OPERATION MANUAL
FOR
NRT302
DATA TERMINAL

1. IMPORTANT INFORMATION

FCC ID: **OOANRT302**

IC: **3539A-NRT302**

Model: NRT302

The FCC and IC id's can also be seen on the terminal's LCD during start up or by pressing 5 and 0 for one second at any time.

FCC Compliance Warning

WARNING: Changes or modifications to the transmitter not expressly approved by the manufacturer could void the user's authority to operate this RF device.

FCC & IC Compliance Statement

This device complies with Part 15 of the FCC Rules and Industry Canada licence exempt
RSS standard(s).
Operation is subject to the following two conditions:
1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.
Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by
Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power
(e.i.r.p.) is not more than that necessary for successful communication.

IC Attestation de Conformité

Le présent appareil est conforme à la partie 15 de la réglementation de la FCC et aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:
1. L'appareil ne doit pas produire de brouillage, et
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi,

même si le brouillage est susceptible d'en compromettre le fonctionnement.
Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

USA-Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications.
However, there is no ensured specification that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:
• Reorient or relocate the receiving antenna.
• Increase the distance between the equipment and the receiver.
• Connect the equipment to outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement
"This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment."

IC
This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du
Canada.

2. INTRODUCTION

The NRT302 data terminal is a hand-held wireless keypad and display for entry of numeric data. This terminal provides the primary data entry method of the NOMAD system.

Data entry is guided by menus displayed on the graphic display.

The terminal is powered by rechargeable batteries with a built in charger that draws DC power from a charging adapter. In an emergency, the rechargeable battery may be replaced by standard alakaline batteries providing no attempt is made to charge the unit while fitted with the non-rechargeable battery.

The terminal does not have to be in radio range for data entry to take place. All data entered is stored in the terminals own memory (the memory is maintained even if the battery is discharged) and then sent to the NOMAD system whenever there is a good communication link. To the operator this is a seamless process. This is a key strength of the NOMAD system - essential operation is guaranteed regardless of sporadic radio interference.

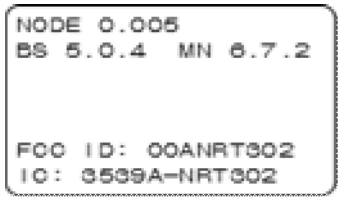
3. SETTING UP A TERMINAL FOR FIRST USE

Before a terminal can be used on the NOMAD network it must be assigned a node number so that the system can distinguish it from other terminals in the system. This will also clear the memory of the terminal and inform the system that all relevant menus should be uploaded into the terminal.

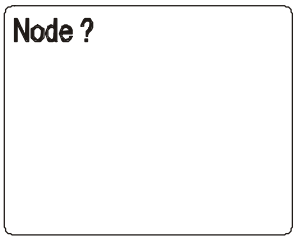
3.1 ENTERING A NODE NUMBER

Every terminal on a given system must be uniquely identified by a node number. Entering a node number on a terminal also initialises it for use on the system by clearing the terminals memory and requesting a full update from the system of all menus.

After inserting the batteries or removing the terminal from its charging station a startup message is displayed.



To set the node number, press the 3 and the 9 keys simultaneously while this message is displayed. The prompt “Node ?” will be shown.



The node number is entered as 5 decimal digits: xyzzz

zzz = the node number.
y = the language.
x = the system number.

The node number itself can be in the range 1 to 231. It is these three digits that identify the terminal on the system.

The language number can be in the range 0 to 3 and indicates which language the menus should be. The default system language is 0. Additional languages (up to three) can be defined in the system setup for NOMAD and individual nodes then initialised to one of these. This way employees of different languages may work on the system side by side. Note that to change language the terminal has to re-initialised and its memory cleared as above. If a language number is entered that hasn't been defined in the NOMAD system then the default language is used.

The system number can be in the range 0 to 3. The default system number is 0. Different system numbers can be entered in the Radionet application and a terminal will only communicate with a system on its own number. This allows adjacent systems to work independently.

After entering the node number as above press the 'ENT' key. The terminal will then initialise its memory after which the startup message will be displayed again.

3.2 CHANGING OPERATING MODES

The terminal can be set to be used by an individual or by a group. The normal mode after initialisation is for individual use.

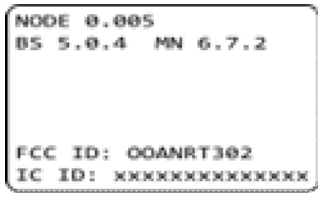
Multi-user mode is intended for the situation where a supervisor is entering in data for several employees. It allows the operator number and time to be set for each data entry.

The mode is changed in a similar fashion to setting the node above. During the startup screen press the '4' and the 'CLR' keys simultaneously. Each time this is performed the mode will toggle between normal and multi-user.

4. THE LCD SCREEN

4.1 STARTUP MESSAGE

The start-up message indicates the firmware versions for the terminal along with the system and node numbers.

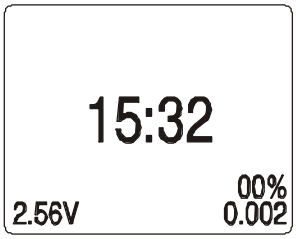


In the example above the firmware bootstrap is version 5.0.5, the main code version is 5.7.4, the system number is 0 and the node number is 002.

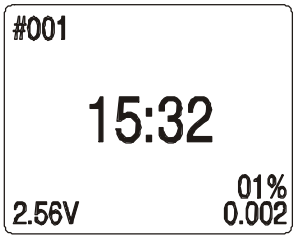
The start-up screen shows for 5 seconds and is shown whenever the terminal is removed from the charging station or the batteries are inserted.

4.2 STANDBY MODE

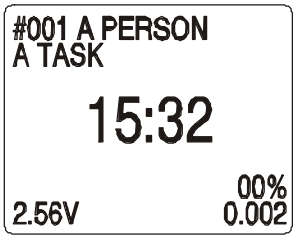
The default display for the terminal takes the general form below,



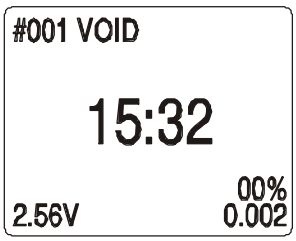
A typical display after removing a terminal from the charging station. It shows the time, the node number and the percentage of memory used. It also shows the operator number and name of the person registered to the terminal along with the currently selected task for RFID use.



This shows that operator 1 has clocked on. There is one message (01%) waiting to be sent to the system (the clock on message).



The message has been sent (00%) and confirmation that operator 1 is recognised in the system is shown by displaying their name. If operator 1 had not been recognised then the following would be displayed.



If the battery starts to get low the “Batt” symbol will alternate with the battery voltage in the lower left corner. When the battery has insufficient power to operate the terminal reliably the “Batt” symbol will be displayed continuously.

4.3 PAGING FACILITY

There is a facility within the NOMAD system to send short text messages to specific terminals. When such a message is received and the terminal is in standby mode it will give a series of beeps and the standard display will be replaced by the text message, which will flash on and off.

To cancel the message and return to normal standby mode press and hold the 4 and 6 keys as if about to enter data. This will cancel the page message. Press the ‘CLR’ key to return to standby mode.

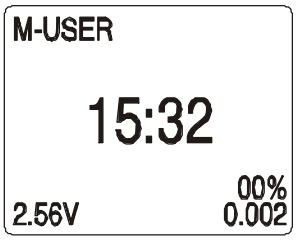
4.4 FEEDBACK

If operator feedback is enabled on the NOMAD system a message is sent to the operator after each task code (for which feedback has been defined) has been received by the system. When the terminal receives the message a double beep will be emitted.

To view the feedback message press and hold the up arrow key while in standby mode. Releasing the up arrow key will return the terminal to standby mode.

4.5 MULTI-USER

If in multi-user mode the operator number/name will be replaced by "M-USER"



5. ENTERING DATA

The normal state of the terminal is standby - the keypad is locked against accidental operation.

5.1 NORMAL MODE

To exit the standby mode press and hold the 4 and the 6 keys together. A prompt inviting the user to "Enter Command" will be displayed.

Note that all or some of the prompts may have been redefined in the NOMAD system depending on the language settings.

Key in the number of the task to be entered. As the digits are keyed in a menu prompt will be displayed if the task code is one that has been defined.

Alternatively, if the task code is not known press and hold up or down arrow keys to scroll up and down through the available task codes.

Press the 'ENT' key when the desired task code is displayed. Further prompts may be displayed requesting the user to in turn enter any additional parameters required by the task code. For example, after pressing 'ENT' for

"Clock In" the user is prompted for "Operator" and should enter their works number.

The number of digits that the terminal will accept will vary depending on the parameter and the setting made in the NOMAD system.

Note that the terminal will only accept codes other than "Clock In" (code 0) if the user has clocked in. Once clocked in the prompt for code 0 will change to "Clock Out". After pressing enter to "Clock Out" the user will be prompted to "Confirm". This is done by pressing the 'ENT' key again.

5.2 MULTI-USER MODE

To exit the standby mode press and hold the 4 and the 6 keys together. A prompt inviting the user to "Enter Operator" will be displayed.

Enter the operator number for the task to be entered and press 'ENT'. A prompt inviting the user to "Enter Time" will be displayed.

The current time will be display in the lower right corner of the screen. To accept this press the 'ENT' key, else key in the required time and press the 'ENT' key.

The rest of the process is as per section 5.1 above.

6. RFID ENTRIES

All entries can also be made with the built in RFID reader. Pressing the scan will activate the RFID reader for 10 seconds or until a valid tag is found. The terminal should be placed with the rear of the casing adjacent to the RFID tag/card to be read.

6.1 WARNING TONES

There are three possible results of reading an RFID tag and each produce a different type of beep from the terminal.

- The tag is read and accepted – single beep
- The tag is read correctly but rejected (for example, an attempt to enter a task before being clocked in) – three distinct beeps.

- The terminal was unable to read the tag – long waning tone with two distinct pitches.

6.2 RFID TYPES

The standard terminal will only recognise MIFARE RFID tags or cards.

6.3 MAKING AN ENTRY

A typical sequence for operator 1 and task number 3, interrupted by task 100 might be as follows.

1. Scan “clock in 001” label (in the canteen/entrance area)
2. Scan “select task 003” label (in the canteen/entrance area)
3. Scan “row” label (in the glasshouse)
4. Scan “row” label (in the glasshouse)
5. Scan “enter task 100” (in the canteen/entrance area)
6. Scan “row” label (in the glasshouse)

In the above sequence, the first scan (clock in) results in an entry in the terminal. The second scan (select task) does not produce an entry in the terminal. The third and fourth scans produce entries for task 3 with the row number scanned. The fifth scan (enter task) produces an entry in the terminal.

The meaning of the task numbers depends on how the system has bee set up, task 3 might be to de-leaf a row of fruit and task 100 might be a coffee break.

Note that the selected task remains selected in the terminal even when a directly entered task (such as coffee) is scanned. In this way the operator can continue with their selected task by scanning the next row number.

6.4 KEYPAD ENTRIES

It is also possible to use a combination of keypad entries and RFID entries. It might be desirable for the operator to use keypad entries for clocking in/out and selecting tasks and only using the RFID labels for the rows for instance.

Conversely, some customers might not appreciate the benefits of labelling every row within a glasshouse yet want greater security over clocking in and task selection. With this in mind a RFID only mode is available.

6.5 RFID ONLY MODE

In RFID only mode, it is still possible to enter a row via the keypad but all other entries, including task selection, must be made via the keypad. RFID only mode is indicated on the screen via "BC" in the top right corner.

To activate/deactivate the RFID only mode the '0' and '2' keys should be held down while the start-up screen is shown (see section 2).

7. ERROR MESSAGES

7.1 CLOCK NOT SET

If the internal clock has not acquired the current time from the NOMAD system then an error message will be displayed "CLOCK NOT SET". If this message is displayed ensure that the terminal is within range of a link unit to allow the terminal to acquire the time. Once the time is acquired the internal clock of the terminal will maintain the time until power is lost.

7.2 FLAT BATTERY

If the rechargeable battery is at a level where safe data entry cannot be guaranteed the terminal will prevent the operator from entering data and a "Flat Battery" message will be displayed whenever data entry is attempted.

The terminal should be placed back in its charger and the battery allowed to charge. Alternatively, the battery could be replaced with a spare fully charged battery.

DATA WILL NOT BE LOST IF THE BATTERY FULLY DISCHARGES.

7.3 MEMORY FULL

If the memory has insufficient space to make another entry the "Memory Full" message will be displayed. If this happens ensure that the terminal is

in communication range of a link unit to allow the system to extract the data and therefore free up memory. While this is happening the % meter in the lower right corner of the display will be seen to decrement as each message is sent.

8. CHARGING

There is no on/off switch on the terminal. It is intended that it is either in use or on charge. No harm will be done to the battery if the terminal is left on charge for indefinite periods.

To charge the terminal place it in the charging station so that it is sitting with the display showing and ensure that the terminal is slid all the way down in the charging station. After a second has elapsed the terminal will beep and the message "CHG1" or "CHG3" will be displayed. These messages indicate that the terminal is charging.

The charging cycle and the meaning of the "CHG" messages is as follows.

CHG1 The battery is very discharged and is being slow charged. When sufficient charge has been put into the battery it will switch to fast charge.
CHG3 The battery is being fast charged. When the battery is fully charged it will switch to trickle charge.
CHG4 The battery is fully charged and is now being trickle charged to maintain its charge.

A fully discharged battery will take around 7 hours to recharge.

9. MAINTAINENCE AND CARE

The NRT302 terminal has been designed to give reliable service in the intended environment and is largely maintenance free.

9.1 BATTERIES

With normal use the expected life time of the supplied batteries is 500 charge/discharge cycles, after which they should be replaced. For optimum performance it is recommended that the batteries be replace annually.

9.2 KEYPAD

On no account should the keys of the terminal be pressed with sharp or hard objects - including fingernails. Use of such objects may result in premature failure of the keypad.

10. SPECIFICATION

Power	2x 1.2V 700mAh NiMH AAA.
Average Consumption	25mA
Charging Input	9-15V DC @ 55mA max
Radio link frequency	915MHz
RFID frequency	13.56MHz
Environmental protection	IP65

10.1 COMMUNICATION RANGE

Communication range is subject to local environmental conditions. The NRT302 terminals are designed to have a typical communication distance of 50m from a link unit in a glasshouse.

Communication range will be affected by local conditions and no guarantee can be made of the actual communication range encountered in an individual situation.

It should be noted that during periods of communication blackout the terminal will continue to function normally (with the exception of feedback and paging) and any entered data will be automatically transferred when communication is re-established.