NEXUS
WIRELESS ALERT

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User Guide

Table of Contents

1. Quick Start

1) Remove lid using a screwdriver. Please note the lid is fitted with push and quarter turn screws.

2) Taped inside the lid you will find a black plastic key which is used to re-set the call point along with the power jumper (JP2). You may wish to find a safe place to keep the re-set key.

3) Insert the batteries or if you are using your own batteries insert these – please note that we recommend EVE ER34615 Lithium D cells for maximum performance.

4) On the left hand side of the PCB board connect the JP2 jumper.

5) The LED screen will light up HI

6) Replace the lid – NEXUS is now ready to operate.

7) If you wish to test the system this is best done using the Master unit with the external key. Press the black button on any call point. The sounders and beacons within range will all start to operate within seconds.

8) To cancel the test turn the external key on the Master to ON for 2 seconds. Sounders and beacons within range will stop in a few seconds. If not, repeat this step.

9) To re-set the call point that was activated, insert the black plastic re-set key into the bottom of the call point.

10) Please note that resetting the call point does not reset the unit. This must be done via the master external key.

11) If you wish to adjust the volume on the sounder, twist it off the base-unit to access the switches underneath.

12) Follow the instructions on the base to change the sound level and pattern if required.

2. Basic description

The NEXUS Alert System consists of one or more battery powered units all of which communicate to create a wireless network. The maximum number of Units in a network (installed on one site) is 64.

NEXUS units complement wireless Genesis PIRs (both Genesis1 and Genesis2 types) and should not interfere or cause significant communication problems.

Master units are equipped with a re-set key and **STOP** button.
Other units are classed as Basic units and have only a **FIRE** button.

Basic Unit can be used for following actions:

- To activate FIRE Alert (when FIRE button broken & device is in NORMAL OPERATION mode)
- To activate SILENT_TEST_FIRE (when FIRE button broken & device is in SILENT_TEST mode)
- To deactivate SILENT_TEST_FIRE (when FIRE button fixed & device is in SILENT_TEST mode)

Master Unit has a FIRE button and a STOP button and can be used for the same actions as Basic Units, plus the following:

- To STOP ongoing FIRE Alert (stops Sounder and Lights of all Units)
- To switch into SILENT TEST mode or back to NORMAL OPERATION mode

Master Unit has a FIRE button and a STOP button and can be used for the same actions as Basic Units, plus the following:

- To STOP ongoing FIRE Alert (stops Sounder and Lights of all Units)
- To switch into SILENT TEST mode or back to NORMAL OPERATION mode

Master Unit(s) should be installed in a room that is not accessible to the public, only to person(s) authorised to carry out NEXUS Alert System maintenance/service.

Operations made by Master Units can also be made by the Genesis IP Masthead if such a feature is supported. The IP Masthead via TCP Client can enter commands that will control these operations (or NEXUS/NVR can do the same automatically).

Possible configurations of the NEXUS System are:

- One or more Basic Units + One or more Master Units
- One or more Basic Units + One or more Master Units + IP Masthead
- One or more Basic Units + IP Masthead, (no Master Unit) – not recommended

Recommended is to have at least 1 Master Unit on site, even if IP-Masthead with AlarmSystem/NVR have control over the Fire Alert System. The Master Unit can serve as a "first aid",
i.e. to STOP Fire Alert if automatic control fails.

3. Setup of Unit, Menu Parameters

Both Basic and Master Units contain the same hardware.
On the bottom left corner of the PCB is [88] display with 4 buttons underneath. (The button "X" next to the display is currently not used).
Buttons and display provide user interface to the configuration of the parameters. The buttons are:

(Select)	**II>**	**^**	(Up)
(Memory)	**M**	**v**	(Down)

How to use it:

If the display is completely off (no segment lights), then the device is working normally.
In order to access the Setup Menu, press Select button and hold it down until display wakes up (anything displayed). Now press the Select button repeatedly to scroll between available Parameter names.
When you stop touching the Select button, after a few seconds it will flash the current value of the selected Parameter. Use buttons Up/Down to edit the value.
Tip: hold Up or Down pressed, it counts automatically.

After setting the Parameter to the desired value (or leaving it without change) continue with the Select button. Scroll to the next Parameter name you need to edit, set it; repeat until all Parameters have desired values.

In order to **“Apply”** all changes (at once) and store the new Setup values to EEPROM, press Memory button and hold it down, until displaying of “bottom segments” changes to “upper segments”. This takes about 5 seconds. Then release the Memory button and the Parameters are saved. The device will reset itself and re-start with updated parameters loaded from EEPROM. (Shows “HI” on display shortly after Reset).

If the Memory button is pressed and released before the “upper segments” are displayed, then the device makes **“Cancel”** operation, ignores the Parameter changes and will self-Reset and restart with the old parameters. No changes will be saved.

Tip: if you need to RESET the Unit, just hold Memory or any of the 4 buttons until Display wakes up, then press the Memory button repeatedly to **“Cancel”** the operation.

Parameters available:

Name displayed	Range	Default Value	Meaning
SI	1..32	1	Site
SU	1..8	1	Subnet
Un	1..64	1	Unit
Cr	0/1	1	CALL Repeater, 1=Enabled / 0=Disabled
CP	3..99	30	CALL Period, values 3..50 are [minutes], values N=51..99: time = 50+(N-50)*5 minutes
MU	0/1	0	Master Unit, 1=Enabled / 0=Disabled
SP	0/1	1	Serial Port, 1=Enabled / 0=Disabled

4. Installation on site: Site, Subnet, Unit

If an IP Masthead is being used then read its **SITE** and **SUBNET** settings. These can be set via DIP switches on the PCB board or via command, values are visible on begin of initial text printed on (power-up) Reset.

The same **Site & Subnet** numbers must then be configured on all NEXUS Units.

All Basic Units and Master Units must have individual **Unit** numbers and the same **Site & Subnet.**

If the NEXUS System is being used without an IP Masthead, then choose any **Site & Subnet.**

Each of the NEXUS Units must have a unique **Unit** number which cannot be repeated. Numbers can be the same as those used for PIRs (if operating these with the same IP Masthead). Sharing the same **Unit** number between NEXUS Units and Genesis PIRs causes no conflict.

Please do not fit NEXUS units directly to a metal wall as this interferes with the signal. If you cannot avoid this, we recommend spacing the unit away from the metal wall with a 5cm wooden baton.

5. CALL Repeater

Each unit regularly transmits CALL messages. These messages serve as a "heartbeat", carrying information about the battery status and enabling the Masthead to track the Unit and check it alive and working.

If all NEXUS Units are in RF transmission/reception range of the IP Masthead, then there is no need to use Repeaters and all Units can have SET CALL REPEATER Disabled.

Some sites, such as those with thick walls or walls combining metal and concrete can prove problematic for transmission and in these circumstances a Repeater may have to be used. In these cases the Unit must have the "CALL REPEATER ENABLED and this will support the propagation of CALL messages.

It is not recommended to have all Units in CALL REPEATER ENABLED mode as such units make more retransmissions. Only use this mode when repeaters are used – this will also save on battery power.

6. CALL Period

CALL Period is the nominal period of regular CALL transmission. The real periods are random, around +/-6% to the nominal value (to prevent collisions).

The call periods can be set from 3 minutes up to 295 minutes (4.9 hours)

Parameter Value	Time
3..50	3..50 minutes
51	55 minutes
52	60 minutes
...	... time = 50+(N-50)*5 minutes
99	295 minutes; time = 50+(99-50)*5 = 295 minutes

Under normal circumstances the Parameter Value will be the same on all the NEXUS Units, but each can be set with different values if required.

Please note that the smaller the value, the shorter the battery life, however shorter values also mean a faster refresh indicating the health of the unit to the Masthead.

7. Master Unit

This parameter is currently not used. Reserved for future versions of firmware.

8. Serial Port

It is recommended that you keep Serial Port Enabled. If no RS232 cable is connected to dedicated pins of CON4, then RS232_circuit is automatically switched to power-down mode, so it takes no additional current.

9. Indicator states

The LED inside the NEXUS FIRE button serves as indicator.

Some NEXUS Alert System actions/operations may take about a minute, and during certain states user must wait until unit is ready for another operation.

For example, when user presses the FIRE button, the NEXUS unit starts immediately (Sounder & Light ON) and also starts RF transmission with many repetitions to guarantee it will propagate to all other units.

During this long RF transmission series the indicator is permanently ON (for about 1 minute), which means the function is Busy and should not be interrupted.

Master Units are equipped with three types of transmission:

STOP (to stop all Units' sounders and lights), **SILENT TEST ENABLE** and **SILENT TEST DISABLE.**

These transmissions also need to propagate to all other units and take about 1 minute, which is indicated as Busy.

Possible indicator states are:

a) permanently ON (about 1 minute) means **Busy** making a long transmission series
b) toggling ON/OFF with period 1s …… **"Silent Test Enabled"** // ready for Silent Test
c) toggling ON/OFF with period 200ms ….. **"FIRE button left activated"** // don't forget to fix it !
d) permanently_OFF ……**"Ready"** for FIRE activation, normal state, taking low current
e) mostly OFF, 200ms flash every 3s …… like d), but also indicating **"Battery Low"**
f) permanently_OFF but appears several seconds ON …… means **"Short Activity"**, probably making CALL or CALL-retransmission

10. Operations (actions)

a) NEXUS FIRE Alert

Normally, the NEXUS Fire Alert Unit should be indicating **“Ready”** state.

If indicating **“Battery Low”** then replacement of batteries is required. Use 2 x Lithium battery type EVE ER34615 (D-cell, 3.6V, 19Ah). Before removing the batteries from the device, unplug jumper JP2. After insertion of the two cells plug the jumper back to switch On. **“HI”** appears on the LED display for 1second.

Please note that when unit is in **“Ready”** or **“Battery Low”** mode the average power consumption is below 500uA.

FIRE button (glass switch) is in Idle position, ready for Fire Alert.

Note: FIRE button must be at least 10s in Idle position before it is ready for Fire Alert. Don’t forget to wait a bit after switching the unit On via jumper JP2.

In the case of FIRE situation, the FIRE button can be pressed (glass broken).

Once activated, the beacon containing sounder and strobe starts a 6 second long initial RF transmission as well as a series of other transmissions, total time of transmissions is about 1 minute. During this time a **“Busy”** state is indicated (indicator LED permanently ON).

Each unit that receives the FIRE Alert message activates it's own beacon and makes it's own transmission as above. This mechanism enables propagation to all NEXUS Units installed on site, as long as they have the same Site and Subnet settings.

The speed of NEXUS Alert propagation depends on many factors, particularly the maximum distance between units. If the distance is more than the RF link range, then one or more units must serve as Repeaters and each re-transmission increases the propagation delay.

If all mutual distances between all units are lower than the RF link range, then reactions should be very quick and all units could be activated within a few seconds (by the initial 6s long transmission).

The FIRE Alert action ends about 1 minute after activation of Source Unit.

The indicator on all units indicates **"Busy"** until the STOP button on the Master unit has been activated.

An exclusion is only the Source Unit, whose indicator changes, it shows **"FIRE button left activated"**; remains indicating this state until FIRE button reverted to Idle position.

Note: If the FIRE button is activated on one unit (i.e. Source Unit) it can be reverted back to Idle state immediately. In this scenario the sounder will stop after 10 seconds, this being the minimum activity length. The strobe would remain ON. This should only enable to recognize the Source Unit has the FIRE button fixed. But still, all other units have both Sounder & Light activated.

The only way to stop everything is to make STOP Action.

b) Stop Action

When one or more units have activated their sounders and strobe it is possible to stop them all via STOP Action. Press the STOP button on any Master Unit, hold it down for about 4 seconds (must be between 2 and 10 seconds) and then release the button. You do not have to wait for all NEXUS units to be activated before performing this action.

The display will change to **“Busy”** (immediately when the STOP button is released) and the unit will start it’s 6 second long initial RF transmission plus a series of other transmissions, total time of transmissions is about 1 minute. During this time a **“Busy”** mode is indicated (indicator LED permanently ON).

It is similar process like FIRE Alert, but now a STOP message is being propagated; as it is a newer message, it has priority over FIRE Alert messages (if not finished yet). So, propagation of FIRE Alert messages is stopped and replaced with STOP messages.

Each NEXUS unit receiving the STOP message deactivates it’s Beacon (both sounder and strobe) and launches a series of re-transmissions for the rest of the 1 minute period. This mechanism enables propagation to all NEXUS Units installed on site (only those with the same Site and Subnet settings).

The STOP action ends about 1 minute after releasing the STOP button on the Master Unit. Indicators on all units should change within one second - **“Busy”** mode will change to **“Ready”** (indicator permanently OFF).

Note: If the FIRE button on the **Source Unit** is still activated (not reverted back yet) then this unit's indicator shows **"FIRE button left activated"**; remains indicating this state until FIRE button reverted to Idle position.

Person authorized for Fire Alert System maintenance should check that all units indicate **"Ready"** state (indicator permanently OFF). Then only the system is ready for next FIRE Alert.

Troubleshooting:

In some cases the STOP message may not be delivered to all units and some (one or more units) remain with beacons activated. In this situation wait until the Master Unit (used) indicates "Ready" state (i.e. previous 1 minute transmission series has finished) and repeat the STOP Action activation (hold STOP for 4 seconds and release). A new STOP transmission series will start.

It is possible, that STOP Action will have to be repeated up to 3 times.

If the STOP Action has still failed after three attempts then follow these steps:

- wait at least 6 minutes, then repeat the STOP Action again.

c) SILENT TEST ENABLE Action

This can only be carried out if all units indicate **“Ready”** mode.

Press the STOP button on any Master Unit, and hold it down until the indicator goes ON (changes to **“Busy”** mode – takes about 10 seconds) then release the button.

Indicator shows **“Busy”** mode and the unit starts a 6 second long initial RF transmission and series of other transmissions - the total time of transmissions is about 1 minute; during this 1 minute a **“Busy”** state is indicated (indicator LED permanently ON).

Each unit that receives the SILENT TEST ENABLE message changes the indicated state from **“Ready”** (permanently OFF) to **“Busy” (**permanently ON) and launches a series of re-transmissions (for the rest of the 1 minute period). This mechanism enables propagation to all NEXUS Units installed on site (that have the same Site and Subnet settings).

This action lasts about 1 minute from the STOP button being pressed. Indicators on all units should change at the same moment (within one second). **“Busy”** mode changes to **“Silent Test Enabled”** (toggling ON/OFF with 1 second period).

All units that received SILENT TEST ENABLE message (including the Master Unit which initiated it) are now ready for SILENT TEST.

d) SILENT TEST FIRE Action

This can only be carried out on units that indicate **“Silent Test Enabled”** mode (toggling ON/OFF with 1 second period).

If a FIRE button is pressed (activated) on a unit that indicates a **“Ready”** state, then it launches normal FIRE Alert that activates also all Sounders !

Press the FIRE button on one unit (selected for testing).

Indicator shows **“Busy”** mode and the unit starts 6 seconds long initial RF transmission plus series of other transmissions, total time of transmissions is about 1 minute. During this time a **“Busy”** mode is indicated (indicator LED permanently ON).

As this unit indicated **“Silent Test Enabled”** instead of normal **“Ready”** state, it starts a transmission of SILENT TEST FIRE message instead of normal FIRE Alert message.

Only units that have been switched to **“Silent Test Enabled”** mode will react to this action.

Each unit that receives the SILENT TEST FIRE message switches strobe light ON (sounder remains OFF) and launches a series of retransmissions (for the rest of the 1 minute period). This mechanism enables propagation to all Fire Units installed on site (that have the same Site and Subnet settings).

After the 1 minute long indication of **“Busy”** mode (permanently ON, during transmission series) the unit reverts to the original indication of **“Silent Test Enabled”** (toggling ON/OFF with 1 second period).

If the Source Unit (unit whose FIRE button was activated) has the FIRE button still in active position, then this unit’s indicator shows **“FIRE button left activated”** and continues to show this mode until the FIRE button is reverted to the Idle position.

Reverting the FIRE button back to the Idle position launches a new transmission now, it is SILENT TEST DONE mode that takes 1 minute and all units will switch Light OFF.

When all units have Light OFF, the system is now ready for testing of another unit.

If necessary, repeat this action with all units. This will verify that all FIRE buttons are operating correctly and that transmission range is correct and reaching all units (and Masthead if used).

e) SILENT TEST DISABLE Action

Any Master Unit that currently indicates **“Silent Test Enabled”** state (toggling ON/OFF with 1 second period) can be used to Disable this function.

Press the STOP button on any Master Unit and hold it down until the indicator goes ON (changes to **“Busy”** mode - should take about 10 seconds), then release the button.

Indicator shows **“Busy”** mode and the unit starts about 6 second long initial RF transmission plus series of other transmissions, total time of transmissions is about 1 minute. During this time a **“Busy”** mode is indicated (indicator LED permanently ON.

Each unit receiving the SILENT TEST DISABLE message changes the indicated mode from **“Silent Test Enabled”** (toggling ON/OFF with 1 second period) to **“Busy”** (permanently ON) and launches a series of re-transmissions (for the rest of the 1 minute period). This mechanism enables propagation to all NEXUS Units installed on site (that have the same Site and Subnet settings).

This action ends about 1 minute after launching it via the STOP button on the Master Unit. Indicators on all units should change at the same time (within a second). None will indicate a **“Busy”** modes but will change to **“Ready”** (permanently OFF).

All units that received SILENT TEST DISABLE message (including the Master Unit which initiated it) are now ready for normal operation.

11. Battery state reading

This function is only available if you are using the IP Masthead.

In order to update information about the battery voltage it is necessary to make operation **SILENT TEST ENABLE** via any Master Unit and then make **SILENT TEST FIRE.**

All units that receive this command and switch Light ON (with Sounder OFF) will make a battery voltage reading during the first 7 seconds of this Light flashing. The current pattern of the Strobe Light is known and microcontroller is able to measure and analyze Battery state during operation of Strobe Light used as a load. If measurement is completed successfully, then "last known" Battery Voltage is registered and this value expressed in [%] is carried in CALL messages (so IP-Masthead users can read it).

As a 100% is taken voltage 7.2V (== 2 x 3.6V Lithium Batteries in serial).

Voltage is also compared with threshold, if lower than 70% (i.e. 5.04V) then **"Battery Low"** indication overrides **"Busy"** indication.

This will last until next **SILENT TEST FIRE** is launched.

12. Maintenance

Person(s) authorised for NEXUS Alert System maintenance/service should make note of the following:

- Check battery status of all units once a month.
- At least once a month check that all units are in RF link range from the Master Unit. Carry out the **SILENT TEST ENABLE** action and check all units are indicating **"Silent Test Enabled"** state (toggling ON/OFF with 1 second period. Then make a **STOP** Action and check all units are indicating **"Ready"** state (permanently OFF).
- Once a week check that all units are indicating **"Ready"** state (permanently OFF)
- If a new Unit or more Units are installed or changed position, then carry out complete testing; see chapter 10 / **SILENT TEST ENABLE + SILENT TEST FIRE + SILENT TEST DONE + SILENT TEST DISABLE;**