

# mcl

## *nanoSwitch*



# Installation Guide

# Regulatory information nanoSwitch

nanoSwitch Telephone Exchange has been designed to meet British Telecom standards.

nanoSwitch is designed for use on-board ships. It may not comply with specific statutory local PTT requirements for use in some countries.

## Maintenance

Maintenance of nanoSwitch must only be performed by Marine Communications Limited or its authorised agent. The user may not make any changes and/or repairs except as specifically noted in this manual. Unauthorised alterations or repairs may affect the approval status of the system and void any remaining warranty.

There are no serviceable components in the exchange. Board replacement is the only method of service. Faulty boards to be returned to Marine Communications Limited or its authorised agent.

## Radiated Emissions

nanoSwitch complies with the current rules regarding radiation and radio frequency emission as defined by the European EMC CE marking.

**This equipment generates and uses R.F. energy and if not installed and used in accordance with the instruction manual may cause interference.**

## Telephone Compatibility

Marine Communications Limited's nanoSwitch Telephone Exchange has been designed to work with most telephone instruments worldwide. However satisfactory performance cannot be guaranteed for every allowable combination of host and subsidiary apparatus.

Only telephones which use DTMF signalling can be used. It will not work with Loop Disconnect (LD) or pulse telephones.

All telephones over 15 years old should be replaced with modern telephones.

## Document History

Version	Date	Notes
1	07/2008	First Issue
2	06/2009	Correction of typing errors
3	06/2010	Added C4025 Processor card information
4	03/2011	Modified for metal case. Added section on Front LCD menus

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# General Information





nanoSwitch Telephone Exchange is a fully digital telephone system designed to meet the current and planned future requirements of all internal and external telephone calls made on-board ship.

nanoSwitch system incorporates state of the art digital technology for command processing and voice switching, using Pulse Code Modulation/ Time Division Multiplexing (PCM/TDM) distributed switching matrix.

nanoSwitch is able to be bulkhead or rack mounted by turning the supplied brackets through 90 degrees.

The system architecture has been designed to allow a high level of software control over the system's hardware. The software has a large range of features and capabilities including Call diversions and pickups, voice prompting etc

All of the features can be controlled at extension, group and user levels.

nanoSwitch has extra features for the marine environment including:

- External shore line, SATCOM, cellular and Public Address access
- AC and DC operation
- Priority intrusion
- Direct dial in and out with voice prompting (DISA)
- Voice prompting for features
- Modular construction

nanoSwitch supports up to 48 extensions for internal telephones, 6 external connections, 1 Public Address interface and 2 uncommitted relays.

The exchange configuration (database) is held on an internal small flash card. The facilities within the exchange can be changed to suit individual requirements using a Windows™ computer. Programming is via USB on the processor board or via a network connection. Configuration and log files can also be transferred to and from a PC using a small MMC card.

The exchange requires an AC (90-260Vac) or DC (24V +/- 20%) power supply.

Every telephone and tie line can be individually configured to meet customer's specific requirements. Using a telephone equipped for Calling Line Indication (CLI) the caller's telephone number can be displayed on the receiver's telephone unit.

The exchange is pre-programmed to provide specific features for 2 classes of extensions.

When connected to external lines, incoming calls are directed to a pre-specified extension. Outgoing calls are enabled for Class A phones and can be dialled directly by prefixing the telephone number with a specific code.

Call-logging facilities are provided by the exchange to enable all internal, outgoing and incoming calls to be logged. The information logged includes the source extension, user name, number dialled and duration of the call. Output is through an RS232 serial interface for a printer.

The system uses -48V bias on telephone lines giving superior performance over 24V systems. The volume on telephones can also be set electronically under engineering control to ensure clarity in reception.

By adding or replacing plug-in modules, users can carry out future expansion and servicing of the exchange. To assist with maintenance and fault finding, either the front LCD display or an PC can be used.





## System Components





## Cabinet

nanoSwitch is supplied as a cabinet which can be either bulkhead mounted or mounted in a customer supplied 19" frame.

The nanoSwitch cabinet is divided into 3 sections. The rear section contains the two part connectors for connection to ships wiring and the power sources. The smaller front section contains the power supplies, whilst the larger front section contains the electronic system boards.

The cover for the electronics section also has 4 fans mounted on it. These are software controlled and automatically turned on as required.

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## Ventilation

Adequate ventilation must be provided to the nanoSwitch. In a customer installed rack mount systems, **mcl** recommend that 1U space is left above the system.

## Front Panel

The front panel has 3 power indicators, an LCD display and cursor buttons for navigating the menu system.



## Power Supply Section

The power supply is made up of 2 parts.

The AC (90-264V @ 50/60Hz) is converted to 48V DC, which is then combined with the DC 24V ( $\pm 20\%$ ) input to another power supply which generates the system output voltage.

There is no break when switching between the AC and DC supplies. The status of the supplies connected to nanoSwitch as displayed on the LCD.

There is one 5V DC output.

**WARNING: There are high voltages in the power supply section. Care must be taken when replacing modules. ALL power inputs must be removed first.**



## System Controller (C4025)

The System Controller incorporates the digital system processor and digital voice control.

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The system is controlled by a 32bit ARM processor (AT91SAM9620) with 64MB of DRAM. The PCM time-slot interchange and voice processing is in a Xilinx FPGA. This also controls the line cards.

A 2GB SD card which contains the configuration and operating software. This can be read by a PC or laptop for rapid updates of firmware and configuration. The call logs and voice prompts are also stored on the card. Voice Prompting is normally in English, but can be updated by the user to any language or message.



## Processor Card (C4024)

*This system controller board has been superseded by the C4025*

The Processor Card incorporates the system's RAM, solid-state hard disk, master clock, RS-232C port, and watchdog circuitry as well as the system PCM voice processing and main microprocessor. The microprocessor is a 32bit high speed CPU which receives and transmits signalling information from/to the other PCBs, controls feature activation and PCM time-slot interchange.

The processor contains 32MB of DRAM and 32MB of solid-state hard disk, which contains the configuration and operating software.

## Analogue Extension Card (C4030)

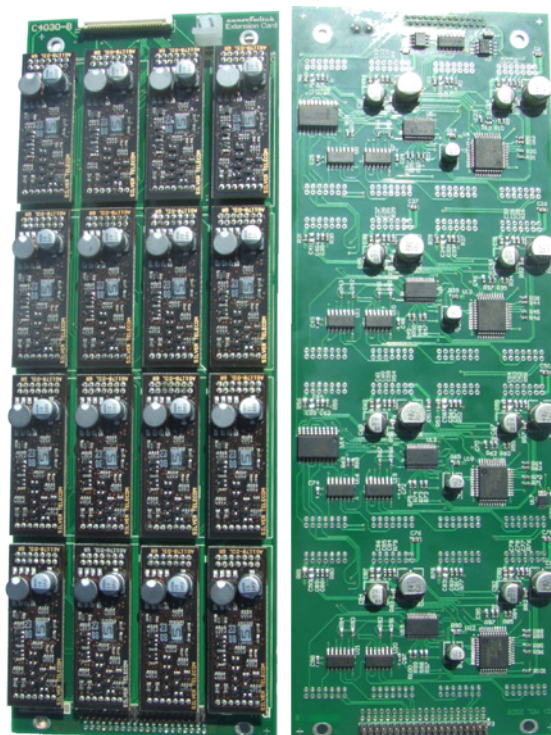
The Analogue Extension Card has 16 single line analogue (POTS) telephone ports. The card provides the appropriate A/D and D/A conversions, on/off-hook detection and ring generation.

A telephone can be connected up to 3000 metres from the system using 0.34mm<sup>2</sup> (22AWG) wire.

The card provides each extension with approximately -48V line bias and 70V 25Hz ringing. The loop current is approximately 24mA.

With suitably equipped telephones, an extension can have a message waiting light illuminated using line reversal, or display caller information.

The line interface modules are plugged into the extension card so that they can be replaced easily if damaged, for example by lightning.





## Analogue External Line Card (C4055)

The Analogue External Line Card has 8 positions which can contain one of the following modules: AG2120 COIC Module, M10 Public Address Module, or M90 Signal Relay Module.

The card provides the appropriate A/D and D/A conversions and signal processing.

The standard card is supplied with 6 x AG2120 modules, 1 x M90 Signal Relay module and 1 x M10 Public Address module.

### AG2120 COIC Module

The AG2120 module provides PABX Loop Start lines with circuitry for ring and loop current detection, A/D and D/A conversions, and pulse and flash signalling.

### M10 Public Address Module

The M10 Public Address Module provides a Public Address output with a voltage free (24VDC 1Amp max) relay switch. The “microphone” output is at approximately 0dBm (line-level). The LED to show the status of the PA relay.

### M90 Signal Relay Module

M90 Signal Relay module providing 2 low voltage (24VDC 1Amp max) normally open relays for problem reporting. The LED shows the status of the relays. The operation of the relays is set in the configurAID software.

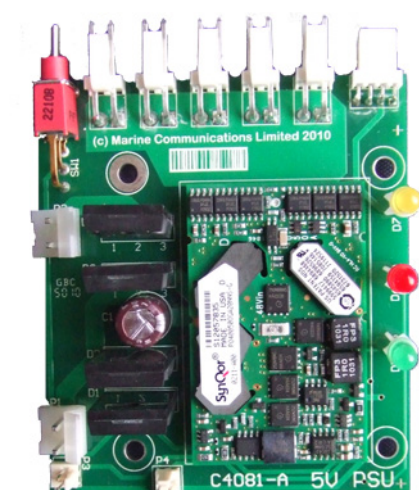
## 5V Power Supply (C4081)

The 5V power supply module combines the two main power inputs (giving priority to the AC input) and converts them to the main 5V output. 3 LEDs show the power status:

Green	AC present
Red	DC present
Yellow	Output on

To prevent the system being activated until commissioning, there is an enable switch inside the main section. When the switch is in the fully up position, then the output power is turned on.

**Warning: The PSU section is energised when AC or DC power is applied.**





## Site Preparation







## General Site Considerations

The first step is to locate an acceptable site for the equipment. When locating the mounting site, the following points should be considered:

- nanoSwitch is designed for bulkhead mounting. The system must be firmly mounted to the bulkhead to reduce the effect of vibration
- The location must have access to a dedicated 93-264 AC 50/60Hz circuit with a circuit breaker or fuse rated at 2 Amps if using the AC power input.
- The location must have access to a dedicated 24 DC circuit with a circuit breaker or fuse rated at 5Amps, if using the DC power input.
- The location must have access to a good earth ground
- The location should be well ventilated with a recommended temperature of 15°C to 25°C and a relative humidity of 5% - 90% non-condensing. The area should be suitable for office type equipment
- The equipment should be away from radio transmitting equipment, generators and other equipment capable of generating electrical equipment. The system should be protected from flooding and heavy machinery as well as excessive dust and vibration
- The location should have adequate accessibility, space and lighting for future servicing
- Telephone cables should be terminated in the integral Main Distribution Frame (MDF) or to an external unit located within 3 metres of the telephone exchange

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## Check on-site Equipment

Once the equipment installation location has been identified and its suitability checked, verify that all the equipment required is onboard and has not been damaged during shipment.

Unpack the nanoSwitch, checking that there is no damage. Check that the type and quantity of boards received is correct and any optional equipment is available. A packing list is included with all systems. Note that the individual boards should not be unpacked at this time.

**If any equipment is missing or damaged,  
notify Marine Communications Limited or your agent  
to correct the situation.**

## Rack Based Systems

Where the system is part of a larger system such as entertainment centre then this will be rack mounted as per the total system supplier's instructions. Terminations for power and telephones may be different than for the standard cased system.

## PCB Installation

**Boards must not be installed or removed with applied power**

The system PCBs contain digital circuitry, which while extremely reliable, can be damaged by exposure to excessive static electricity. When handling PCBs, a grounded wrist strap should be used to protect the cards from static discharges. Also, use common sense when handling the PCBs. For example, do not place a PCB in positions where heavy objects might fall on the PCB and damage components.



## System Installation





## Mounting the Case

The cabinet is designed for either bulkhead mounting or rack mounting.

Once the unit has been mounted, remove the top/bottom gland plate(s) and cut gland holes in the appropriate position. The cables can then be connected to the in-built MDF mounted in the rear of the case.

All cables should be securely fastened to prevent damage due to vibrations.

### Bulkhead

The mounting positions are as shown below. Bolts of M6 size should be used for fixing the supplied mounting brackets.

The mounting positions are as shown on the next page.

### Rack Mounting

nanoSwitch is designed to be mounted in a standard 19" rack system. The module is 2U high, and 430mm deep. The unit must be placed on runners and sliders to allow easy access and to support the unit along the full depth. The unit will need access to the top so that services can be carried out.

## Power Wiring

AC Power is connected to the exchange through an IEC power connector. The supplied line socket must be used as this fits the retaining clamp.

DC Power is connected with a Phoenix Contact (Part Number 1766990).

## Ground (Earthing) Point

The ground (earth) is connected through the power connectors. The DC supply connector has the earth pin in the middle.

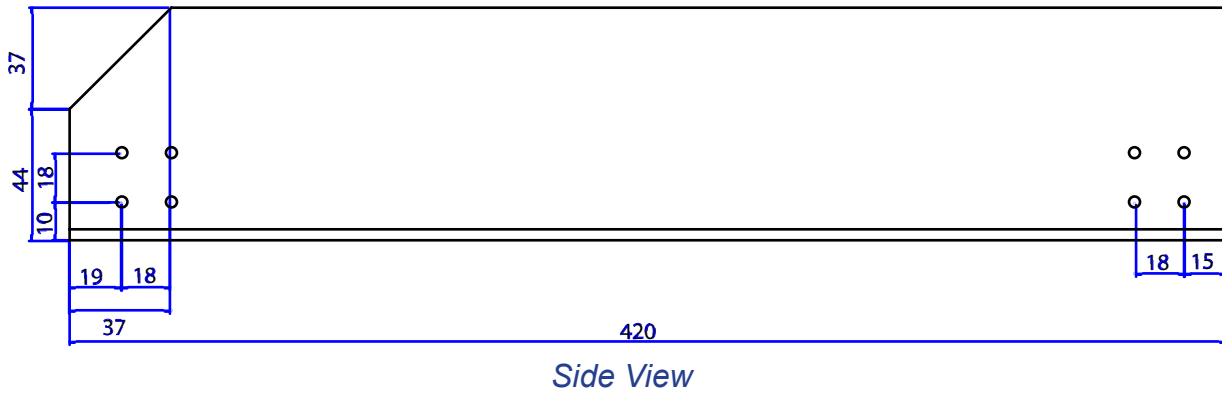
## Extension Wiring

Connection to the ship's telephones is via the built in MDF. See the section on "System Wiring" for more details.

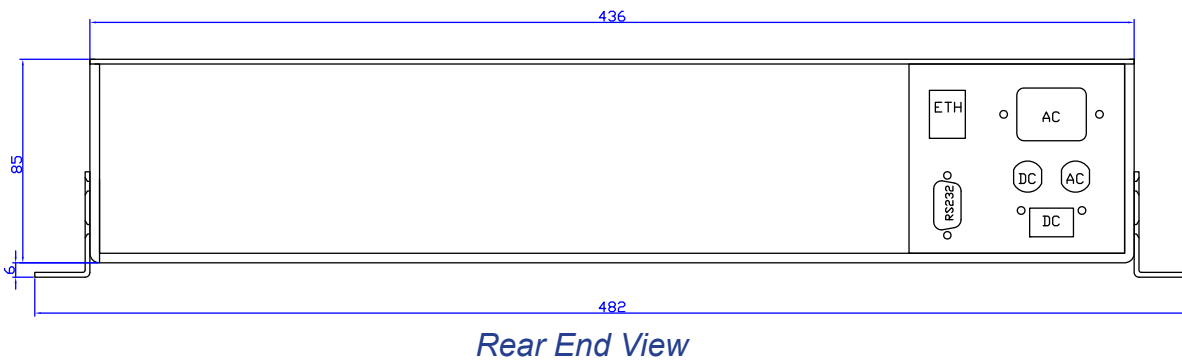
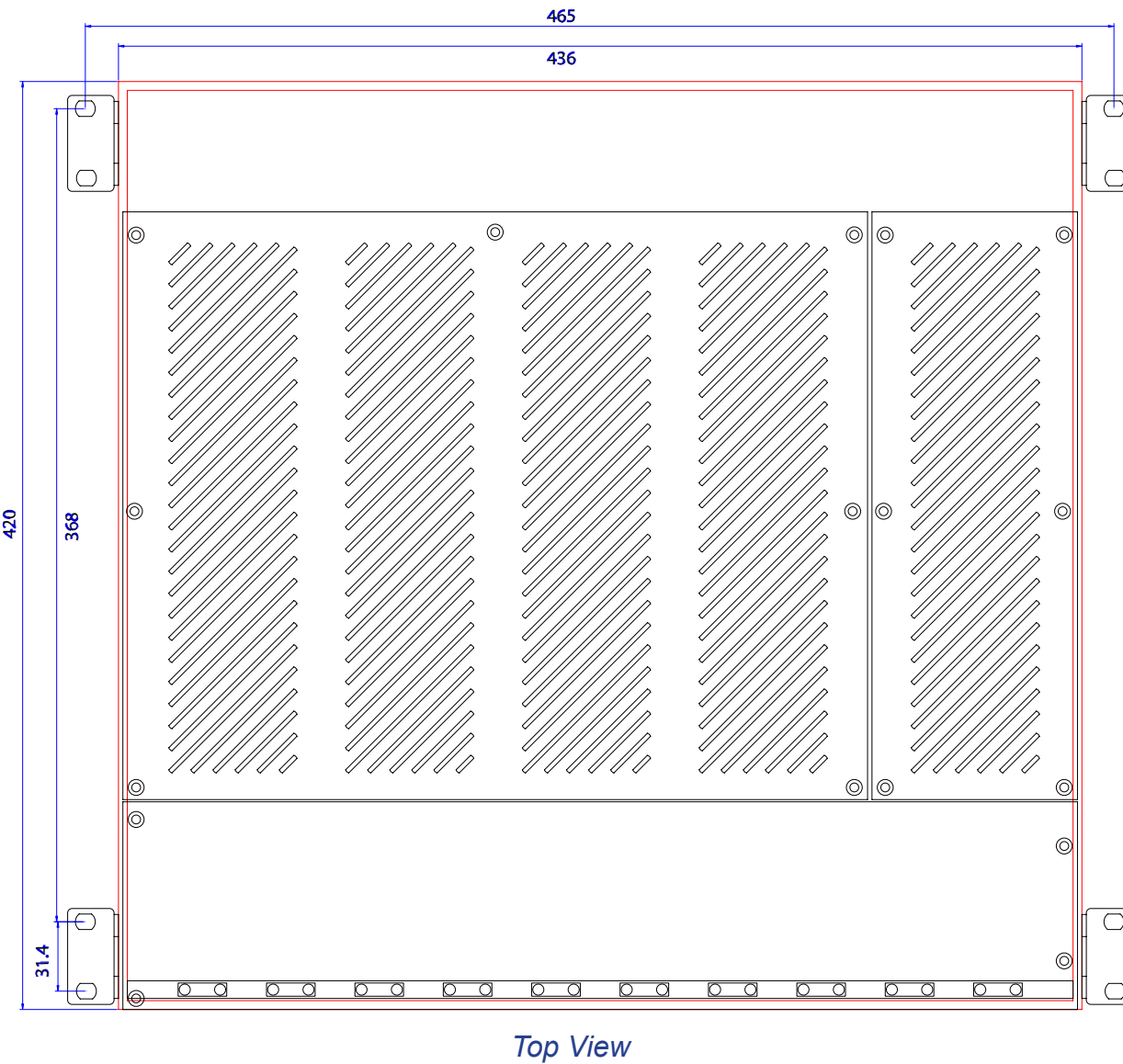
## Clearance

There should be 5cm free space around the equipment. More space will be required to allow cables etc to enter the unit at the rear.

If the unit is mounted in a rack, then there needs to be at least a 1U space above the unit.



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## System Wiring





## Power Connections

On the rear of the frame there is a connector panel with four connectors and 2 fuses.

**AC Power** is connected to the exchange through an IEC power connector. The supplied line socket must be used as this fits the retaining clamp.

**DC Power** is connected through the supplied green connector.

The fuses are 6.3A slow blow fuses.



A serial printer can be connected to the nanoSwitch. The wiring for the port is the same as on a Personal Computer. The manual for the printer will give the required wiring and connections. The serial printer is set up as 115200 baud, 8-bits and 1 stop bit and CTS/RTS handshaking.

An RJ45 ethernet socket is also provided.

## Extension and External Wiring

The connection to the ship's wiring is through the internal MDF.

The “screwless” connectors are designed to take up to 2.5mm cables and just require a flat blade screwdriver (blade size 2.5mm x 0.4mm) to capture the wire.

The drawing on the next page gives more detail.

Extension Wiring

Connector	Pins	Ext	Ext No
P1	1,2	1	100
P1	3,4	2	101
P1	5,6	3	102
P1	7,8	4	103
P2	1,2	5	104
P2	3,4	6	105
P2	5,6	7	106
P2	7,8	8	107
P3	1,2	9	108
P3	3,4	10	109
P3	5,6	11	110
P3	7,8	12	111
P4	1,2	13	112
P4	3,4	14	113
P4	5,6	15	114
P4	7,8	16	115
P5	1,2	17	116
P5	3,4	18	117
P5	5,6	19	118
P5	7,8	20	119
P6	1,2	21	120
P6	3,4	22	121
P6	5,6	23	122
P6	7,8	24	123

Connector	Pins	Ext	Ext No
P7	1,2	25	124
P7	3,4	26	125
P7	5,6	27	126
P7	7,8	28	127
P8	1,2	29	128
P8	3,4	30	129
P8	5,6	31	130
P8	7,8	32	131
P9	1,2	33	132
P9	3,4	34	133
P9	5,6	35	134
P9	7,8	36	135
P10	1,2	37	136
P10	3,4	38	137
P10	5,6	39	138
P10	7,8	40	139
P11	1,2	41	140
P11	3,4	42	141
P11	5,6	43	142
P11	7,8	44	143
P12	1,2	45	144
P12	3,4	46	145
P12	5,6	47	146
P12	7,8	48	147

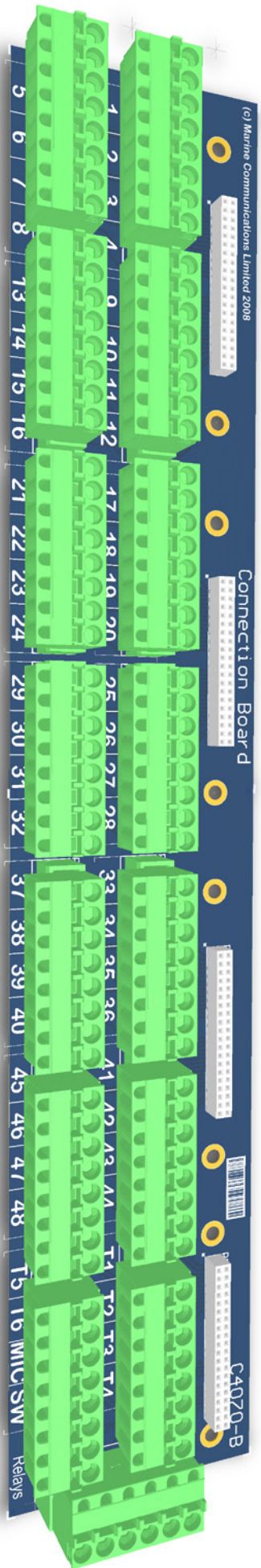
External Line Wiring

Connector	Pins	Tie Line	Access
P13	1,2	1	800
P13	3,4	2	801
P13	5,6	3	802
P13	7,8	4	803

Connector	Pins	Tie Line	Access
P14	1,2	5	804
P14	3,4	6	805
P14	5,6	MIC	850
P14	7,8	SW	

Relay Wiring (P15)

1	2	3	4	5	6
NC1	COM1	CO1	NC2	COM2	NO2



## Front Control Panel



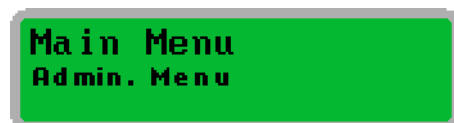


## Front Control Panel

The front panel allows various aspects of the nanoSwitch to be inspected and controlled. The functions described here are present in V4.23 of the firmware. Updates to the firmware will change the options available.



The front screen shows the current system time and date (in the format Hours:Minutes Day/Month), the software version number (in this example V04.23#C0), the available power inputs (AC or DC), the current system status (OK) and how to get into the menus ("Press \* for menus").



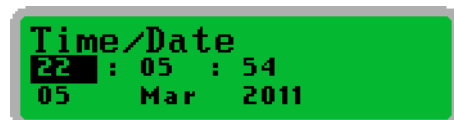
The options are changed by using the ▲ and ▼ keys to move up and down and the option is selected by pressing the ★ key. The previous menu is returned to by pressing the ✱ key.

The options are:

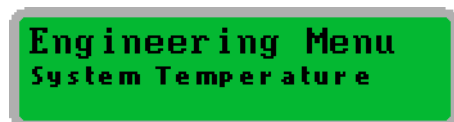
- Admin Menu
- Engineering Menu
- System Information



The administrator menu allows the time and date to be set as well as showing which alarm calls and call diversions are in operation.

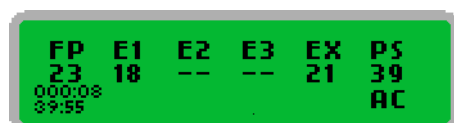


This sets the time and date of the nanoSwitch. The various parts of the time and date are changed by using the ▲ and ▼ keys, and the ◀ and ▶ keys are used to move between the parts. To save the time and date, press the ★ key. To cancel the changes, use the ✱ (back) key. If the time and date are saved then a ✓ will appear in the top right hand corner.

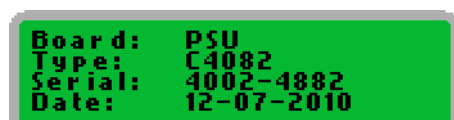


The options are:

- System Temperature
- Board Information
- Fan Mode
- Board Fan Temp
- PSU Fan
- LCD Settings



System Temperature shows the temperature of the various boards in the system. All temperatures are displayed in Centigrade. The time that the system has been running is also displayed in the bottom left hand corner.



Board Information shows the type and serial number of the boards installed in the system. The date is when the board was shipped from [mcl](#).

**Fan Mode**

FAN 1	FAN 2	FAN 3	FAN 4
AUTO	ON	OFF	AUTO

Fan Mode sets how the fans in the lid are controlled. AUTO means that the fan is temperature controlled (set in the next menu); ON means that the fan is permanently turned on; OFF means that the fan is normally off. However the fan will turn on if the temperature rises above the “ALL” temperature setting.

**Board Fan Temp.**

OFF	ON	ALL
40°C	45°C	65°C

Board Fan Temp. controls the temperature at which the lid fans turn off and on. The OFF/ON/ALL temperature values (in centigrade) are changed by using the ▲ and ▼ keys, and the ◀ and ▶ keys are used to move between the temperatures. To save the time and date, press the ★ key. To cancel the changes, use the ✕ (back) key. If the temperatures are saved then a ✓ will appear in the top right hand corner.

**PSU Fan**

MODE	OFF	ON
AUTO	35°C	50°C

PSU Fan controls the large fan in the PSU section (the small fan is permanently turned on). The settings have the same meaning as above.

**LCD Settings****Direction**

LCD Settings set the direction or orientation of the LCD display, when the system is installed in a rack or on a bulkhead.

**Set LCD Direction**

The ▲ ▼ ◀ and ▶ keys change the direction of the LCD. To save the orientation, press the ★ key. To cancel the changes, use the ✕ (back) key.

**Set LCD Direction**

System:	NANO16
Firmware:	V04.23#C0
Uptime:	000:08:40:10
Temp.:	40 °C

System Information shows in more detail the type of nanoswitch. The temperature is the overall temperature in the system.

# Extension Commissioning







## Extension Commissioning

The extensions should be tested before the nanoSwitch is programmed with the customers requirements. If the exchange has been supplied with a customer program, then this must be used instead of the factory configuration tables, when checking the extension numbers and access rights.

### Ship's Wiring

**Before power is connected to the nanoSwitch,  
All short circuits must be found and removed.  
Only a Digital Multimeter (DMM) to be used for line testing**

The resistance reading between the two wires of the extension should be between 17K $\Omega$  and 30K $\Omega$ . The resistance reading between either of the wires and the ship should be greater than 500K $\Omega$ .

### Line Status

Once all of the wiring has been tested, power can be applied to the nanoSwitch.

The line status can be shown on the front LCD or via the USB port to a PC.

### Line Testing

The initial test requires all the telephones to be on-hook.

There are two methods of testing an extension. The first method for testing extensions when the system has been commissioned and an extension is not working. The second method is to be used when commissioning the whole system.

### Extension Test

The extension test is for use when the system has been commissioned and an extension stops working or a new extension is added. These tests do not require any special mode on the exchange, however the extension needs the right to use the engineering functions.

### Commissioning Mode

The commissioning mode is designed to help configure a new system, when there might be wiring errors and it is not known if all the extensions have been installed. If a printer is attached, then a report can be generated as each extension is tested if required.

The tests will confirm that the extension is working and has been allocated the correct class of service. All of the prompts are in English. Only one person is required for the tests, however up to five technicians can test telephones simultaneously.

The commissioning mode is activated by entering the one of the following two codes into any telephone:

# Distributor ID & Passcode \*6 601 - commissioning mode without printing

# Distributor ID & Passcode \*6 602 - commissioning mode with status printout

The commissioning mode is deactivated, by selecting option 5 from the commissioning menu.

The commissioning mode schedule on the pages 7-4 needs to be carried out from each extension.

When all of the extensions have been tested and the commissioning mode has been deactivated, the following engineering codes are available. The codes are accessed by entering the following sequence **# Distributor ID & Passcode \*6**.

603 - print the commissioning report

604 - remove commissioning mode from system - **Use with care**

605 - Clear the commissioning report. (This is useful before entering the commissioning mode for the first time)

## Basic Extension Test

Test	Action	Correct Response	Possible Problems
1	Telephone handset lifted	Line status shows off-hook Dial Tone Heard in earpiece.	Wrong extension shown. → Ships wiring wrong Dial Tone not heard or very quiet → Faulty telephone - Replace telephone → Poor Ship wiring - Disconnect wire at exchange and check using test points → If still no dial tone heard, swap extension card.
2	Dial '*'	Dial tone goes silent.	Dial Tone continued to be heard → Telephone is old "LD" or Pulse - replace with modern DTMF telephone → Faulty telephone - check with know working telephone
3	Dial '6'	New tone heard.	
4	Replace handset	Telephone starts ringing. Line status shows "Ringing"	Ringing Heard - test pass move to test 5 Ringing not heard → Ringing on telephone turned off - turn on → Ringer on telephone faulty - replace telephone with known working telephone → "BT" telephone used, which needs special socket, install special socket → Faulty extension card - swap extension card.
5	Lift handset	Message "Ring Test Successful" is heard in handset.	This message will always be heard as the exchange has no method of checking that the ringer is working
6	Replace handset	Line status shows on-hook	

## Commission Mode Tests

Test	Action	Response	Possible Problems
1	Telephone handset lifted	Line status shows off-hook. The Extension number and Exchange position is repeated continuously.	Wrong extension status shown. → Ships wiring wrong Wrong Extension number reported → Incorrect configuration - Use command '1' to report correct extension number. Wrong Exchange port reported → Incorrect ship wiring - Use command '3' to report correct exchange position. Dial Tone not heard or very quiet → Faulty telephone - Replace telephone → Poor Ship wiring - Disconnect wire at exchange and check using test points → If still no dial tone heard, swap extension card.
2	Check Extension Number Dial '1'	The extension number (and corrected number if entered) is reported. If the number is correct press '1'	If the number is wrong, but the correct number is not known, press '2' If the number is wrong, and the correct number is known, press '3' followed by the correct number ending with '#'. The system will then repeat the number. Press '1' to confirm the new number. Press '2' to discard the number. Press '3' to re-enter the number.
3	Check Standard Rights Dial '2'	The default user ID (and corrected ID if entered) is reported. If the ID is correct press '1'	If the ID is wrong, but the correct ID is not known, press '2' If the ID is wrong, and the correct ID is known, press '3' followed by the correct ID ending with '#'. The system will then repeat the number. Press '1' to confirm the new ID. Press '2' to discard the ID. Press '3' to re-enter the ID.
4	DTMF Digit check Dial '7'	A message information that all DTMF keys should be pressed. As each key is pressed, the digit is repeated. When all keys have been pressed, a message reports all keys detected.	If a key is not recognised, wait 20 seconds and a prompt will ask if all keys have been pressed. Press '1' if all keys were pressed or press '2' if not all keys pressed.
5	Ring Test Dial '9'	Replace the handset and the telephone will ring back. When the handset is lifted after the ringing has been heard, press '1' to confirm the test worked.	If the ringing is not heard within 20 seconds, lift the handset and press '2' to the prompt to mark the test failed. → Ringing on telephone turned off - turn on → Ringer on telephone faulty - replace telephone with known working telephone → "BT" telephone used, which needs special socket, install special socket → Faulty extension card - swap extension card.
6	Replace handset	Line status shows on-hook.	

# External Line Commissioning





## External Line Commissioning

Before the external lines are commissioned, all of the extensions should be tested and the nanoSwitch programmed with the customers requirements.

### Line Status

The line status can be shown on the front LCD or via the USB port to a PC.

### Line Testing

There is no special commissioning mode for the external lines. The system needs to be running normally and the external equipment tested.



### AG2120 COIC Module Test - Outgoing

Test	Action	Response	Possible Problems
1	Dial the access code for the tie line. (Default is 800 upwards)	Line status show line active The dial tone from the external equipment is heard.	Wrong external line shows as active → Wrong access code entered. No external line shows as active → Extension being used for testing does not have the right to access tie line. Quiet or no dial tone heard. → Poor Ship wiring - check using test point → If dial tone heard, swap AG2120 module or external card. If there are problems, further fault finding with <b>mcl</b> is required.
2	Check the external system through exchange.	System works as expected	
3	Replace handset	Line status shows as in-active The external equipment detects dropped line.	

### AG2120 COIC Module Test - Incoming

Test	Action	Response	Possible Problems
1	Place an incoming call through the external equipment.	Line status shows as incoming ring. Designated extension rings (The Default is extension 104)	The status does not change to incoming ring → The ringing is not detected by the exchange. Check that the incoming ring is within detection parameters. Check that the incoming ring is detected on the test point, using a telephone. The Designated telephone does not ring. → Incorrect programming. Check the programming.
2	Lift handset on ringing extension	Line status shows as active. The system is connected to the external equipment.	
3	Check the external system through exchange	System works as expected	



**M10 Public Address Module Test**

Test	Action	Response	Possible Problems
1	Dial the access code for the public address line. (Default is 850 upwards)	Line status shows as active The public address system is accessed	Wrong line show as active → Wrong access code entered. No line shows as active → Extension being used for testing does not have the right to access tie line.
2	Check the external system through exchange.	System works as expected	If there are problems, further fault finding with <b>mcl</b> required.
3	Replace handset	Line status shows as in-active The external equipment detects dropped line.	

**M90 Signal Relay Module Test - Power Fail Mode**

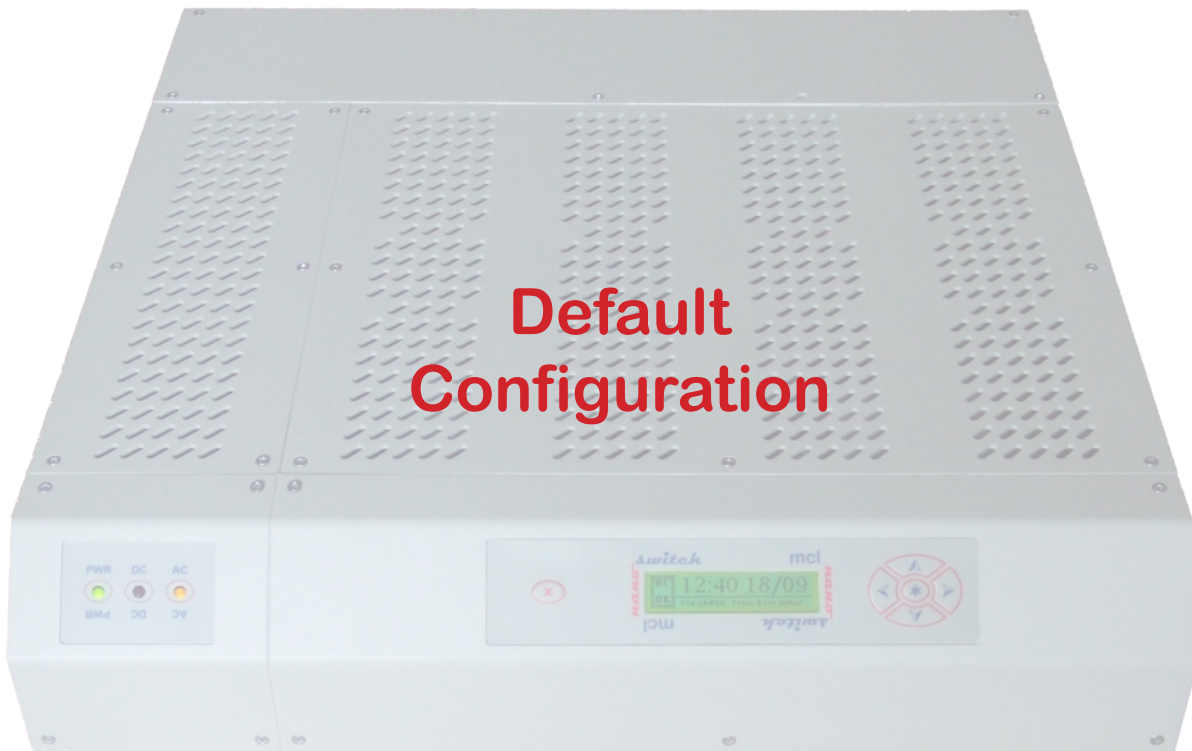
Test	Action	Response	Possible Problems
1	Turn the exchange on	When the exchange has started up and is running, the main relay will be activated, and the contacts closed.	
2	Turn the exchange off	The main relay will be de-activated and the contacts opened.	

**M90 Signal Relay Module Test - Other Modes**

The M90 signal relay module can be used in different modes, depending on the requirements discussed with **mcl**. Test schedules will be provided with these modes.



# Default Configuration





## Default Configuration Table

This is the factory configuration for a nanoSwitch. The extension are numbered from 100.

Board	Port	Ext #	Class	Tie Access	PA Access	Transfer	Interrupt
1	1	100	Officer	✓	✓	✓	✓
1	2	101	Officer	✓	✓	✓	✓
1	3	102	Officer	✓	✓	✓	✓
1	4	103	Officer	✓	✓	✓	✓
1	5	104	Officer	✓	✓	✓	✓
1	6	105	Officer	✓	✓	✓	✓
1	7	106	Officer	✓	✓	✓	✓
1	8	107	Officer	✓	✓	✓	✓
1	9	108	Crew		✓	✓	
1	10	109	Crew		✓	✓	
1	11	110	Crew		✓	✓	
1	12	111	Crew		✓	✓	
1	13	112	Crew		✓	✓	
1	14	113	Crew		✓	✓	
1	15	114	Crew		✓	✓	
1	16	115	Crew		✓	✓	
2	1	116	Crew		✓	✓	
2	2	117	Crew		✓	✓	
2	3	118	Crew		✓	✓	
2	4	119	Crew		✓	✓	
2	5	120	Crew		✓	✓	
2	6	121	Crew		✓	✓	
2	7	122	Crew		✓	✓	
2	8	123	Crew		✓	✓	

Board	Port	Ext #	Class	Tie Access	PA Access	Transfer	Interrupt
2	9	132	Crew		✓	✓	
2	10	133	Crew		✓	✓	
2	11	134	Crew		✓	✓	
2	12	135	Crew		✓	✓	
2	13	136	Crew		✓	✓	
2	14	137	Crew		✓	✓	
2	15	138	Crew		✓	✓	
2	16	139	Crew		✓	✓	
3	1	140	Crew		✓	✓	
3	2	141	Crew		✓	✓	
3	3	142	Crew		✓	✓	
3	4	143	Crew		✓	✓	
3	5	144	Crew		✓	✓	
3	6	145	Crew		✓	✓	
3	7	146	Crew		✓	✓	
3	8	147	Crew		✓	✓	
3	9	148	Crew		✓	✓	
3	10	149	Crew		✓	✓	
3	11	150	Crew		✓	✓	
3	12	151	Crew		✓	✓	
3	13	152	Crew		✓	✓	
3	14	153	Crew		✓	✓	
3	15	154	Crew		✓	✓	
3	16	155	Crew		✓	✓	

The external lines are numbered from 800 to 805 for AG2120 Tie lines, and 850 for M10 Public Address Module. M90 Signal Module is for power/system fail relay output.

Board	Port	Access #	Type	Default Extension
4	1	800	Tie Line	104
4	2	801	Tie Line	104
4	3	802	Tie Line	104
4	4	803	Tie Line	104

Board	Port	Access #	Type	Default Extension
4	5	804	Tie Line	104
4	6	805	Tie Line	104
4	7	-	M90 Signal	-
4	8	850	M10 PA	-



# Standard Commissioning Report Sheets







## Commissioning Report Sheet

These tables allow for a report to be kept as the nanoSwitch is commissioned. The first table is for a factory configuration. The blank sheet is for your use. For programmed systems, configurAID for nanoSwitch can produce similar check sheets.

Board	Port	Ext #	Ship Location	Correct Exchange Position	Correct Ext. #	Ring OK	DTMF OK	Notes
1	1	100						
1	2	101						
1	3	102						
1	4	103						
1	5	104						
1	6	105						
1	7	106						
1	8	107						
1	9	108						
1	10	109						
1	11	110						
1	12	111						
1	13	112						
1	14	113						
1	15	114						
1	16	115						
2	1	116						
2	2	117						
2	3	118						
2	4	119						
2	5	120						
2	6	121						
2	7	122						
2	8	123						
2	9	124						
2	10	125						
2	11	126						
2	12	127						
2	13	128						
2	14	129						
2	15	130						
2	16	131						

Board	Port	Ext #	Ship Location	Correct Exchange Position	Correct Ext. #	Ring OK	DTMF OK	Notes
3	1	132						
3	2	133						
3	3	134						
3	4	135						
3	5	136						
3	6	137						
3	7	138						
3	8	139						
3	9	140						
3	10	141						
3	11	142						
3	12	143						
3	13	144						
3	14	145						
3	15	146						
3	16	147						

[illegible]

[illegible]