

NEC Factory Computer  
FC-Note Series

**ShieldPRO**

FC-N21S



**Even stronger and easier-to-use. An advanced, robust notebook.**

- A shield design which performs even in harsh environments
  - Wide operating temperature range from -20°C to 45°C (choose from selection menu)
  - IP54-compliant splash and dust resistance
  - Improved impact and vibration resistance
  
- Ease of use for fieldwork
  - Convertible specifications
  - Fitted with a 12.1" TFT colour LCD (with touchscreen on all models)
  - 2.5Kg lightweight body
  - Equipped with an array of security functions

<http://www.nec.co.jp/fc/>

Even stronger in the field.

The advanced, robust FC-N21S notebook.



NEC’s robust notebook is capable of operating even in harsh fields. The new FC-N21S has achieved a durability that surpasses previous models. It has convertible specifications which enable you to change between a notebook and a tablet to suit your use. With a lightweight body and an array of security functions it really is easy to use. Whether field maintenance or construction and building sites, it operates as an information terminal in a variety of fields.

Main applications

Outdoor operations terminal	Electricity, gas, waterworks, communications, railroads, construction, etc
Inspection/maintenance terminal	In-house facilities, all types of maintenance equipment, etc
In-vehicle terminal	Police, firefighting, transport, heavy machinery, etc

## A robust design that operates in harsh locations

- A wide operating temperature range from -20°C to 45°C

The wide temperature range HDD equipped model can operate from -20°C to 45°C. With the standard HDD the range is 5°C to 45°C.

- A highly reliable fan-less design

- An impact-resistant design that has withstood a drop-test from 90cm.

A magnesium diecast alloy is used in the case and the device is fitted with a hard disk drive that is protected even further against impact. Strength has been achieved that has withstood a drop test onto plywood and concrete from a height of 90cm.

\* This is not a guarantee that this product will not break or malfunction.

- A vibration resistant design capable of in-vehicle use

- An IP54-compliant splash and dust resistant design

Confidentiality about all of the equipment has been improved. The design prevents the infiltration of water and dust from anywhere. This device is capable of being used outside in the rain or being handled with wet or dirty hands.



## Durability, resistance, reliability - all validated by testing

\* Refer to the installation environment requirements for information on the evaluation parameters for each test.

■ Splash resistance test (IP54 compliant) While turned off, water is sprayed onto the device from all directions for 5 minutes at a rate of 10ℓ/min.



### ■ Impact test

While turned on, the device is subjected to half sine wave impacts at a peak value of 147 m/s<sup>2</sup> (15G) and a cycle of 11 ms.

While turned off, the device is subjected to half sine wave impacts with a peak value of 490 m/s<sup>2</sup> (50G) and a cycle of 11 ms.

### ■ Dust resistance test (IP54 compliant)

While turned on, the device is left for 8 hours inside a machine decompressed to 2KPa in which talcum powder was circulating



■ Drop test

● Onto plywood

While turned off, the device is dropped once from a height of 90 cm onto plywood on each face, side and corner for a total of 26 drops.

● Onto concrete

While turned off, the device is dropped once from a height of 90 cm onto concrete on each face for a total of 6 drops.



■ Vibration test

● Sine wave vibration (vibration time 56 minutes)

While turned on, the device is subjected to vibration at the following frequencies: 10 – 55 Hz: 0.075 mm (0-P), 55 Hz – 500 Hz: 9.8 m/s<sup>2</sup> (0-P).

While turned off, the device is subjected to vibration at the following frequencies: 10 – 55 Hz: 0.15 mm (0-P), 55 Hz – 500 Hz: 19.6 m/s<sup>2</sup> (0-P).

● Random wave vibration (vibration time 60 minutes)

While turned off, the device is subjected to vibration at the following frequencies: 20 Hz – 1000 Hz: 0.04 G<sub>rms</sub>, 1000 Hz – 2000 Hz: -6dB/Octave.

## Realising excellent ease of use in the field

### ■ Convertible specification

The specifications can change from a notebook-type/tablet-type (vertical) to a tablet type (horizontal) to match your intended use.



### ■ Fitted with LED backlit LCD

Through the use of an LED backlit LCD (12.1”) you start with a bright screen image when booting up in a low temperature environment.

### ■ Touchscreen as standard

A touchscreen is standard in all models. You can use not only a pen but also your finger to navigate. A real contribution to user-friendliness in the field.

### ■ 3 USB ports as standard

3 USB 2.0 ports are fitted as standard. Of these, one port uses an improved hot-swap-resistant USB connector which has supported 10,000 hot-swaps.

## A lightweight design that improves functionality in the field

### ■ A 2.5kg lightweight body

A light, durable magnesium diecast alloy is used in the case and the high-density design of the sub-composites has enabled the substrate to be streamlined. Even with the addition of a 12.1” display we have achieved a lightweight 2.5kg body.



**Equipped with an array of security features to prevent information leaks**

■ **Fingerprint recognition**

(Choose on the selection menu)

Fingerprint recognition equipped models are fitted with a fingerprint sensor (line model) which enables personal recognition. Windows® XP (English version/Swedish Version) pre-installed models may use the following functions:

- Windows Log-on
- Screensaver unlocking
- Alternative application passwords



The device contains a security chip called TPM (Trusted Platform Module) which complies with security specifications as defined at the TCG (Trusted Computing Group). By using the TPM for storage and management of information such as encryption keys that was previously stored on the HDD, we achieve solid security against the remote threat of theft of the HDD.

※ Only available with Windows® XP (English version/Swedish Version). It is necessary to install the attached software.

■ **Anti-theft lock**

Thefts are prevented by using a marketplace security cable.

**A large capacity battery that gives 8 hours of life**

■ **Large capacity battery**

The device uses a large capacity battery that gives approximately 3 – 8 hours of life (with the standard battery). This reduces the need to change the battery during field work.

- ※ 3 hour … Max Brightness,  
Connecting peripheral equipment (USB x 3 , CD-ROM Drive)

■ **Power-saving design**

The device uses a low-energy-consumption CPU and LCD. It is due to this power-saving design that its long operating time is achieved.

Selection menu When you purchase the FC-N21S, please choose from the following to fit your application.

● **Windows® XP Pre-install model**

Series name	Selection menu				
Body (base)	Keyboard	OS	Memory Capacity	Language	Disk / Battery Fingerprint recognition
<b>FC-N21S</b> <b>CPU</b> Intel® Core™ Solo Processor Ultra Low Voltage U1400 (1.20GHz) <b>Memory x 2 slots</b> <b>PC Card x 1 slot</b> <b>SD Card x 1 slot</b>	<b>B</b> Standard keyboard			<b>C</b> Swedish	<b>1</b> Standard HDD (SerialATA specification: 60GB) Standard battery Fingerprint recognition: No
		<b>Y</b> Windows ®XP Professional (Service Pack2)		<b>D</b> English	<b>2</b> Standard HDD (SerialATA specification: 60GB) Standard battery Fingerprint recognition: Yes
			<b>0</b> 1GB (1GB×1)		<b>3</b> Wide temperature range HDD (UltraATA specification: 40GB) Wide temperature range battery Fingerprint recognition: No
					<b>4</b> Wide temperature range HDD (UltraATA specification: 40GB) Wide temperature range battery Fingerprint recognition: Yes

■ Main specifications

		FC-N21S※1
CPU ※2		Intel® CoreTMSolo Processor Ultra Low Voltage U1400 (extended Intel SpeedStep® technology ※3 fitted) 【1.20GHz】
Cache memory	Primary	Instruction-use 32KB / Data-use 32KB (Internal CPU)
	Secondary	2.048KB (Internal CPU)
System bus		533MHz (Memory bus: 400MHz)
Chip set		Mobile Intel® 945GM Express Chip set ICH7-M
Security chip ※4		TPM v1.2 compliant
Memory		Max: 2GB ※6 SO-DIMM slot x 2 DDR2-SDRAM (PC2-3200 <DDR2-400>)
Display functions	Display device	12.1" TFT colour LCD (XGA) with touchscreen ※8
	LCD dead pixels	Below 0.0005%
	Graphics accelerator	Internal Mobile Intel® 945GM Express chip set (Dual display function) ※10, smoothing function, screen rotation function supported)
	Video RAM	Max 128MB (using main memory)
	Resolution/display colours	LCD: Max 1024x768 pixels (16.77 million colours ※11) External monitor: Max 1600x1200 pixels ※12 (16.77 million colours ※11)
Auxiliary storage device ※13	Fixed disk drive ※14	[selection] 60GB (Serial ATA specification) or 40GB (Wide temperature range: Ultra ATA specification)
	Silicon disk drive ※14	[selection] 8GB (UltraATA specification)
Input device	Keyboard ※15	English keyboard Key pitch: 17.55mm, Key stroke: 2.4mm (Back-light keyboard: 2.0mm)
	Pointing device	Touchpad
	Tablet button	Capable of assigning random functions (max. 10) ※16
Interface ※13	USB ※17	3 (1 port with improved hot swap resistance), USB2.0 compatible
	Serial	Max. 115,200bps D-sub 9 pin x 1 (male)

	Display	External monitor connector (Analogue RGB) Mini D-sub 15 pin (female)	
	Network	Internal LAN	RJ45 (1000BASE-T / 100BASE-TX / 10BASE-T) LAN connector x 1
		Wireless LAN	[selection] IEEE802.11a/b/g compliant ※18 WEP compatible [encryption key length 64/128 bit (user-setting key length 40/104 bit)], WPA-PSK (TKIP/AES) compatible, WPA2-PSK (AES) compatible
	Internal modem ※19		RJ11 modular connector x 1 Modem: Data transfer speed max. 56Kbps ※20 (V.90/V.92 compatible), FAX: Data transfer speed max. 14.4Kbps (V.17 compatible)
	Audio-related		PCM record and playback functions, internal mono-speaker Microphone input (stereo, mini-jack), dual headphone/line output (stereo, mini-jack)
PC Card slot ※13 ※21			Type I / II x 1 slot (Type III use not supported), PC Card Standard compliant, CardBus compatible
SD Card slot ※13 ※21			1 slot
Security functions			Hard disk data erasing function in the BIOS.
		Fingerprint sensor ※8	[selection] Internal (line model), fingerprint recognition capable when logging on to OS, exiting screensaver, etc
Power management			Automatic or discretionary setting possible (CPU control ※ 2 , hard disk control, monitor power-saving function, suspend (standby) function, hibernation function)
Power	Equipment		Boot-up voltage: 16V±5%

	Battery ※23 24	[selection] Standard type: Battery life: approx. 3 – 8 hours, charging time: approx. 3 hours, weight: 0.3Kg ※ 3 hour … Max Brightness, Connecting peripheral equipment (USB x 3 , CD-ROM Drive) 8 hour … min brightness, non-operation Wide temperature range type: Battery life: approx. 2-5 hours, charging time: approx. 3 hours, weight: 0.3Kg
	AC adapter	AC100 to 240V±10%、50/60Hz [a separate power cord is required for use outside of Japan]
Standards		RoHS directive compatible, conforms to VCCI class B, design based on EMC directive (EN55022, EN61000-6-2) and low voltage directive (EN60950-1) standards*, power design based on UL60950-1 standard 【*standards necessary for a CE marking】
Power consumption		Approx. 15W (Maximum approx. 50W)
Energy consumption efficiency (achieving energy-saving)		Target FY FY2007 ※25:1 section 0.0020 (A)
Dimensions		284 (W) x 255 (D) x 48 (H) mm (excluding protruding section and bumper section)
Mass		Approx. 2.5kg (Including standard battery)
OS Install		[Selection] Windows®XP Professional (Service Pack 2) English or Swedish

\*1: Refer to the selection menu table for model names and numbers. \*2: This device contains functionality to dynamically control the CPU based on usage and load conditions. \*3: Intel SpeedStep® technology may not be available for use with operating systems other than the preinstalled operating system. \*4: Only supported by the preinstalled Windows® XP Professional. \*5: Use the selection menu to select from 256MB/512MB/1GB/2GB for installed memory configurations. FC-UG-M011 (256MB, PC2-4200), FC-UGM012 (512MB, PC2-4200), FC-UG-M013 (1GB, PC2-4200) expansion memory modules may be used. \*6 One slot is available for user-replaceable memory. When more at least 1GB memory has been selected from the selection menu. If less than 1GB memory has been selected from the selection menu, the maximum value is the selected memory size+1 GB. \*7: While LCD displays are manufactured according to high-precision technologies, cosmetic imperfections may appear as small dots in the display (extremely small black dots or red, green or blue dots that are always on). Variations in colors or brightness may also be apparent, depending on the

viewing angle. Please note that these are characteristics common to all LCD displays and should not be construed to be failures or flaws. \*8: Does not function when USB lock is turned on. \*9: According to the ISO13406-2 standard, dead pixel ratio calculations are based on units of sub-pixels. Refer to <http://www.express.nec.co.jp/products/pc/lcddot.html> for details. \*10: This feature enables different desktops to be displayed on the internal LCD display and an external display. \*11: 16.77 million color display functionality enabled by graphic accelerator dithering. \*12: Resolutions and colors supported by this system. Actual resolutions and colors are limited to those supported by the resolution and refresh rate of the connected display. The same image may be simultaneously displayed on the internal LCD display and an external display. However, if the zoom display feature is turned off, the entire image may not fit on the external display. \*13: Please confirm suitability and functionality of third party accessories before use. \*14: The hard disk drive and silicon flash disk drive are mutually exclusive options and may not be selected at the same time. Also, the silicon flash disk drive has an upper limit to the number of write cycles. Refer to the website (<http://www.nec.co.jp/fc/>) for details. \*15: Product ships with English keyboard when Windows® XP Professional (Service Pack 2) English Language preinstalled operating system is selected. \*16: Certain usage limitations if the Linux preinstall model is selected. \*17: Peripherals and software using this device must support this interface. \*18: This computer contains a Wi-Fi Alliance compliant, “Wi-Fi®” certified wireless LAN module. Speed and range may vary depending on the other communication device, radio interference, nearby obstacles, usage location, usage conditions, and application software or operating system. Also, IEEE802.11b/g (2.4GHz) and IEEE802.11.a (GHz) technologies are not mutually incompatible. Super AG®, and Atheros XR® (eXtended Range) technologies are supported. Use of wireless LAN (5GHz) is restricted to indoors by the Radio Wave Law. In countries and regions where a license to use wireless LAN has been obtained are UK and Sweden. In countries and regions outside those specified, please use the device with the wireless LAN function switched off. \*19: Actual communication speed will vary depending upon line conditions. Also, the internal fax modem only supports conventional telephone lines. In countries and regions where the internal FAX modem can be used are UK and Sweden. Please do not use the internal FAX modem outside of the specified countries. \*20: 56kbps is the maximum data download speed. The maximum upload speed is 33.6kbps. \*21: PC cards and SD cards sold separately. Please obtain commercially available products. \*23: Actual battery usage time and charge time may differ from these values, depending on usage conditions. Please note that the battery pack performance will deteriorate with age. CPU performance is set to LOW mode when long life operation mode is selected in the BIOS Setup menu. \*24: Battery usage time as measured according to the JEITA battery operation measurement method (Ver.1.0). Actual usage time may vary depending on usage conditions, display brightness and system settings. \*25: Energy efficiency rating is calculated by subtracting the composite theoretical performance, as determined by the Energy Saving Law, from actual energy consumption, as measured according to methods specified by the Energy Saving Law (for target year: 2007). An energy efficiency achievement A rating refers to 100% to 200% achievement, AA rating refers to 200% to 500% achievement, and AAA rating refers to achievement greater than 500%.

■ Environmental Conditions

Item		Conditions	
		Standard hard disk / Standard battery	Wide temperature range hard disk Wide temperature range battery *3
Temperature	During operation	5°C to +45°C	-20°C to +45°C
	Non-operation	-40°C to +70°C	
	Assessment criteria	IEC 68-2-1,2,14 / MIL-STD-810F, Method 501.4 502.4	
Humidity	During operation	5% - 95% RH (no condensation)	
	Non-operation	5% - 95% RH (no condensation)	
	Assessment criteria	IEC 68-2-30 / MIL-STD-810F, Method 507.4	
Altitude	During operation	15,000ft (4,572m)	
	Non-operation	40,000ft (12,190m)	
	Rate of change	2,000 ft/min (609.6m/min)	
	Assessment criteria	IEC 68-2-13 / MIL-STD-810F, Method 500.4	
Shock Resistance *2	During operation	147m/s <sup>2</sup> , 11ms, half-sine wave	
	Non-operation	490m/s <sup>2</sup> , 11ms, half-sine wave	
	Assessment criteria	EC 68-2-27 / MIL-STD-810F, Method 516.5	
Vibration Resistance *2	During operation	[Sine wave] Frequency: 10-55Hz: 0.075mm(0-P), frequency 55Hz-500Hz: 9.8m/s <sup>2</sup> (0-P)	
	Non-operation	[Sine wave] Frequency: 10-55Hz: 0.15mm(0-P), frequency 55Hz-500Hz: 19.6m/s <sup>2</sup> (0-P) [Random wave] Frequency: 20Hz-1000Hz: 0.04G <sup>2</sup> /Hz, frequency 1000Hz-2000Hz: -6dB/Octave	

	Assessment criteria	During operation	Sine wave oscillation: IEC68-2-6
		Non-operation	Sine wave oscillation: IEC68-2-6 Random wave oscillation: MIL-STD-810F, Method 514.5 Category 24 FIGURE 514.5C-17
Dust resistance/moisture resistance	During operation		IP54
	Non-operation		IP54
	Assessment criteria		IEC 529 / MIL-STD-810F

IEC: International Electrotechnical Commission.

MIL: United States Military Specifications and Standards.

\*1: Continuous operation under the above environmental conditions is not guaranteed.

Also, for PC model numbers with internally installed commercially available optional components, the environmental conditions are considered to be the environmental conditions of the internally installed options.

The internal clock may lose accuracy if the computer stored under temperatures below 0°C. Set the clock to the correct time before using.

\*2: This does not constitute a guarantee of withstanding sympathetic vibrations encountered when approaching the natural frequency of this device.

\*3: The usable temperature range of the included AC adapter is 5°C to 40°C. Unplug the AC adapter when using under conditions outside the usable temperature range of the AC adapter.

■ List of Peripherals

Model Name	Product Name
FC-UG-M013	Expansion RAM module (1GB、 PC2-4200) *1
FC-HD60KN	Hard disk drive (Standard) *2
FC-HD40KN	Hard disk drive (Wide temperature range) *3
FC-N011	Replacement battery (Standard type)
FC-N011/L	Replacement battery (Wide temperature range type)
FC-N012EU	AC adapter *6
FC-N013	Battery charger
FC-N21S-UE	English user's manual *8

\*1: Functions as PC2-3200 (DDR2-400) in this product.

\*2: Specifications= capacity: approx 60GB; power consumption (idle): 0.6W; energy efficiency rating: d class 0.010W/GB (target year: 2007)

\*6: Operating temperature range: 5°Cto 35°C

\*8: Some sections of the Japanese language manual are omitted from the English language manual. Please verify the English language manual composition at the NEC website (<http://www.nec.co.jp/fc/>).

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calculated as 1GB=1 billion bytes. Space visible to the operating system may appear smaller than this actual value. ●To verify operation of extended peripherals, operating systems or applications, check with their manufacturers. ●Version numbers or detailed functionality of preinstalled or included software applications are subject to change without notice. These changes may result in some limitations to functionality. ●Hard disk capacity or CD-ROM or other drive speeds may be subject to change without notice. ●This product (including software) is sold only in Japan. NEC provides no overseas warranty services or technical support for this product. ●In accordance with provisions of the Foreign Exchange and Foreign Trade Law regarding restricted goods, obtain any approvals from the Japanese government and follow any necessary procedures when carrying this product (including software) outside of Japan. For more information, refer to the notices contained in the manual or included with each product. ●Please note that the operating system installed in this computer cannot be used with any Microsoft upgrade/downgrade programs.

**Important note about destroying or transferring ownership of this computer and memory cards** To avoid any issues caused by from unintended release of important data when destroying or transferring ownership of this computer or any memory cards, it is extremely important that you delete all data stored on hard disks or memory cards as your own responsibility. Please refer to the electronic manual included with this computer for data removal instructions.

**Wireless LAN Precautions** It is extremely important to enable security when using the wireless LAN feature. For details, refer to the electronic manual included with this computer.

**Warning** - If using an embedded pacemaker, use wireless LAN products at least 30cm away from the location of the pacemaker. - Do not power on wireless LAN products in areas where the use of wireless devices is prohibited, such as airplanes or hospitals. Doing so may interfere with electronic devices or medical devices and cause serious incidents.

**■Radio Wave Precautions** ●Japanese radio laws and regulations restrict wireless LAN (5GHz \*1) to indoor use only. ●The wireless LAN (2.4GHz \*2) functionality of this computer uses the 2.4GHz radio frequency band. This frequency band is shared with industrial, scientific and medical devices, including microwave ovens as well as other same power radio stations and factory radio networks for mobile identification devices used in factory assembly lines, that require licenses, and as specified low power radio stations and amateur radio stations (hereafter referred to as "other radio stations") that do not require a license. ●Before using this product, first verify that there are no "other radio stations" in operation nearby. ●In case of interference between this device and "other radio stations," either immediately change the channel used by this device, move to another location, or cease using the device (cease emission of radio waves). ●In case of any other radio interference incident with which you may require assistance, please contact us or an NEC support service location (see the contact information or electronic manual included with this product). \*1: IEEE802.11a \*2: IEEE802.11b/g

**Safety Precautions** Before using, please refer to the "Usage Precautions" contained in the electronic manual included with this product for proper usage of this product. Do not use this product in locations exceeding the environment conditions (locations with high amounts of water, steam, dust or oily smoke, etc.). Doing so may cause fire, equipment failure or electrical shock. ★ The specifications and designs contained herein may be subject to change without advance notice. Due to paper and ink variations, colors in photographs may appear slightly different than the actual product. ★To maintain long term, consistent availability of parts, the parts depicted herein may be substituted for other parts of equivalent performance.