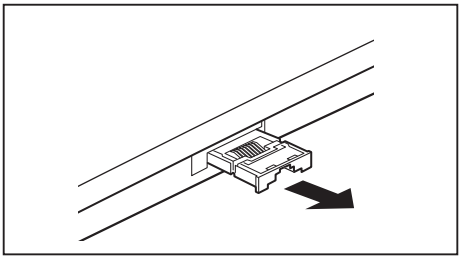
For information about connecting with the LTE network, please see the documentation for the hardware that you will be using.

You can connect your device to the internet via LTE. To do this, use one of the following connection types:

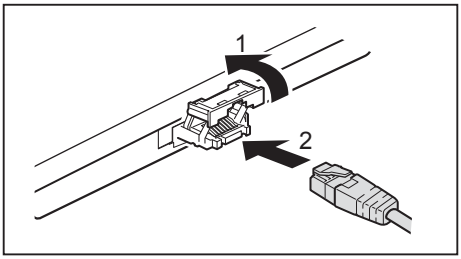
- Integrated LTE module (the type depends on your model variant)
- a USB dongle (a USB stick with your mobile phone provider's SIM card)
- a mobile end-device (e.g. mobile phone with Bluetooth or cable connection)

Ethernet and LAN

The internal network module of your notebook supports Ethernet LAN. You can use it to establish a connection to a local network (LAN = Local Area Network).



► Pull the LAN adapter out of the LAN port on the notebook in the direction of the arrow.



► Push the LAN adapter upwards in the direction of the arrow (1).

► Connect the network cable to the LAN adapter (2).

► Connect the network cable to your network port.

Your network administrator can help you to configure and use the LAN connections.

The network cable is not included in the delivery scope. This type of cable can be obtained from a specialist dealer.

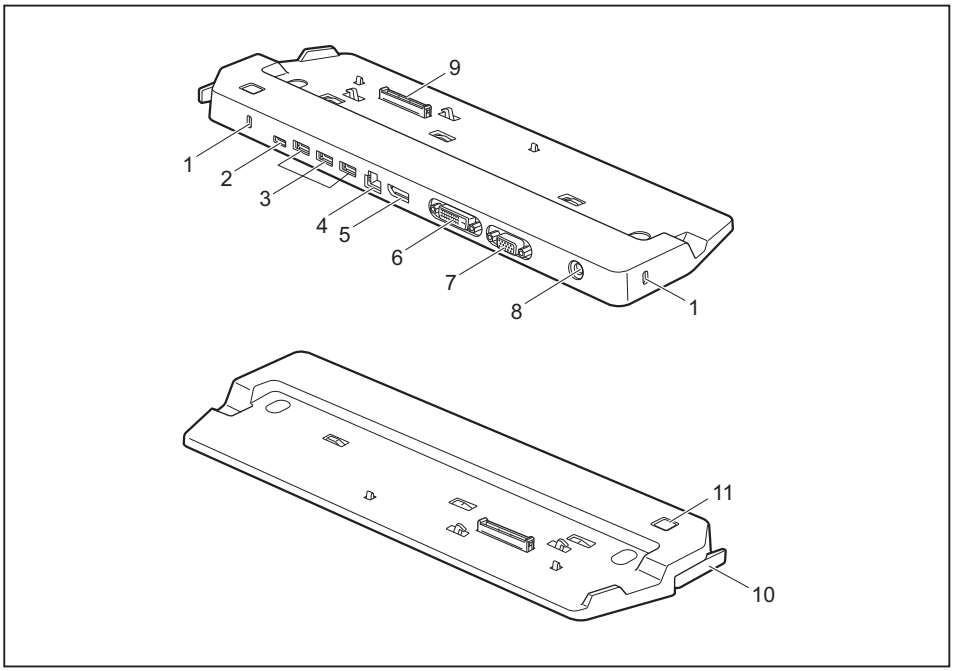
Your Port Replicator (optional)

Your Port Replicator is a device that enables you to quickly connect your notebook to your peripherals, such as a monitor, printer etc.

The features offered by the Port Replicator include standard ports for monitor, audio, mouse and keyboard.

You need only dock the notebook in order to use your peripheral devices.

Ports on the Port Replicator



1 = Security Lock device
2 = USB connection 3.0 (USB Type-C™)
3 = USB connections 3.0
4 = LAN port
5 = Display port
6 = DVI-D (Digital Visual Interface - Digital) screen connection
7 = VGA monitor port
8 = DC input connector (DC IN)
9 = Connector on the Port Replicator for the docking port on the underside of the notebook
10 = Release
11 = ON/OFF button

Setting up the port replicator

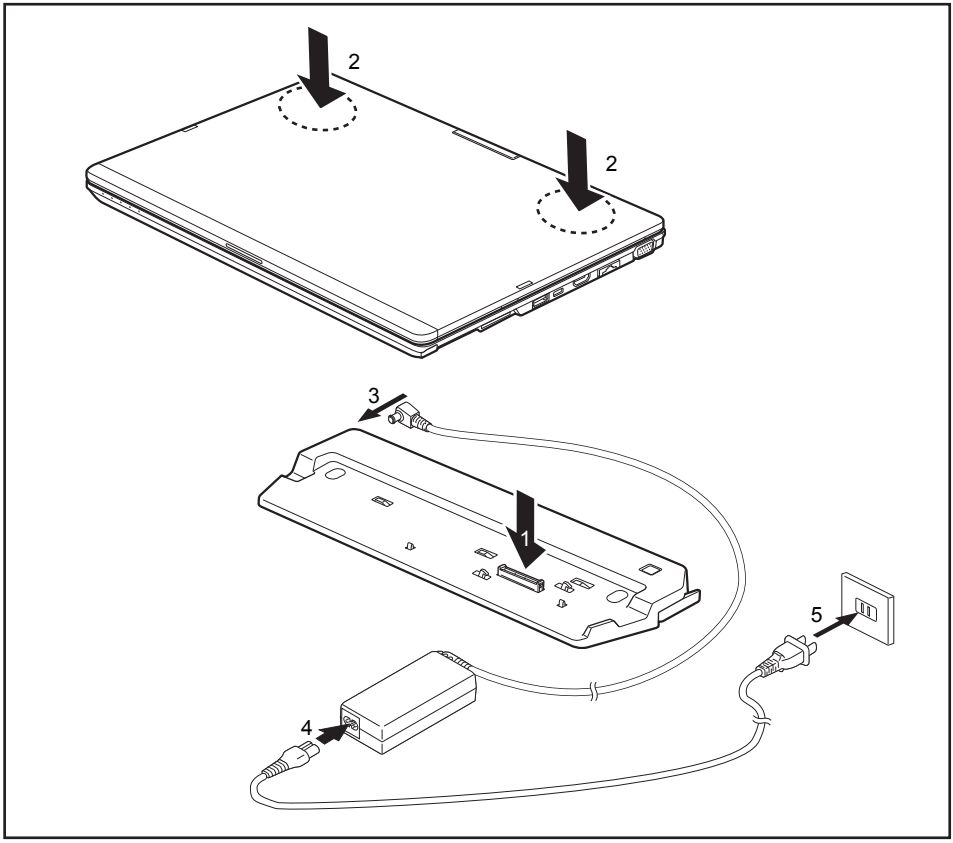
Select a suitable location for the Port Replicator before setting it up. Follow the instructions below when doing so:

- Never place the port replicator on a soft surface (e.g. carpeting, upholstered furniture, bed). This can block the air vents of the notebook and cause overheating and damage.
- Place the port replicator on a stable, flat and non-slip surface. Please note that the port replicator's rubber feet may mark certain types of surface.
- Never place the port replicator and the mains adapter on a heat-sensitive surface.
- Do not expose the port replicator to extreme environmental conditions.

  Protect the port replicator from dust, humidity and heat.

Connect the notebook to the port replicator

► Disconnect the mains adapter cable from the DC socket (DC IN) of the notebook.



► Position the notebook on the Port Replicator so that the connector on the base of the notebook is aligned with the connector of the Port Replicator (1).

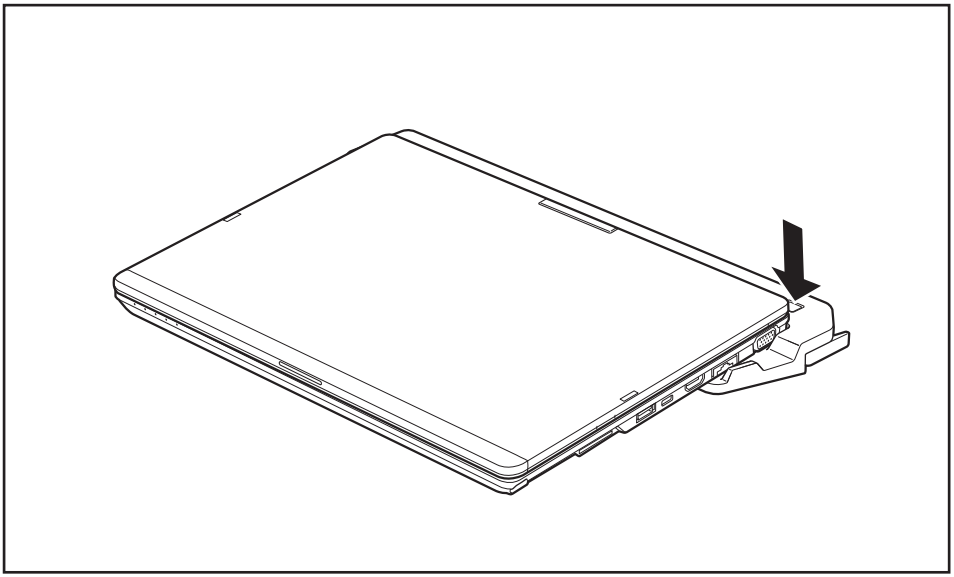
► Press down on the notebook's rear corners so that it locks into position (2).

► Connect the mains power adapter cable to the DC voltage socket (DC IN) of the port replicator (3).

► Connect the power cable to the mains adapter (4).

► Plug the power cable into the mains socket (5).

Switching on the notebook via the port replicator



► Press the ON/OFF button on the port replicator to switch the notebook on.

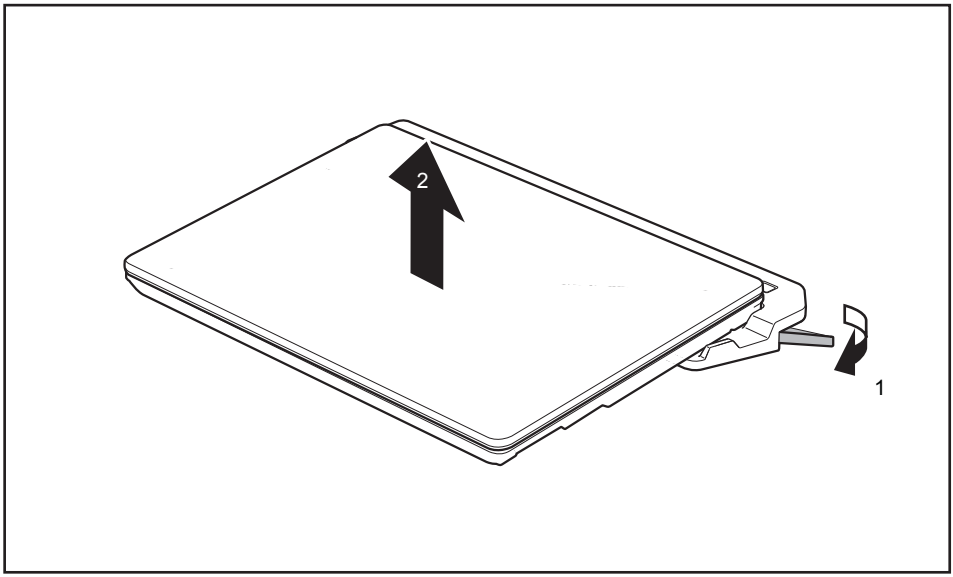
Switching off notebook via Port Replicator

► Close all applications and shut down your operating system (please refer to the manual for the operating system).

i

If the notebook cannot be shut down properly, press the ON/OFF button on the Port Replicator for about four seconds. The notebook will switch itself off. Any unsaved data may however be lost.

Disconnecting the notebook from the Port Replicator



► Pull the unlocking lever in the direction of the arrow (1), until you hear the notebook unlatch.
► Lift off the notebook (2).

Security functions

Your notebook has several security features that you can use to secure your system from unauthorised access.

This chapter explains how to use each function, and what the benefits are.

Please remember that in some cases, for example, forgetting your password, you may be locked out and unable to access your data. Therefore, please note the following information:

- Make regular backups to external data carriers such as external hard drives, CDs, DVDs or Blu-ray Discs.
- Some security functions need you to choose passwords. Make a note of the passwords and keep them in a safe place.

If you forget your passwords you will need to contact the our Service Desk. Deletion or resetting of passwords is not covered by your warranty and a charge will be made for assistance.

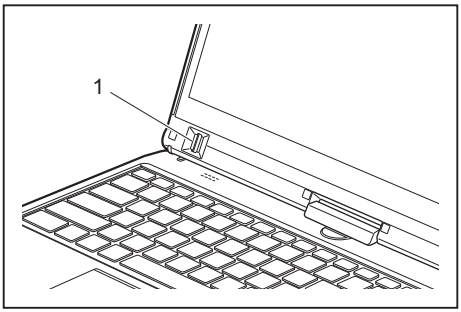
Brief overview of security functions

Detailed information about the security equipment of your device can be found in the "Professional Notebook" manual, on the "Drivers & Utilities" CD/DVD or on the Internet at "http://www.fujitsu.com/fts/support/index.html".

Security functions	Type of protection	Preparation
Security Lock	Mechanical	Fit and lock the Kensington Lock Cable (accessory).
Fingerprint sensor (configuration dependent)	Biometric	Install the supplied fingerprint software.
Palm vein scanner (depending on the configuration)	Biometric	Installing the supplied software
BIOS password protection	Password protection for *BIOS Setup*, operating system and hard disk with supervisor and user password. The passwords consist of a maximum of eight alphanumeric characters.	Specify at least one supervisor password in the *BIOS Setup* and activate the password protection for the operating system and hard disk as desired.
Boot from removable media	Prevents unauthorised booting of an operating system from external media (e.g. USB stick, USB CD-ROM drive etc.).	In the BIOS Setup, go to the *Security* menu and edit the option *Boot from Removable Media*.
Owner Information	Overlay service desk or owner information during the boot process.	In the BIOS Setup, go to the *Security* menu and edit the option *Owner Information*.
System Lock	The BIOS and the system can only be started with SmartCard and PIN.	Initialise the SmartCard in the BIOS.
SmartCard reader	PIN and SmartCard protection for operating system	To use the SmartCard reader functions, install the supplied (or other suitable) software.
Trusted Platform Module	Identification and authentication of the notebook	Define a supervisor password in the *BIOS Setup* and enable the TPM (*Security Chip*).

Setting up the fingerprint sensor (configuration dependent)

The fingerprint sensor can record an image of a fingerprint. With additional fingerprint software, this image can be processed and used instead of a password.

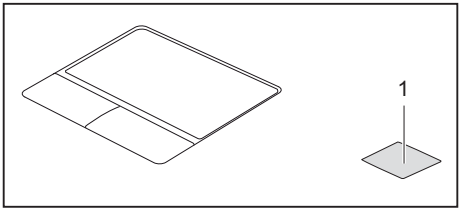


► You must install the fingerprint software in order to be able to use the fingerprint sensor (1).

The current *Workplace Protect* software for palm and fingerprint sensors can be found on the Internet at "http://www.fujitsu.com/fts/solutions/business-technology/security/secure/index.html".

Configuring the palm sensor (configuration dependent)

The palm vein sensor can record the image of the pattern of the veins of the hand. This image is evaluated by additional software and can be used instead of a password.



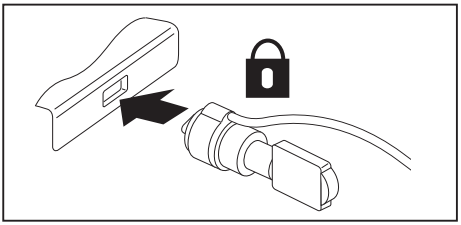
► To be able to use the palm vein sensor (1), you must install the software.

The current *Workplace Protect* software for palm and fingerprint sensors can be found on the Internet at "http://www.fujitsu.com/fts/solutions/business-technology/security/secure/index.html".

Using the Security Lock

Your device comes with a Security Lock device for the Kensington Lock Cable. You can use the Kensington Lock Cable, a sturdy steel cable, to help protect your notebook from theft. The Kensington Lock Cable is available as an accessory.

Fujitsu recommends the use of a combination lock.



► Fit the Kensington Lock Cable on the device on your notebook.

Attach another Kensington Lock cable to your Port Replicator to also protect your Port Replicator from theft. There are two security lock devices on your Port Replicator.

Configuring password protection in BIOS Setup Utility

Before using the various options for password protection in the *BIOS Setup utility* to increase data security, please observe the following:

Make a note of the passwords and keep them in a safe place. If you forget your supervisor password you will not be able to access your notebook. Deletion of the password is not covered by your warranty and a charge will be made for assistance.

Your password can be up to 32 characters long and can contain letters, numbers and special characters. A distinction is made between upper and lower case.

When using special characters, you must remember that these are dependent on the country variants of the keyboard used.

Protecting BIOS Setup Utility (supervisor and user password)

If you have opened these operating instructions on the screen, we recommend that you print them out. You cannot call the instructions onto the screen while you are setting up the password.

The supervisor password and the user password both prevent unauthorised use of the *BIOS Setup Utility*. With the aid of the supervisor password you can access all of the functions of the *BIOS Setup Utility*, while the user password will only give you access to some of the functions. You can only set up a user password if a supervisor password has already been assigned.

Please refer to section "Settings in BIOS Setup Utility", Page 96 for a description of how to call up and operate the *BIOS-Setup-Utility*.

Assigning the supervisor and user passwords

- ► Start the *BIOS Setup Utility* and go to the *Security* menu.
- ► Select the *Set Supervisor Password* field and press the Enter key.
- ↳ With *Enter new Password*: you are asked to enter a password.
- ► Enter the password and press the Enter key.
- ↳ *Confirm new Password* requires you to confirm the password.
- ► Enter the password again and press the Enter key.
- ↳ *Changes have been saved* is a confirmation that the new password has been saved.
- ► To set the user password, select *Set User Password* and proceed exactly as when configuring the supervisor password.
- ↳ If you do not want to change any other settings, you can exit *BIOS Setup Utility*.
- ► In the *Exit* menu, select the option *Save Changes & Exit*.
- ► Select *Yes* and press the Enter key.
- ↳ The notebook is then rebooted and the new password comes into effect. It will now be necessary to first enter your supervisor or user password in order to open the *BIOS Setup Utility*. Please note that the user password only provides access to a few of the BIOS settings.

Changing the supervisor or user password

You can only change the supervisor password when you have logged into the *BIOS Setup Utility* with the supervisor password.

- ► Call the *BIOS Setup Utility* and go to the *Security* menu.
- ► When changing the password, proceed exactly as for password assignment.

Removing passwords

To remove a password (without setting a new password) perform the following steps:

► Start the *BIOS Setup Utility* and go to the *Security* menu.
► Highlight the *Set Supervisor Password* or *Set User Password* field and press the Enter key.
↳ You will be requested to enter the current password by the *Enter Current Password* prompt.
You will be requested to enter a new password by the *Enter New Password* prompt.
► Press the Enter key twice.
► In the *Exit* menu, select the option *Save Changes & Exit*.
► Select *Yes* and press the Enter key.
↳ The notebook will now reboot with the password removed.
Removing the supervisor password simultaneously deactivates the user password.

Password protection for booting of the operating system

With the supervisor password you have set in the *BIOS Setup Utility* (see section "Assigning the supervisor and user passwords", Page 64), you can also prevent starting of the operating system.

Activating system protection

► Start the *BIOS Setup Utility* and go to the *Security* menu.
► Select the *Password on Boot* option and press the Enter key.
► Select the desired option (*Disabled*, *First Boot* or *Every Boot*) and press the Enter key
► Select the *Save Changes & Exit* option under *Exit*.
↳ The notebook reboots. You will be prompted to enter your password (the supervisor password).

Deactivating system protection

► Start the *BIOS Setup Utility* and go to the *Security* menu.
► Select the *Password on Boot* option and press the Enter key.
► Select the *Disabled* option and press the Enter key.
↳ If you do not want to change any other settings, you can exit *BIOS Setup Utility*.
► Select the *Save Changes & Exit* option under *Exit*.
↳ The notebook will reboot. The system is no longer password-protected.

Password protection for the hard disk

If a supervisor password has been assigned, a password for the hard disk can also be set in the *Hard Disk Security* menu.

The hard disk is protected by this password. Data on this hard disk can only be read into another system if the correct password has been entered.

SmartCard reader

SmartCards are not supplied as standard equipment. You can use all SmartCards that comply with the ISO standard 7816-1, -2 or -3. These SmartCards are available from various manufacturers.

With the appropriate software you can use your SmartCard as an alternative to password protection, but also as a digital signature, for encrypting your e-mails or for home banking.

We recommend that you always use two SmartCards. Always keep one of the SmartCards in a safe place if you are carrying the other SmartCard with you.

In order to be able to take advantage of all the security features of your notebook, you will need a CardOS SmartCard from Fujitsu.

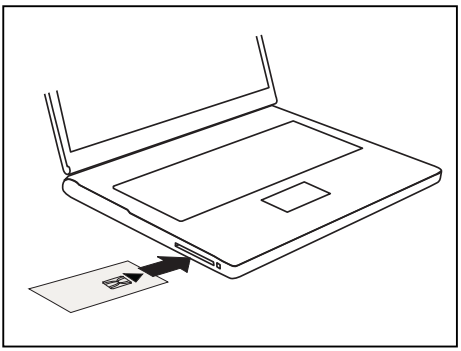
The SmartCard can only be used with a PIN, offering maximum protection even if you lose the SmartCard. In order to maximise your security, the CardOS SmartCard is disabled if three incorrect attempts are made to enter the PIN.

When you use the CardOS SmartCard for the first time, you will either need to enter the preset PIN "12345678" or the PIN given to you by your systems administrator.

Inserting the SmartCard

Do not use force when inserting and removing the SmartCard.

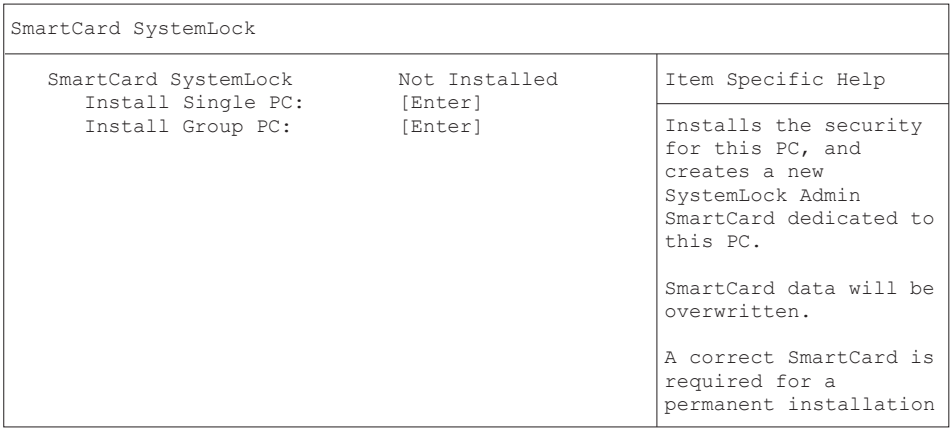
Make sure that foreign objects do not fall into the SmartCard reader.



► Slide the SmartCard into the SmartCard reader with the chip facing upwards and to the front.

SmartCard System Lock

With *SystemLock* enabled, the device can only be started using an initialised SmartCard (SICRYPT, CardOS or Fujitsu) and a personal identification number (PIN). The SmartCard and PIN are checked during system booting in the BIOS, i.e. before the operating system is started.



All new SmartCards have a preset PIN (Personal Identification Number) and PUK (Personal Unblocking Key).

On SICRYPT and CardOS SmartCards, the value *12345678* is preset for the PIN and the PUK.

On Fujitsu cards, the value *0000* is preset for the PIN and the value *administrator* is preset for the PUK. For security reasons, we recommend that you change both PIN and PUK without fail.

Additional software (e.g. Smarty) is required so that the system can also check that the correct SmartCard is inserted while the system is running.

For information on how to uninstall *SystemLock*, please refer to "Uninstall SystemLock". A system which was protected using *SystemLock* can no longer be released.

Always create a backup copy of the SmartCard which was used.

Access rights of SmartCards

A new SmartCard initially only has a preset PIN and PUK. Access rights and the customised PIN and PUK are not assigned until the SmartCard is initialised. The SmartCard type depends on the access rights assigned to the card, as described below:

- User SmartCard: starting the system, changing the PIN
- SuperUser SmartCard: starting the system, changes in *BIOS Setup*, changing the PIN
- Service SmartCard: changes in *BIOS-Setup*, operating system boot-up not possible
- Admin SmartCard: starting the system, changes in *BIOS Setup*, changing the PIN, uninstalling *SystemLock*, initialising SmartCards, blocking SmartCards

The following table shows an overview of the rights granted with each type of SmartCard when a PIN or PUK is entered:

	User SmartCard		**SuperUser SmartCard**		**Service SmartCard**		**Admin SmartCard**	
	PIN	PUK	PIN	PUK	PIN	PUK	PIN	PUK
Start-up system	x		x				x	
Run BIOS Setup			x		x		x	
Change own PIN	x		x		x		x	x
Unblocking own blocked SmartCard		x*		x*		x*		x
Unblocking all blocked SmartCards								x
Generating user cards								x
Uninstall SystemLock								x

* *BIOS Setup* setting (*Unblock own SmartCard*)

Usually there is always one Admin SmartCard and at least one User or SuperUser SmartCard that will allow a system to be operated.

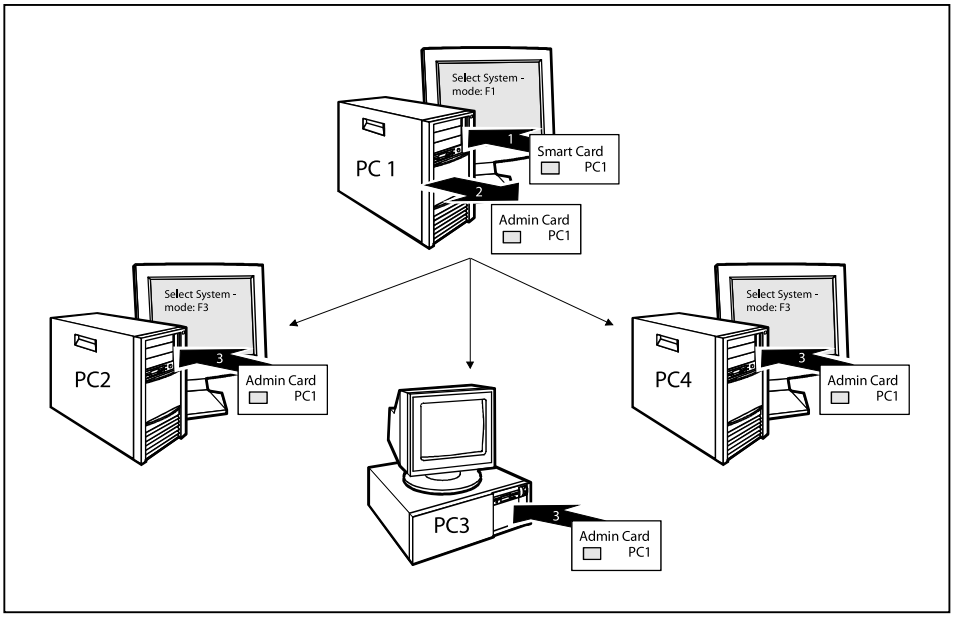
SmartCard user groups

User groups can be set up using *SystemLock*. This enables several systems to be started with one SmartCard. A user group consists of at least two systems. Each user that is allowed to start the systems is provided with one SmartCard. The user can start any of the systems using this SmartCard.

Basic information on setting up user groups

When installing *SystemLock*, the first PC in the user group is set up as a "Single PC". The Admin SmartCard generated during this process is used to set up the user group. *SystemLock* sets up each additional device as a "Group PC" during installation. The existing Admin SmartCard is inserted, information is read in and the device is added to the user group. The Admin SmartCard determines which user group the device belongs to.

If you use FTS-CardOS SmartCards, *SystemLock* can be administered via the Windows program "SystemLock Admin". "SystemLock Admin" allows you to conveniently manage *SystemLock* at the operating system level, create SystemLock Organisation Units and Groups, generate SmartCards for these Organisation Units or Groups, assign access authorisations for user cards at various levels and restore access authorisations using remote access. You can also change the SmartCard's PIN or PUK for yourself and other users and reactivate blocked cards. For a detailed description, see the "SystemLock Admin" Help manual.



User SmartCards or SuperUser SmartCards must still be generated using *SystemLock* so that users can access the systems within the user group. Using a User SmartCard or SuperUser SmartCard a user can log on to each system within the user group.

Installing SystemLock

During initial installation, the first SmartCard becomes the Admin SmartCard. Together with the PUK, it has all access rights, and should therefore be kept in a safe place. It can only be used by the authorised user (administrator), e.g. to initialise user cards.

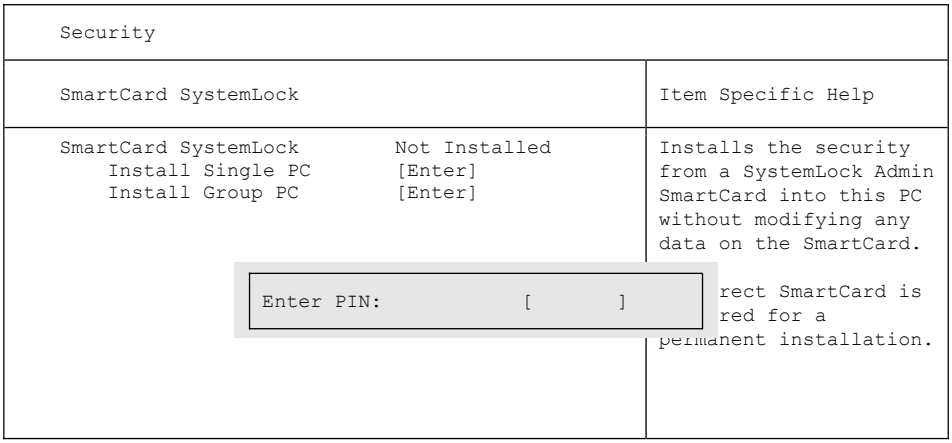
You need an Admin SmartCard if you want to set up a user group. You use the Admin SmartCard to add further systems to the user group.

Setting up the first system in a user group or a stand-alone system for use with SystemLock

► Start the device and call up BIOS Setup.

► From the *Security* menu, choose the option *SmartCard SystemLock*.

↳ The following SmartCard SystemLock menu will be displayed:



► Insert a new SmartCard in the reader and press Enter.

New SmartCards have a preset PUK (see above).

if you want to re-initialise a previously initialised SmartCard, you will need to know the PUK which was assigned to it.

► Enter the PUK.

↳ When the following appears:

- *ACCESS DENIED* = You have entered an invalid PUK. After six failed attempts, the SmartCard will be blocked and can no longer be used.

► Enter a new PIN at the following prompt:

↳ *Enter new PIN:*

Confirm new PIN:

A number with 4 to 8 digits is acceptable for the new PUK. For security reasons, we recommend that you change the PUK for every SmartCard, and use an 8-digit number each time.

► Re-enter the new PIN to confirm.

↳ When the following appears:

- *PIN/PUK do not match* = You have confirmed the PIN incorrectly. You will be requested to re-enter the new PIN and reconfirm.

Please wait a few seconds after confirming the new PIN: *SystemLock* is being installed.

The following message will be displayed if installation is successful:

```
Setup Notice
Changes have been saved
[Continue]
```

► Now press the Enter key. The SystemLock administration menu will be displayed:

Security	
SmartCard SystemLock	Item Specific Help
SmartCard SystemLock Installed Uninstall: [Enter] BIOS Recovery: [Allowed] SmartCard and Pin [Always required] SmartCard Initialization Admin SmartCard [Enter] SuperUser SmartCard: [Enter] User SmartCard: [Enter] Service SmartCard: [Enter] SmartCard Configuration Change PIN: [Enter] Change PUK: [Enter] Unblock SmartCard: [Enter]	Allows to deactivate The smartcard security. ATTENTION: Always check the BIOS password settings after uninstalling SystemLock. NOTICE: Reinstalling a SinglePC implies re-initializing all of your smartcards

► For security reasons, the preset PUK should always be changed before removing the new SmartCard. To do this, under *SmartCard Configuration*, select the option *Change PUK*, press the Enter key and input the new PUK.

► First enter the preset PUK.

↳ *Enter the PUK:*

New SmartCards have a preset PUK (see above).

You will need to know the PUK assigned to the SmartCard if you want to re-initialise a previously initialised SmartCard.

► Enter the PUK.

↳ When the following appears:

- *ACCESS DENIED* = You have entered an invalid PUK. After six failed attempts, the SmartCard will be blocked and can no longer be used.

► Enter the new PUK as follows.

↳ *Enter new PUK:*

Confirm new PUK:

A number with 4 to 8 digits is acceptable for the new PUK. For security reasons, we recommend that you change the PUK for every SmartCard, and use an 8-digit number each time.

► Re-enter the new PUK to confirm.

↳ When the following appears:

- *PIN/PUK do not match* = You have confirmed the PUK incorrectly. You will then be requested to re-enter and reconfirm the new PUK.

Instructions on how to initialise additional SmartCards can be found in Section "Carrying out administrator functions", Page 75.

► If you do not want to initialise any further SmartCards, press Esc and remove the Admin SmartCard. NEVER write the PIN or PUK on the SmartCard under any circumstances!

i

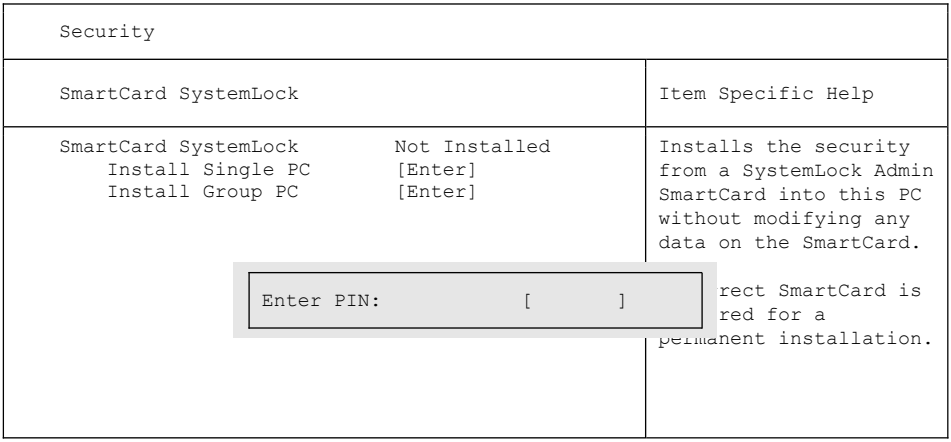
Keep the SmartCard and PIN/PUK in a safe place and protect them from unauthorised access.

Adding a system to a user group

► Start the device.

► Call up *BIOS Setup* and select the *SmartCard SystemLock* page from the *Security* menu.

↳ The following SmartCard SystemLock menu will be displayed:



► Insert the Admin SmartCard for the user group.

↳ *Enter PIN:*

► Enter the PIN.

↳ When the following appears:

- *ACCESS DENIED* = You have confirmed the PIN incorrectly. You are then requested to enter and confirm the new PIN again. After three failed attempts, the SmartCard will be blocked and can then only be activated again by entering the PUK.

Enter the PUK:

► Enter the PUK.

↳ When the following appears:

- *ACCESS DENIED* = You have entered an invalid PUK. After six failed attempts, the SmartCard will be blocked and can no longer be used.

Please wait a few seconds after entering the PIN and PUK: *SystemLock* is being installed.

The following message will be displayed if installation is successful:

```
Setup Notice

Changes have been saved

[Continue]
```

Now press the Enter key. The SystemLock administration menu will be displayed:

```
Security

SmartCard SystemLock                                  Item Specific Help

SmartCard SystemLock          Installed               Allows to deactivate
    Uninstall:                [Enter]                 The smartcard security.
    BIOS Recovery:            [Allowed]
    SmartCard and Pin         [Always required]       ATTENTION:
                                                      Always check the BIOS
SmartCard Initialization                              password settings after
    Admin SmartCard           [Enter]                 uninstalling
    SuperUser SmartCard:      [Enter]                 SystemLock.
    User SmartCard:           [Enter]
    Service SmartCard:        [Enter]                 NOTICE:
                                                      Reinstalling a SinglePC
SmartCard Configuration                               implies re-initializing
    Change PIN:               [Enter]                 all of your smartcards
    Change PUK:               [Enter]
    Unblock SmartCard:        [Enter]
```

Generate a user card for the device as described in Section "Carrying out administrator functions", Page 75.

► If you do not want to initialise any further SmartCards, press Esc and remove the Admin SmartCard.

Carrying out administrator functions

If you have an internal SmartCard reader, you can switch on the device by inserting the SmartCard. If you use the ON/OFF switch to switch the device on, the following message appears:

SystemLock

Insert a SmartCard.

► Insert the Admin SmartCard. The following message will be displayed:

↳ *Enter your PIN:*

You can now select:

F2=Setup, F3=Change PIN, F4=Administration

► Press the F4 function key. The following message will be displayed:

↳ *Enter the PUK:*

► If you have entered the PUK correctly, you receive the following message:

↳ *PUK OK.*

Initialize another SmartCard or press ESC to abort?

F5=User, F6=SuperUser, F7=Admin, F8=Service, F9=Unblock SmartCard, F10=Uninstall

F5: Normal User SmartCard ("System" access rights):

Only allows system start-up, does not allow changes in BIOS Setup.

F6: Extended User SmartCard ("System and Setup" access rights):

Allows system start-up and changes in BIOS Setup.

F7: Admin SmartCard ("Admin" access rights):

Allows generation of further Admin SmartCards.

F8: Service SmartCard ("Service" access rights):

Only allows changes in BIOS Setup.

F9: Re-activate a blocked User SmartCard.

Enables a new user PIN entry.

F10: Uninstalls SystemLock.

Additional SmartCards should be produced either as Normal User SmartCards ("System") or as Extended User SmartCards ("System and Setup"). These then have restricted access to the device.

► Press the desired function key. The following message will be displayed:

↳ *Remove the SmartCard.*

► Remove the Admin SmartCard.

↳ *Insert a SmartCard.*

Keep the Admin SmartCard in a safe place and protect it from unauthorised access.

► Insert the next SmartCard. It will be initialised as required.

↳ The following message will be displayed:
Remove the SmartCard.

Always change the PIN and PUK for all further SmartCards. The PUK is used to re-activate a blocked SmartCard.

► Remove the User SmartCard and label it, e.g. with the name of the user. But NEVER write the PIN on the SmartCard under any circumstances!

Remote Access Enabling – F4

Requirement:

The device is centrally administered as part of an Organisation Unit and is registered in a SystemLock Admin database. The SmartCard used for the group installation must have been initialised beforehand using the *SystemLock Admin.EXE* Windows program (see "SmartCard user groups", Page 69).

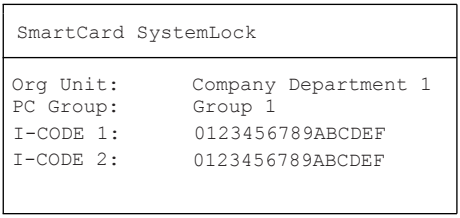
In order to enable "remote" access to a device for a user, or to grant one-time "remote" access to a device for a guest or service technician, proceed as follows:

► Start the device.

↳ The prompt to *Insert a SmartCard* will appear.

► Press the F4 key.

The following dialogue box will appear:



↳ The user must then contact the administrator or the administration hotline and inform them of the data and codes displayed .

The administrator then specifies the type of the once-only access rights:

User access	The user can boot the system once.
Service access	The user has one-time access to the BIOS for service purposes, without access to the SystemLock functions.
Admin access	The user has access to the BIOS and the SystemLock functions, e.g. for activating the device when the associated SmartCard has been lost.

An activation code will be generated that depends on the access rights granted; this will be given to the user by the Hotline.

The user must now press the Enter key on the PC to be activated, enter the first half (Code 1) of the activation code and confirm the entry by pressing Enter. The dialogue box for entering the second half (Code 2) of the activation code will appear. If an incorrect entry is made, there is no limit to the number of times the process can be repeated.

When all 32 characters of the activation code have been correctly entered, the device will boot with the rights assigned by the administrator, in the same way as if a corresponding SmartCard were inserted.

The activation code can only be used once to start the device; it immediately becomes invalid when the device boots. If you wish to switch off the device and start it again without your SmartCard, the procedure described above must be repeated each time.

Switch on the device using SystemLock

If you have an internal SmartCard reader, you can switch on the device by inserting the SmartCard. If you use the ON/OFF switch to switch the device on, the following message appears:

Insert a SmartCard.

► Insert your SmartCard.

↳ *Enter PIN:*

► Enter your PIN.

↳ When the following appears:

ACCESS DENIED = You have entered an incorrect PIN. After three failed attempts, the SmartCard will be blocked and can only be enabled again by entering the PUK.

↳ Depending on the rights assigned to your SmartCard, you can select the following functions when this message is displayed on the screen:

F2=Setup, F3=Change PIN

If your SmartCard has the appropriate rights, you can:

F2: start BIOS Setup.

F3: change PIN.

If you do not select a function, the system will boot up.

Start BIOS Setup F2

A SmartCard with the appropriate rights must be inserted (SuperUser, Service or Admin).

Changing PIN

It is possible to change the PIN for any initialised SmartCard.

► Press the function key F3.

► Enter the old PIN.

► Enter the new PIN.

A number with 4 to 8-digits is acceptable for the new PIN. For security reasons, we recommend that you change the PIN for every SmartCard, and use an 8-digit number each time.

► Confirm the new PIN.

Uninstall SystemLock

► Start the device.

► Follow the instructions given in section "Carrying out administrator functions", Page 75. Select "Uninstall" to uninstall *SystemLock*. You can now use the device again without the need for a SmartCard.

Error messages

In this chapter you will find the error messages which are generated by the mainboard and the SmartCard reader.

Error	Cause
Boot access denied	The SmartCard has no access rights to the system.
Check your SmartCard	The SmartCard is either inserted incorrectly or it is not a suitable SystemLock SmartCard.
SmartCard reader FAILURE	An error has occurred on the serial port to the SmartCard reader. If this error occurs frequently, the connection between the SmartCard reader and the mainboard must be checked, or the SmartCard reader must be replaced. While the error is present, access to the system is blocked.
Non-authorised SmartCard	The SmartCard cannot be used on this device. The SmartCard has been configured for a different device.
SystemLock installation FAILED:	An error occurred while installing *SystemLock*. Do not switch off the device, insert the "BIOS Flash diskette" instead. Perform a BIOS update and try the installation process again.
The SmartCard is blocked. *Enter the PUK:*	You have exceeded the maximum allowed number of incorrect PIN entries. The SmartCard is blocked. Enter the administrator PUK to re-activate the SmartCard. You must then enter a new User PIN to restart the system.

Trusted Platform Module - TPM

To use the TPM, you **must** activate the TPM in the *BIOS Setup* before the software is installed. The condition for this is that you have assigned at least the supervisor password (see "Security functions", Page 60).

Enabling TPM

- Requirement: You have set a supervisor password, see "Security functions", Page 60.

► Call up the BIOS Setup and select the *Security* menu.

► Mark the *TPM Security Chip Setting* field and press the Enter key.

► Select *Enabled* to activate the TPM.

↳ Once you have activated the TPM the *Clear Security Chip* option appears.

Select *Clear Security Chip* to delete the holder in the TPM. By clicking on *Enabled*, all secret keys (e.g. SRK - Storage Root Keys, AIK - Attestation Identity Keys etc.) generated by applications are deleted.

Please note that you will then no longer be able to access the data you have encrypted with the keys based on that holder.

► From the *Exit* menu, choose the option *Exit Saving Changes*.

► Press the enter key and select *Yes*.

↳ The notebook will restart, and TPM will be enabled after the reboot.

Disabling TPM

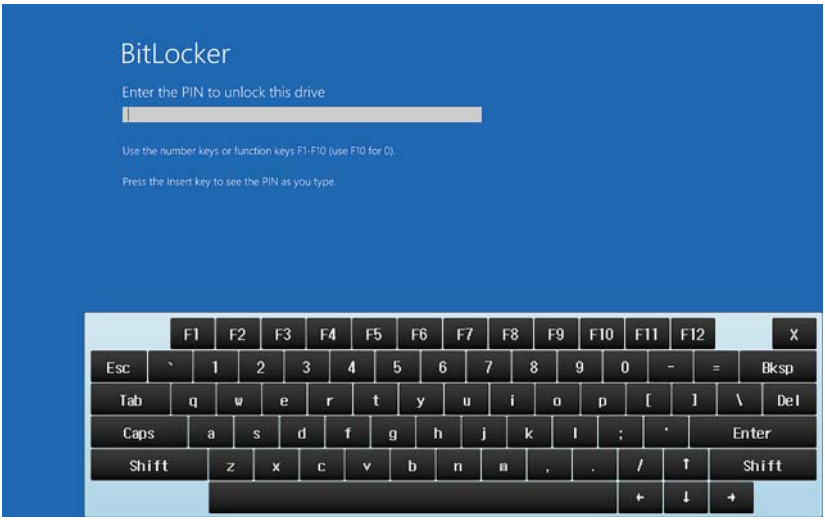
- Requirement: You have set a supervisor password, see "Security functions", Page 60.

► Call up the BIOS Setup and select the *Security* menu.
► Mark the *TPM Security Chip Setting* field and press the Enter key.
► Select *Disabled* to deactivate the TPM.
► In the *Exit* menu, choose the option *Exit Saving Changes*.
► Press the enter key and select *Yes*.
↳ Your notebook will now restart and TPM will be disabled.

Enable password entry using the on-screen keyboard (on-screen keyboard for BitLocker password)

If TPM is activated, in the BIOS Setup you can enable an on-screen keyboard for the internal touch screen.

► Call BIOS Setup and select the *Advanced* menu.
► Mark *Boot Configurations* and press the enter key.
► From the *UEFI Boot On-Screen Keyboard* selection, choose the option *Enable* or *Disable*.
► In the *Exit* menu, choose the option *Exit Saving Changes*.
► Press the Enter key and select *Yes*.
↳ The notebook restarts and the password dialogue is displayed.
Tap on the password field to enable the on-screen keyboard.



Connecting external devices

Always refer to the safety information provided in "Important notes", Page 12 before connecting or disconnecting any devices to or from your notebook.

Always read the documentation supplied with the device you wish to connect.

Never connect or disconnect cables during a thunderstorm.

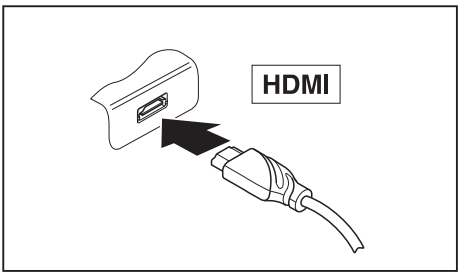
Never pull at a cable when disconnecting it. Always grasp the plug.

With some devices such as USB devices, it is not necessary to switch off the notebook and the device before connecting/disconnecting. For more information about whether or not devices need to be switched off, please refer to the documentation supplied with the external device.

Some of the external devices require special drivers (see the operating system and external device documentation).

HDMI port

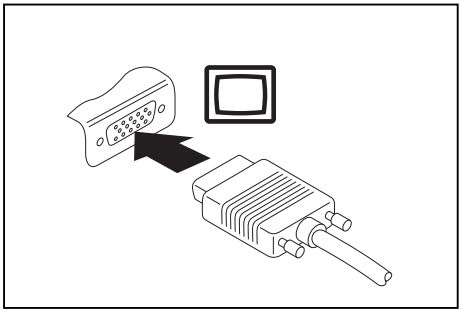
The HDMI port on your notebook can be used to connect an external amplifier, LCD TV or a plasma TV with an HDMI connection.



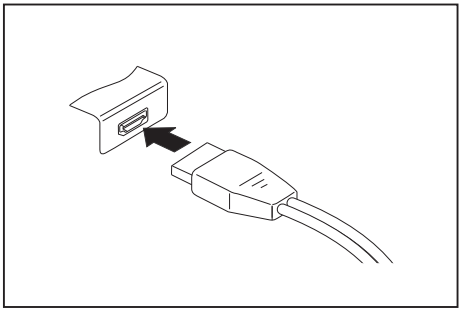
- ► Connect the data cable to the external device.
- ► Connect the data cable to the HDMI port of the notebook.

Connecting an external monitor

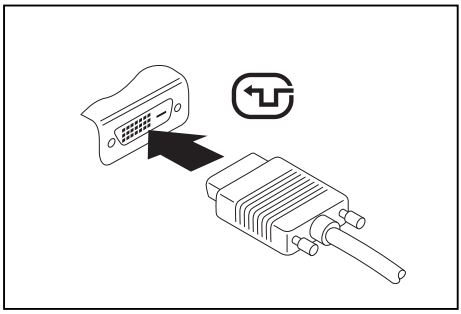
An analog screen is connected to the Notebook laptop or to the optional port replicator (VGA video graphics array screen connection). A digital screen is connected to the optional port replicator (display port or DVI-D Digital Visual Interface - Digital screen connection). The screen output is limited to a maximum of two screens at the same time (see "Key combinations", Page 42, section "Changing the screen output").



Analogue VGA monitor port (on notebook or on optional port replicator)



Digital display port (on the optional port replicator)



Digital DVI-D monitor port (on the optional Port Replicator)

- ► Switch off the notebook and the external monitor.
- ► Plug the data cable of the external monitor into the monitor port.
- ► First switch on the external monitor and then the notebook.

You can also switch between the external monitor and the LCD monitor of the notebook, see chapter "Key combinations", Page 42.

You can display the same picture on the external monitor and the notebook LCD monitor simultaneously.

Connecting USB devices

On the USB ports, you can connect external devices that also have a USB port (e.g. a DVD drive, a printer, a scanner or a modem).

USB devices are hot-pluggable. This means you can connect and disconnect devices while your operating system is running.

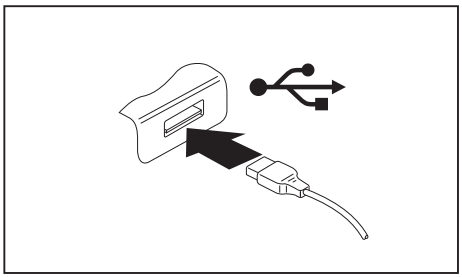
USB 1.x has a maximum data transfer rate of 12 Mbit/s.

USB 2.0 has a data transfer rate of up to 480 Mbit/s.

USB 3.0 has a data transfer rate of up to 5 Gbit/s.

USB 3.1 has a data transfer rate of up to 10 Gbit/s.

Additional information can be found in the documentation for the USB devices.



- ► Connect the data cable to the external device.
- ► Connect the data cable to a USB port of the notebook.

Device drivers

USB devices will be automatically recognised and installed by your operating system.

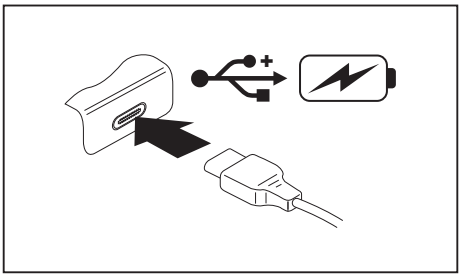
USB connection with charging function (USB Type-C™)

At this USB port, you can charge a connected USB device or operate devices without an additional power supply (e.g. a monitor or printer).

This is also possible with connected notebook computers by going to the *BIOS Setup Utility* under the menu *Advanced > Miscellaneous Configurations* and activating the function *USB Type-C Power Delivery on System-Off*. Instructions for how to call up and operate the *BIOS Setup Utility* can be found in section "Settings in BIOS Setup Utility", Page 96.

USB devices are hot-pluggable. This means you can connect and disconnect the cables of USB devices while the system is running.

Additional information can be found in the documentation for the USB devices.



- ► Connect the data cable to the external device.
- ► Connect the data cable to a USB port (USB Type-C™) of the notebook.

USB port with charging function (Anytime USB charge)

You can use this USB port to charge or supply power to a connected USB device (e.g. to charge a PDA or a mobile phone or to connect a USB lamp).

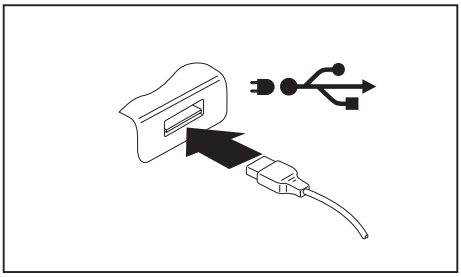
This is also possible when the Notebook laptop is switched off, if in the *BIOS-Setup-Utility* (BIOS: basic input-output system) in the menu *Advanced - Miscellaneous Configurations* the function *Anytime USB Charge* is activated. If the setting *AC* is selected, the device will only be charged when the mains adapter is connected.

Please refer to section "Settings in BIOS Setup Utility", Page 96 for a description of how to call up and operate the *BIOS-Setup-Utility*.

It is recommended that the notebook be operated with the power supply connected whenever the USB port with charging function is in use, as this function will drain the battery more quickly if an external USB device is being charged.

The power supply unit must already be connected when the notebook is switched off, as otherwise the USB charging function will be disabled and the connected USB devices will not be charged.

Some USB devices (e.g. mobile telephones) require a driver in order to utilise the USB charging function. In this case the USB charging function will not work when the notebook is switched off, as no drivers are active when the notebook is switched off.



- ► Connect the data cable to the external device.
- ► Connect the data cable to a USB port (Anytime USB charge) of the notebook.

How to remove USB devices correctly

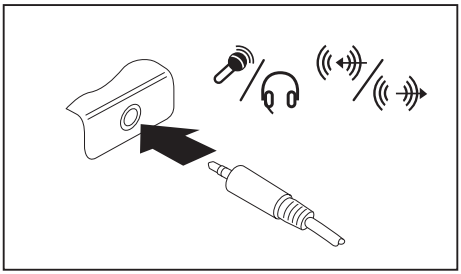
Always correctly remove the device according to the rules described below, to ensure that none of your data is lost.

- ► Left click on the icon to safely remove hardware, located in the taskbar.
- ► Select the device which you want to shut down and remove.
- ► Press the Enter key.

↳ Wait for the dialogue box which tells you that it is now safe to remove the device.

Headphones/microphone/Line-In/Line-Out/headset-combi port

Using the headphones/microphone/Line-In/Line-Out/headset-combi port, you can connect a headset, headphones, a microphone or external loudspeakers to your notebook.



- ► Connect the audio cable to the external device.
- ► Connect the audio cable to the headphone port of the notebook.
- ↳ The internal loudspeakers are disabled.

i

If you purchase a cable from a retailer, please note the following information:

The headphones/microphone/Line-In/Line-Out/headset-combi port on your notebook is a "3.5 mm jack".

If you want to connect headphones or a speaker you will need a "3.5 mm jack plug".

Removing and installing components during servicing

Only qualified technicians should repair your notebook. Unauthorised opening or incorrect repair may greatly endanger the user (electric shock, fire risk) and will invalidate your warranty.

After consulting the Hotline/Service Desk, you may remove and install the components described in this chapter yourself.

If you remove and install components without consulting the Hotline/Service Desk, then the warranty of your notebook will be voided.

Notes on installing and removing boards and components

- Switch the notebook off and pull the power plug out of the mains socket.
- Always remove the battery.
- Take care when you use the locking mechanisms on the battery and any other component.
- Never use sharp objects such as screwdrivers, scissors or knives as leverage to remove covers.

Boards with electrostatic sensitive devices (ESD) are marked with the label shown.

When handling boards fitted with ESDs, you must always observe the following points:

- You must always discharge static build up (e.g. by touching a grounded object) before working.
- The equipment and tools you use must be free of static charges.
- Remove the power plug from the mains supply before inserting or removing boards containing ESDs.
- Always hold boards with ESDs by their edges.
- Never touch pins or conductors on boards fitted with ESDs.

Preparing to remove components

If you are going to remove or change system components, prepare for the removal as follows:

Please observe the safety information in chapter "Important notes", Page 12.

Remove the power plug from the mains outlet !

► Switch the device off.

The device must not be in energy-saving mode !

► Close the LCD screen.
► Remove all the cables from the device.
► Turn the device over and place it on a stable, flat and clean surface. If necessary, lay an anti-slip cloth on this surface to prevent the device from being scratched.
► Remove the battery (see "Removing the battery", Page 46).

Installing and removing memory expansion

If you are asked by the Hotline/Service Desk to remove and install the memory expansion yourself, proceed as follows:

Please observe the safety information in chapter "Important notes", Page 12.

When installing/removing memory modules, the battery must be removed from the notebook and the notebook must not be connected to the power supply, see "Preparing to remove components", Page 88.

Only use memory expansion modules that have been approved for your notebook (see "Technical data", Page 108).

Never use force when installing or removing a memory extension.

Make sure that foreign objects do not fall into the memory extension compartment.

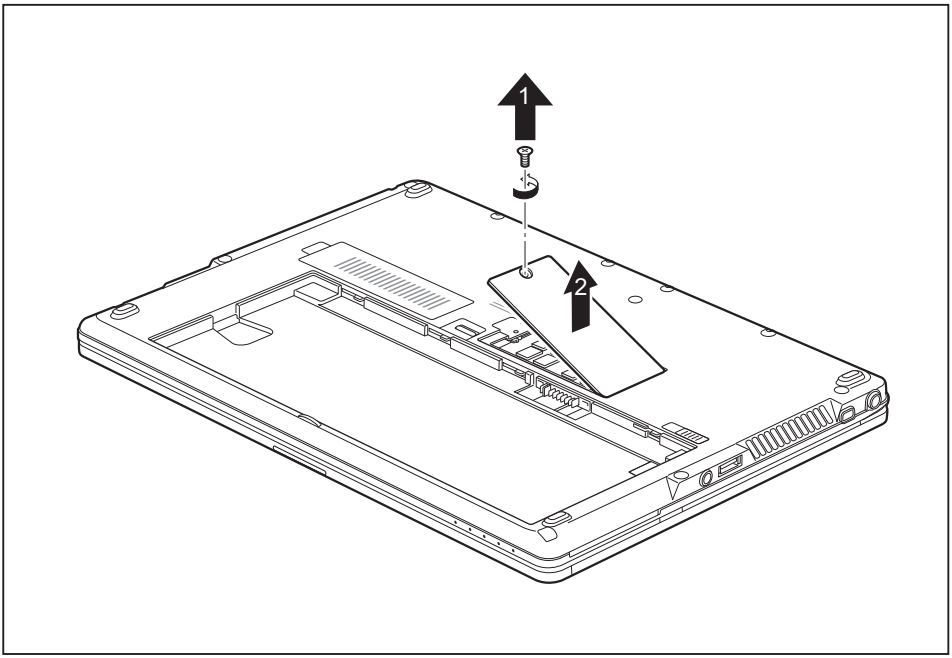
You must open the service compartment to remove or install a memory module. On some devices, opening the compartment may expose other components. These components should be removed and replaced only by authorised specialists. Therefore, be sure to observe the following:

Individual components can become very hot during operation. Therefore, we recommend that you wait one hour after switching off the notebook before removing or installing memory modules. Otherwise, there is a risk of suffering burns!

As some components are exposed that are sensitive to static electricity, please take note of chapter "Notes on installing and removing boards and components", Page 87.

Removing a cover

► Prepare for removal, see "Preparing to remove components", Page 88.

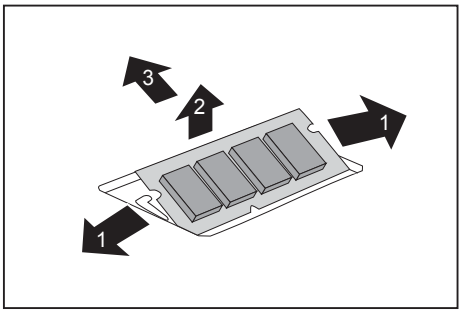


► Remove the screw (1).

Keep the screw in a safe place.

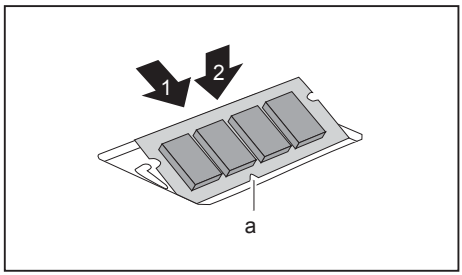
► Lift the cover off the notebook (2).

Removing memory modules



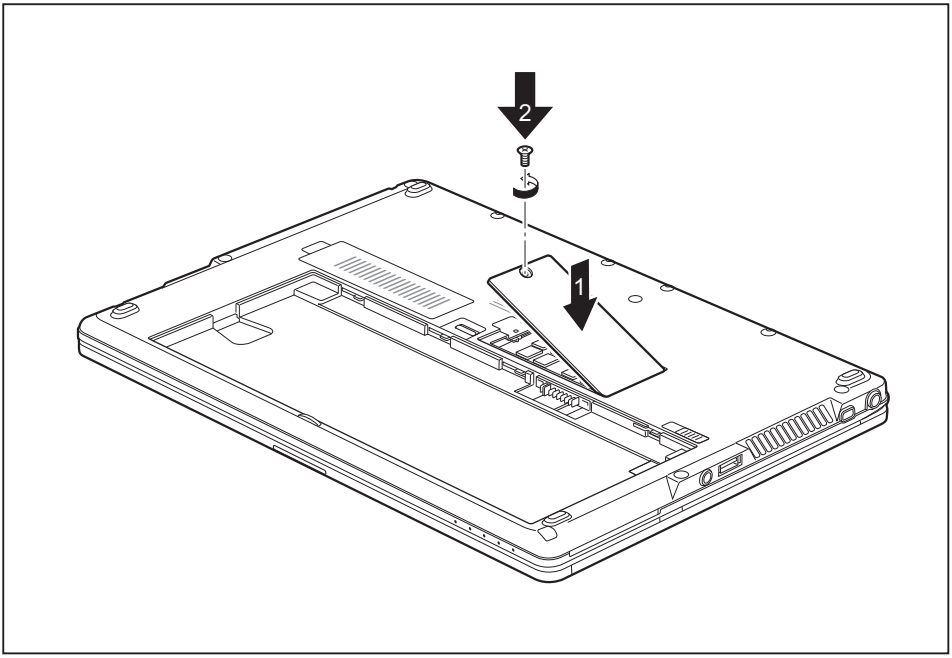
- ► Carefully push the two mounting clips outwards (1).
- ↳ The memory module snaps upwards (2).
- ► Pull the memory module out of its slot in the direction of the arrow (3).

Installing a memory module



- ► Insert the memory module with the contacts and the recess (a) facing the slot (1).
- ► Carefully push the memory module downwards until you feel it click into place (2).

Attaching the cover

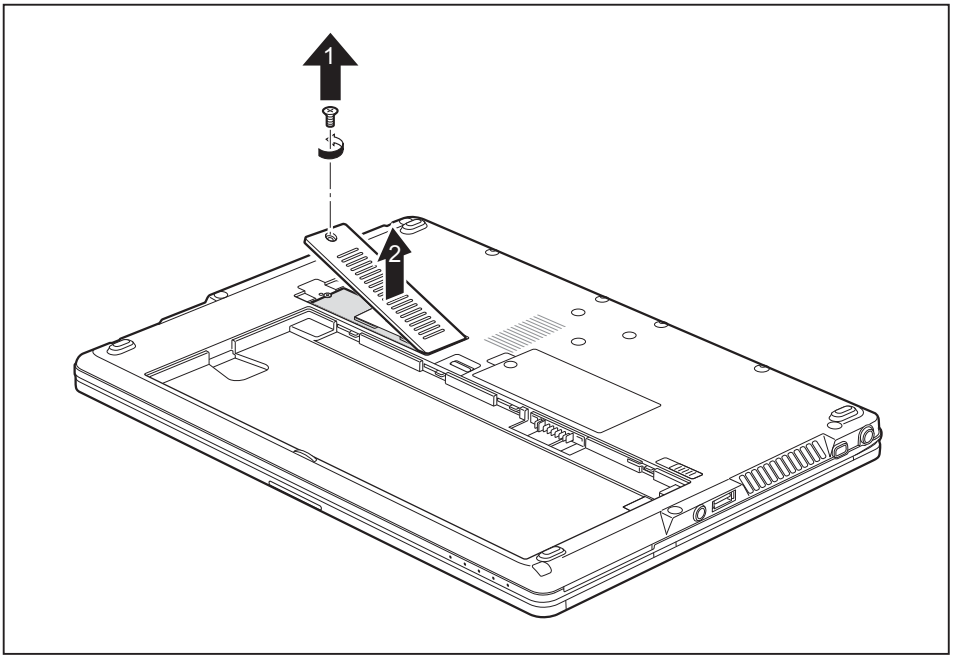


► Place the cover in the correct mounting position (1).
► Tighten the screw (2).
► Complete the installation, see "Finishing component removal", Page 95.

Installing and removing an M.2 module

Removing a cover

► To prepare to remove this module, see "Preparing to remove components", Page 88.



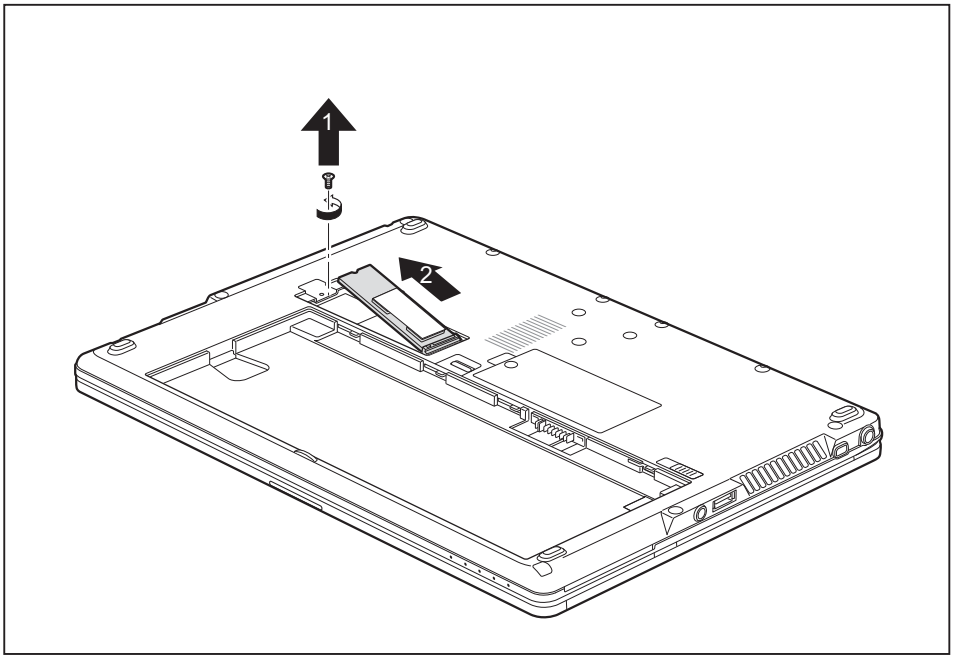
► Remove the screw (1).

Keep the screw in a sensible place where you'll be sure to find it. If you want to remove several components at the same time, keep the screws for these individual components separate from each other. If you insert the wrong screw into a component, you might damage the component.

The screws do not all have the same length, and the correct screw must be used when fitting the cover.

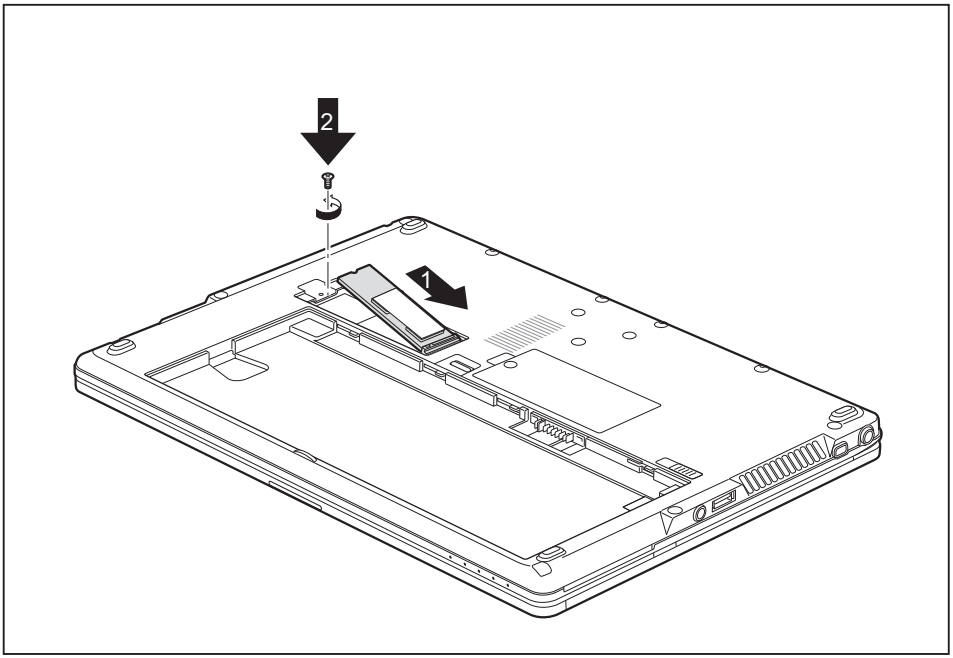
► Lift the cover off the notebook (2).

Remove the M.2 module



- ► Loosen the screw (1).
- ► Pull the M.2 module in the direction of the arrow (2) out from its slot on the mainboard and remove it from the casing.

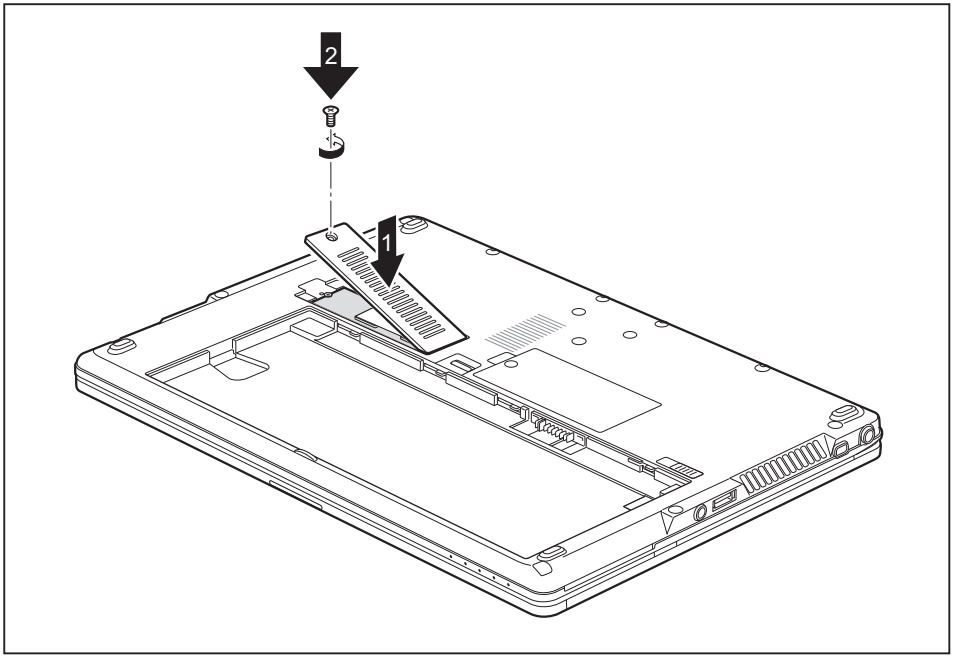
Install the M.2 module.



► Insert the M.2 module in the direction of the arrow (1) in a slightly diagonal position into its slot on the mainboard.

► Secure the M.2 module with the screw (2) in its installation slot.

Attaching the cover



- ► Put the cover back in place (1).
- ► Fasten the screw (2).
- ► Complete the installation, see "Finishing component removal", Page 95.

Finishing component removal

After you have removed or changed the system components as you required, please prepare your device for operation again as follows:

- ► Install the battery again (see "Inserting battery", Page 47).
- ► Turn the notebook the right way up again and place it on a flat surface.
- ► Reconnect the cables that you disconnected before.

Settings in BIOS Setup Utility

The *BIOS Setup Utility* allows you to set the system functions and the hardware configuration for the notebook.

When it is delivered, the notebook is set to factory default settings. You can change these settings in *BIOS Setup Utility*. Any changes you make take effect as soon as you save and exit the *BIOS Setup Utility*.

The *BIOS Setup Utility* program contains the following menus:

About	Displays information relating to the BIOS, processor and notebook
System	Advanced system settings
Advanced	Configuration of various hardware components, such as mouse, keyboard, processor
Security	Password settings and security functions
Boot	Configuration of the start-up sequence
Exit	Exits the *BIOS Setup Utility*

Starting the BIOS Setup Utility

► Reboot the device (switch off/on or reboot the operating system).

↳ Depending on the *Fast Boot* setting in the *BIOS Setup utility*, the following information may appear on the screen during start:

```
<F2> BIOS Setup <F12> Boot Menu
```

► Press the function key F2.

► If a password has been assigned, enter the password and press the Enter key.

If you have forgotten the password, contact your system administrator or contact our customer service centre.

The *BIOS Setup Utility* starts.

Operating BIOS Setup Utility

Press the F1 key to display help on the operation of the *BIOS Setup Utility*. The description of the individual settings is shown in the right-hand window of the *BIOS Setup Utility*.

With the F9 key you can load the default settings of the *BIOS Setup Utility*.

- ► Use the cursor keys ← or → to select the menu you wish to access to make changes.
- ↳ The menu is displayed on the screen.
- ► Select the option you want to change with the cursor keys ↑ or ↓.
- ► Press the Enter key.
- ► Press the ESC key to exit the selected menu.
- ► For future reference, make a note of the changes you have made (for example, in this manual).

Exiting BIOS Setup Utility

You need to select the desired option in the *Exit* menu and activate it by pressing the Enter key:

Exit Saving Changes - save changes and exit BIOS Setup Utility

► To save the current menu settings and exit the *BIOS Setup Utility*, select *Exit Saving Changes* and *Yes*.

↳ The notebook is rebooted and the new settings come into effect.

Exit Discarding Changes – Discard changes and exit BIOS Setup Utility

► To discard the changes, select *Exit Discarding Changes* and *Yes*.

↳ The settings in place when *BIOS Setup Utility* was called remain effective. *BIOS Setup Utility* is terminated and the notebook is rebooted.

Load Setup Defaults – Copy Standard Entries

► To copy the standard entries for all menus of the *BIOS Setup Utility*, choose *Load Setup Defaults* and *Yes*.

Discard Changes – Discard changes without exiting the BIOS Setup Utility

► To discard the changes you have made, select *Discard Changes* and *Yes*.

↳ The settings in place when *BIOS Setup Utility* was called remain effective. You can now make additional settings in the *BIOS Setup Utility*.

► If you want to exit*BIOS Setup Utility*with these settings, select *Exit Saving Changes* and *Yes*.

Save Changes - save changes without exiting the BIOS Setup Utility

► To save the changes, select *Save Changes* and *Yes*.

↳ The changes are saved. You can now make additional settings in the BIOS Setup Utility.

► If you want to exit BIOS Setup Utility with these settings, choose *Exit Saving Changes* and *Yes*.

Save Changes and Power Off

► To save the changes and switch off your device, select *Save Changes and Power Off* and *Yes*.

↳ The changes are saved. Your device is shut down.

Troubleshooting and tips

Follow the safety notes in the "Safety/Regulations" manual when connecting or disconnecting cables.

If a fault occurs, try to correct it as described. If you fail to correct the problem, proceed as follows:

- ► Make a note of the steps and the circumstances that led to the fault. Also make a note of any error messages displayed.
- ► Switch the notebook off.
- ► Please contact the Hotline/Service Desk.

The telephone numbers can be found at: "http://support.ts.fujitsu.com/contact/servicedesk". Have the following information ready when you call:

- The model name and serial number of the notebook. The serial number is located on a sticker on the underside of the notebook.
- Notes of any messages that appear on the screen and information on acoustic signals.
- Any changes you have made to the hardware or software since receiving the notebook.
- Any changes you have made to the *BIOS Setup* settings since receiving the notebook.
- Your system configuration and all peripheral devices connected to your system.
- Your sales contract.

Our notebooks have been designed primarily with mobile applications in mind. This means that considerable effort has been made to optimise components and equipment in terms of weight, space and energy requirements. Depending on the particular configuration you have purchased, it is possible that functionality may be slightly reduced compared to a desktop PC if you are running processor-intensive gaming software, e.g. games with intensive 3D graphics. Updating your hardware with drivers which have not been approved by Fujitsu Technology Solutions may result in performance losses, data losses or malfunction of the equipment. A list of approved drivers and current BIOS versions can be downloaded from: "http://support.ts.fujitsu.com/Download/Index.asp"

Help if problems occur

Should you encounter a problem with your computer that you cannot resolve yourself:

- ► Note the ID number of your device. The ID number is found on the type rating plate on the back or underside of the casing.
- ► Contact the Service Desk responsible for your country for clarification of the problem: "http://support.ts.fujitsu.com/contact/servicedesk". When you do this, please have ready the ID number and serial number of your system.

The notebook's date or time is incorrect

Cause	Troubleshooting
Time and date are incorrect.	► With the *BIOS-Setup-Utility*, you can set the date and time in the *main* menu.
If the time and date are still set incorrectly after switching on the notebook.	► Please contact your sales outlet or our Hotline/Service Desk.

Battery indicator does not illuminate

Cause	Fault elimination
The battery is not installed correctly.	► Switch the notebook off. ► Check whether the battery is installed correctly in its compartment. ► Switch the notebook on.
The battery is not being charged.	► Connect the Tablet PC to a mains outlet using the mains adapter. **Note:** The battery will only be charged again when the battery capacity is less than 90 %.

When certain characters are entered on the keyboard, only numerals are written

Cause	Troubleshooting
The virtual numeric keypad of your device is activated, see "Virtual numeric keypad", Page 41	► Press the Num key.

The notebook's LCD screen remains blank

Cause	Troubleshooting
Monitor is switched off.	► Press a key or touch the touchpad.
External monitor or television set connected.	► Press the key combination to switch the screen output, see "Key combinations", Page 42.

The LCD screen is difficult to read

Cause	Troubleshooting
Reflected glare	► Turn the notebook or alter the tilt of the LCD screen. ► Increase the brightness of the screen.

The external monitor remains blank

Cause	Troubleshooting
Monitor is switched off.	► Switch the external monitor on.
Power saving has been activated (monitor is blank).	► Press any key to continue.
Brightness is set to dark.	► Adjust the brightness of the monitor.
Screen output is set to the notebook's LCD screen	► Press the key combination to switch the screen output, see "Key combinations", Page 42.
The external monitor's power cable or data cable is not connected properly.	► Switch off the external monitor and the notebook. ► Check whether the power cable is plugged properly into the external monitor and into the power socket. ► Check whether the data cable is properly connected to the notebook and the external monitor (if it is plugged in with a connector). ► Switch on the external monitor and the notebook.

The external monitor is blank or the image is unstable

Cause	Troubleshooting
The wrong external monitor has been selected or the wrong screen resolution has been set for the application program.	► Terminate the application program in Windows by pressing Alt + F4. If the fault persists after closing the program, use the key combination for switching the screen output (see "Key combinations", Page 42) to switch over to the notebook's LCD screen. Change the following setting: ► Set the screen resolution: Set the screen resolution as described in the documentation for your operating system. ► Select monitor: Select monitor 1 or 2 as described in the documentation for your operating system.

The cursor does not correctly follow the pen movements

Cause	Fault elimination
Pen incorrectly calibrated	► Calibrate the pen as shown under *Hardware and Sound / Tablet PC Settings* in the Control Panel, see "Setting the pen", Page 35 and "Calibrating the pen", Page 35.

Pen input not working

Cause	Troubleshooting
Incorrect driver installed.	► If your device is one which can only be operated using the pen, install the driver for the standard model. **or** ► If your device is one which can be operated using the pen and by finger, install the driver for the "Dual Digitizer" model.
The pen is in power-saving mode.	► Press the pen button gently to wake the pen from sleep mode.
The pen battery is completely discharged.	► Insert the pen fully into its slot on the notebook to charge the pen battery.

The notebook cannot be started

Cause	Troubleshooting
The battery is not installed correctly.	► Check whether the battery is installed correctly in its compartment. ► Switch the notebook on.
The battery is dead.	► Charge the battery. **or** ► Insert a charged battery. **or** ► Connect the mains adapter to the notebook.
The power adapter is not connected correctly.	► Check whether the mains adapter is connected correctly to the notebook. ► Switch the notebook on.

The notebook stops working

Cause	Troubleshooting
Notebook is in energy saving mode.	► Leave energy saving mode.
An application programme has caused the malfunction.	► Close the application program or restart the notebook (by restarting the operating system or switching the device off and back on again).
The battery is dead.	► Charge the battery. **or** ► Insert a charged battery. **or** ► Connect the mains adapter to the notebook.

The printer does not print

Cause	Troubleshooting
The printer is not switched on.	► Make sure that the printer is switched on and ready for operation (refer to the documentation supplied with the printer).
The printer is not connected correctly.	► Check that the data cable connecting the notebook to the printer is properly connected.
The printer driver is faulty or not correctly installed, or it is the wrong printer driver.	► Check that the data cable connecting the notebook to the printer is properly connected. ► Check whether the correct printer driver is loaded (refer to the printer documentation).

The wireless connection to a network does not work

Cause	Troubleshooting
The wireless component is disabled.	► Switch the wireless component on (see "Switching the wireless components on and off", Page 53).
The wireless component is enabled. Despite this, the wireless connection to a network does not work.	► Check whether the wireless connection is switched on via the software. ► Further information on using the wireless component can be found in the help files.

The battery discharges too quickly

Cause	Troubleshooting
The battery is either too hot or too cold. In this case the battery indicator flashes.	► Bring the notebook up/down to a normal temperature again. ► If the operating time of the battery life is extremely short, the battery is probably too old. Replace battery if necessary.
You may have an application running that consumes a great deal of power due to frequent accessing of the hard disk or optical drive.	► Use the mains adapter as frequently as possible.
The maximum brightness may have been set for the screen.	► Set the screen slightly darker with the key combination for *Decreasing the screen brightness* in order to reduce the amount of power being drawn.

SmartCard reader is not recognised.

Cause	Troubleshooting
Chip card inserted incorrectly.	► Make sure you have inserted your SmartCard into the SmartCard reader with the chip facing upwards/downwards (device-dependent). ► Check whether the SmartCard you are using is supported. Your SmartCard must comply with the ISO standard 7816-1, -2, -3 and -4.

SmartCard PIN forgotten

Cause	Troubleshooting
PIN forgotten	► If you are working in a network, contact your system administrator, who can unlock your notebook with a Supervisor PIN.

SmartCard lost

Cause	Troubleshooting
SmartCard lost	► If you are working in a network, contact your system administrator, who can boot up your notebook with a Supervisor SmartCard.

User and/or supervisor SmartCard lost

Cause	Troubleshooting
User and/or supervisor SmartCard lost	► If you have lost your User SmartCard, you can continue working with the Supervisor SmartCard and initialise a new User SmartCard or deactivate the SystemLock function. ► If you have lost the Supervisor SmartCard, you can continue working, but you no longer have all your rights and can no longer initialise a Supervisor SmartCard. ► If you have lost both SmartCards, you can no longer boot your system. Please contact our Service Desk. You must provide proof of ownership for the device. Then the Service Desk will refer you to our service partner, who will unlock your device (for a charge).

Acoustic warnings

Cause	Troubleshooting
A beep sounds every few seconds. The battery is almost flat.	► Charge the battery.

Error messages on the screen

This section describes the error messages generated by the BIOS Setup. Error messages displayed by the operating system or programmes are described in the relevant documentation.

If the error message appears repeatedly, despite troubleshooting measures, please contact the place of purchase or our customer service centre.

Error message/cause	Resolution
CMOS battery bad If the error message occurs repeatedly, the buffer battery in the notebook is flat.	► Contact your sales outlet or our customer service centre.
System CMOS checksum bad - default configuration used The system configuration information is incorrect.	► Switch the notebook off. ► Switch the notebook on. ► Press the function key F2 to access the *BIOS Setup*. ► In the *BIOS Setup*, select the *Exit* menu. ► Select the entry *Load Setup Defaults*. ► Select *OK* and press the Enter key.
Extended memory failed at offset: xxxx Failing Bits: zzzz zzzz When testing the extended memory an error has resulted at the address xxxx.	► Check whether the additional memory module has been inserted correctly.
Failure Fixed Disk n The settings of the hard disk drive are incorrect.	► Start the *BIOS Setup* (*Primary Master* submenu) and select the correct settings.
Keyboard controller error	► Switch the notebook off using with the ON/OFF button. ► Wait 3 - 5 seconds and switch on the notebook again.
Keyboard error	If you are using an external keyboard: ► Check the connection and reboot the notebook.
nn Stuck key	► Make sure that no key is pressed.
Operating system not found	► Check in the *BIOS Setup* whether your hard disk has been set correctly. ► Make sure that the operating system is installed on the corresponding drive.
Press <F1> to resume, <F2> to SETUP This error message appears if an error occurs during the self-test before starting the operating system.	► Press the F1 function key to start the operating system. ► Press the function key F2 to access the *BIOS Setup*.

Error message/cause	Resolution
Previous boot incomplete - Default configuration used Due to an error during the previous system boot, default values were used for certain settings. Check the settings in the BIOS Setup.	► Press the F1 function key when prompted to do so.
Real time clock error	► Contact your sales outlet or our customer service centre.
nnnnK Shadow RAM failed at offset: xxxx Failing Bits: zzzz	► Contact your sales outlet or our customer service centre.
System battery is dead - Replace and run SETUP	► Contact your sales outlet or our customer service centre.
System cache error - Cache disabled	► Contact your sales outlet or our customer service centre.
System timer error	► Contact your sales outlet or our customer service centre.

Restoring the contents of the hard disk under Windows

Restoring the system under Windows 10

If necessary, you can reset your system to the original state of the hard disk.

► Beginning at the right edge of the Windows Start screen or the desktop, use a finger to sweep over the screen to open the *Action Centre*.

► Select *All settings*.

► Select *Update & security*.

► Select *Recovery*.

► Select according to your requirements from the options given.

Technical data

Notebook

General	
Processor	7th Generation Intel® Core™ laptop with vPro™ technology (vPro depending on the configuration)
Main memory (SO DIMM)	Maximum 16 GByte DDR4 1 slot for 4, 8 or 16 Gbyte module
Electrical data	
Safety regulations complied with	CE
Protection class	II
Maximum power consumption (with the notebook switched on and the battery charging):	65 W (without the port replicator) / 90 W (with the port replicator)
LCD screen	
Size	33.78 cm / 13.3" TFT (thin film transistor flat screen) FHD (full high-definition) or HD Glare/Anti-Glare (depending on the configuration)
Resolution	FHD: 1920 x 1080 pixels HD (high-definition): 1366 x 768 pixels 32 bit
Pixel class	II
Brightness control	11 levels
Technology	Wide-View High-Bright display with LED background lighting
Digitizer and glass panel	• Dual Digitizer / touch and pen support • Toughened glass
Camera	HD (high-definition), with status display
Graphics card	
Chip	Intel® HD Graphics 620
Maximum resolution on external display:	HDMI: 4096 x 2160 pixels
Dimensions	
Width x depth x height	318 mm x 224 mm x 19.8 mm / 12.52 inches x 8.82 inches x 0.78 inches
Weight depending on configuration	Basic weight 1.3 kg / 2.87 lbs
Input devices	
Keyboard	85 keys with backlit keyboard
Touchpad	2 keys
Pen	2 pen buttons
Slots	

Memory card slot	1 x SD Card
SmartCard slot	1 x
SIM card slot	1 x
Ports	
HDMI port	1 x
VGA (video graphics array) connection	1 x
LAN port	Socket, RJ45
Microphone port / Line In / headphones port / Line Out	3.5 mm stereo mini jack
Docking port	1 x
USB (Universal Serial Bus)	3 x USB (1 x USB 3.0, 1 x USB 3.0 with a charging function (Anytime USB charge), 1 x USB 3.0 with a charging function (USB Type-C™))
Security Lock	1 x
Ambient conditions	
Environment class DIN IEC 721	7K1
Mechanism class DIN IEC 721	7M2
Operating temperature	5°C to 35°C / 41°F to 95°F
Transport temperature (2K2)	-15°C to 60°C / 5°F to 140°F

Port Replicator (optional)

Electrical data	
Safety regulations complied with	CE
Protection class	II
Ports	
Monitor port (analogue)	15-pin
Monitor port (digital)	25-pin, DVI-D
Display port	1 x
Maximum resolution of an external monitor	VGA, DVI: 1920 x 1200 pixels Display port: 2560 x 1600 pixels
LAN port	RJ45
USB (Universal Serial Bus)	3 x USB 3.0 1 x USB 3.0 (USB Type-C™)
Audio	Headphone port
Docking port	1 x
Security Lock	2 x
Ambient conditions	
Environment class DIN IEC 721	7K1
Mechanism class DIN IEC 721	7M2
Operating temperature	5°C to 35°C / 41°F to 95°F
Transport temperature	-15°C to 60°C / 5°F to 140°F

Rechargeable battery

You will find information on the batteries used in your device on the Internet at "http://www.fujitsu.com/fts/support/".

Rated voltage	14.4 V
Rated capacity	50 Wh
Nominal power	3490 mAh

The operating time depends on the device configuration, the active applications and the energy-saving settings.

Mains adapter for use with the notebook and port replicator

The following technical data applies to the mains adapter supplied with the notebook and to the port replicator which you can order optionally.

Primary	
Rated voltage	100 V to 240 V (automatic)
Rated frequency	50 Hz to 60 Hz (automatic)
Max. rated current	0.7 A to 1.2 A
Secondary	
Nominal power	65 W / 90 W
Rated voltage	19 V
Max. rated current	3.42 A / 4.74 A

An additional mains adapter or power cable can be ordered at any time.

Manufacturer’s notes

Disposal and recycling

You can find information on this subject on your notebook or on our website ("http://www.fujitsu.com/fts/about/fts/environment-care/").

Declarations of Conformity

The "Declarations of Conformity" for the device can be found on the Internet at: "http://globalsp.ts.fujitsu.com/sites/certificates/default.aspx".

Fujitsu Technology Solutions hereby declares that your device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Electrical safety including ergonomic requirements (GS, depending on the device)

Please refer to the associated data sheet to establish whether the model variant of your device has GS certification. You can find further information on the Internet at "http://www.fujitsu.com/fts/products/computing/pc/tablets/datasheets".

Intended viewing distance	300 mm as a hand-held product. A monitor and a keyboard should be connected externally for use in an office.

CE marking

The shipped version of this device complies with the requirements of EC directives 2004/108/EC "Electromagnetic compatibility", 2006/95/EC "Low voltage directive", 2011/65/EU "RoHS directive" and 2009/125/EC "ecodesign directive" (from 20/04/2016: 2014/30/EC "Electromagnetic Compatibility" and 2014/35/EC "Low Voltage Directive").

CE marking for devices with radio component

This equipment complies with the requirements of Directive 1999/5/EC of the European Parliament and Commission from 9 March, 1999 governing Radio and Telecommunications Equipment and mutual recognition of conformity.

CE nnnn (!) ; nnnn: For digits and exclamation mark (!), see label on the product.

The product complies with the legal limits for SAR in the EU.

You can find more information and declarations of conformity on the Internet at: "http://globalsp.ts.fujitsu.com/sites/certificates".

This equipment can be used in the following countries:

Belgium	Bulgaria	Denmark	Germany
Estonia	Finland	France	Greece
UK	Ireland	Iceland	Italy
Latvia	Liechtenstein	Lithuania	Luxembourg
Malta	Netherlands	Norway	Austria
Poland	Portugal	Rumania	Sweden
Switzerland	Slovakia	Slovenia	Spain
Czech Republic	Hungary	Cyprus	Croatia
Turkey			

Limitation in France: The use of WLAN in the 5 GHz band is not permitted outdoors.

Contact the corresponding government office in the respective country for current information on possible operating restrictions. If your country is not included in the list, then please contact the corresponding supervisory authority as to whether the use of this product is permitted in your country.

The CE conformity declaration covers accessories (e.g. mains adapters, batteries, cable adapters) and software (e.g. module drivers, module firmware and operating system). The software used and affecting compliance is purchased by the module vendors and is under their sole control.

Radio frequencies used

	RF module	Frequency band	Max. transmission power
1	BT	2400-2480 MHz	100 mW
2	WLAN	2410-2480 MHz	100 mW
3	WLAN	5150-5350 MHz class 2	200 mW
4	WLAN	5470-5725 MHz class 1	1 W
5	GSM	850 MHz, 900 MHz	2 W
6	LTE	2100 MHz, 2600 MHz	500 mW
7	LTE	850 MHz, 900 MHz	2 W

Other certification markings

Any other certification markings are listed in the "Manual Appendix - Additional Certifications" supplement.

If such markings are available, you can find the supplement on the Internet at "http://support.ts.fujitsu.com/Manuals/" with the Operating Manual for your device.

Index