

SATLOOK Digital-NIT

MANUAL



Emitor AB

Owner's Manual

Thank You for purchasing a Emitor AB SATLOOK Digital NIT-instrument.

This manual covers the operation and maintenance of the Emitor AB SATLOOK Digital NIT-instrument.

All information in this publication is based on the latest product information available at the time of printing.

Emitor AB reserves the right to make changes at any time without notice and without incurring any obligation.

No part of this publication may be reproduced without written permission.

This manual should be considered a permanent part of the instrument and should remain with it if it is resold.

If a problem should arise, or if You have any questions about the instrument, consult an authorized Emitor AB dealer.

! Notice !

Operating a SATLOOK Digital NIT-instrument requires special skills. Please read this Owner's Manual thoroughly before operating the instrument.

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1. Description:

The Emitter SATLOOK Digital NIT is a Swedish designed Spectrum-analyzer and SAT-TV instrument. The SATLOOK Digital was engineered for the precision alignment and adjustment of satellite-dishes. This instrument was designed for the professional when accurate and precise information is needed.

With ease of operation through powerful processor technology - there's no need for a lot of unnecessary buttons and knobs. The basic functions are easy to access and only take minutes to learn.

A 4.5" B/W-monitor is provided which shows either normal SAT-TV-channel, the frequency spectrum 950-2150 MHz (or parts thereof) alt. Digital data.

Menus/help-displays are shown on the LCD-screen (64x128) beside the monitor.

Analog SAT-TV channels can be tuned in and viewed upon (Multistandard Video –PAL, NTSC and SECAM).

Audio frequencies between 5.5 – 8.5 MHz may be listened to.

The Spectrum function spans the frequency band 920-2150 MHz.

The spectrum can be expanded (zoom in) for correct adjustment of polarization ("cross-polarization").

The instrument has high resolution for accuracy. It presents measured data ± 2 dB (at around 20 C).

Frequency tuning is done with the main knob in 1 MHz steps with the frequency displayed either on the monitor or on the LCD.

SATLOOK Digital NIT presents, under a sub menu, digital information like BER (bit error rate), constellation-diagram (QPSK) and S/N (signal/noise ratio) for both DirecTV and DVB formats.

The SATLOOK Digital NIT can also identify a found satellite and present the satellite-provider with its orbital-position (and in some cases name).

NIT stands for NETWORK INFORMATION TABLE which is part of the DVB-standard that almost all TV-satellites transmit. The NIT contain information about the Satellite and TV/Radio-channels.

SATLOOK Digital NIT can very easily **identify a Satellite** as it can readout the NIT information.

Switching between TV, Spectrum, and Digital-modes is achieved with a push of a button on the side of the instrument.

Numerous memory-positions, spectrum-pictures, and certain frequencies can be saved (both analog and digital transponders).

Saved spectrum –positions can be mixed simultaneously with an actual reading for easy satellite-identification and control of signal-levels.

Measurements on group of channels may be done; with up to 10 frequencies at the same time.

They can be individually programmed with 13V or 18V, 22 kHz on or off.

The polarization of the LNB is switchable 13V/18V and the Hi-Lo band with 22 kHz-tone.

Both functions are indicated on top of the LCD.

The instrument features circuitry -protection to prevent short-circuits during connection of the LNB.

The DiSEqC-function controls all DiSEqC-accessories (like switches and LNB's). The function is easily implemented and very flexible to use.

Note that the SATLOOK Digital NIT can also run DiSEqC-actuators. It can be set-up for running DiSEqC 1.2 (normal DiSEqC-actuators), SatScan (Nokia) and SatSelect (Triax).

The SATLOOK Digital NIT is powered by a built- in, rechargeable battery. The battery is recharged from the external battery charger or the car-adaptor.

Battery-status is shown on top of the LCD-display (in shape of a battery).

Very light and flexible; the SATLOOK Digital NIT weighs less than 9 pounds including the battery and the carrying-case.

DiSEqC is a trademark of EUTELSAT

II. Operation:

A. Unpacking.

Start with unpacking the instrument and check that the following items are included:

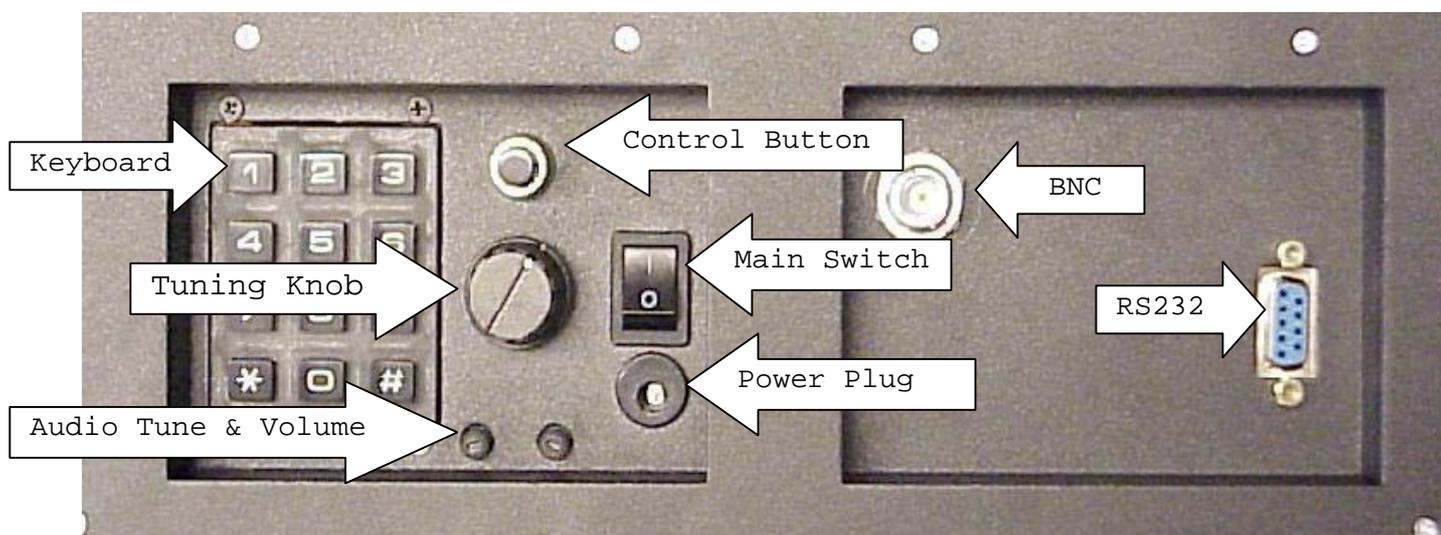
1. SATLOOK Digital NIT-instrument.
2. Nylon carrying case with shoulder strap.
3. Power supply 110vAC/13,5v DC, center pin positive.
5. Auto Adapter cord (Car charger) 12v.
6. Adapter BNC-male/F-female.

The instrument's keypad, control knobs and control-button are shown on the picture below, these items control the SATLOOK Digital NIT's functions and modes.

The power-plug is used when charging the battery or running the instrument with the SATLOOK Digital NIT power supply.

RF-input is made via the BNC-connector and adapter plug which is provided.

The instrument also has a RS232 (computer interface) connector for software revisions.



B. Connection:

Use the main switch to turn the instrument On and connect a signal-source via the BNC/ F-connector adapter. After a few seconds to warm-up the SATLOOK Digital NIT will display the frequency spectrum of 920-2200 MHz on the picture-screen and the main-menu on the LCD-display.

III. Knob and control-button:

Start by pushing the control-button. The text on the front panel LCD-display (upper row) will change from **FREQ** (frequency) to **SPAN** (frequency-span). Another push and the display returns to the **FREQ**-mode.

The control-button handles a few important functions . It is important to learn how to use the control-button in order to correctly access the SATLOOK Digital NITS's various functions. The functions of the control-button in the different modes.

Spectrum:

Frequency
Bandwidth(span)

Picture-mode:

Frequency
Memory

Digital-mode:

Frequency
Memory

When the SATLOOK Digital NIT is in Frequency-mode, the cursor is controlled by the tuning knob. Move the cursor up/down by turning the knob left or right.

D. Information:

The cursors position (frequency), the spectrums start frequency (920 MHz), the spectrums stopfrequency (2150 MHz) and bandwidth (1231 MHz) can be read out on the monitor - screen.

The most important measured data , the dB-value, is shown in the middle of the monitor. Measurement of the tuned frequency is continuous with the presentation being updated a couple of times per second.

III. Functions MAIN MENU

When the instrument is initially powered up, you will see the following display:



1. Picture TV-mode.

After choosing a specific frequency; access the TV-mode by pressing button # 1 or "Picture" in the Main Menu. The tuning knob controls the frequency-position in this mode but the function changes when the control button is pushed. The chosen function is displayed at the top of the LCD display; in this example FREQ is selected.

The function switches between **Frequency** and **MEMORY**.

Measuring a specific frequency can be executed in the "**Picture**" mode (dB-value is shown in the LCD-display).

Other functions in the Picture-mode:

1. Invert Switch between normal video (KU-band) and inverted Video (C-band). Selected position is displayed in the LCD-display.
2. Sound For listening to analog audio. Audio volume and frequency (5.5 – 8.5 MHz) are adjusted with the two small knobs just under the main-knob.
3. Memory For storing the different analog and digital channels (frequencies). Tune in the "right" frequency before entering this function (ex. 1720 MHz).
Enter the Memory function (button nr 3) and push Save (button nr 1).
The instrument asks: -"SAVE. ARE YOU SURE ?"

Check that the Memory position is the right one (displayed at the right bottom on the LCD-display). If not, chose a new one with the knob (0-99). Free positions are named: Pos free

After selecting a position, push button nr 1 (YES).
Notice that even the preselected 13V/18V, 22 kHz on/off will be memorized.



Text-editor:

When the channel (frequency) is saved, the Text-editor appears on the monitor which makes it possible to enter a name for that memory-position (ex. CNN).

Use the knob to select the first letter (ex. C) and save it with the control-button. Move to the next letter (ex. N) and so on.

If a mistake is made and wrong letter is saved, simply correct by pushing button nr 1 (Delete) and the cursor will jump one position backward.

4. Atten: Attenuation. Manuell attenuation 15dB on/off.
Selected position is displayed in the LCD-display.
0. 13/18V Selection of 13V alt. 18V. Chosed position is displayed at the top of the LCD-display.
- #. 22kHz 22 kHz on/off. Chosed position is displayed at the top of the LCD-

display.

(6)

2. Digital

SATLOOK Digital NIT can easily and very accurately measure digital transponders (MPEG-streams).

This kind of measuring is very good to do when an installation is done, to control and verify that the installation is correctly performed (fingerprint of the installation).

It is less accurate when trying to find a satellite and adjusting the cross-polarisation.

Therefore, start with finding the "right" satellite with the spectrum-function. Check and adjust the cross-polarisation with the "Max zoom in" function.

* Test the maximum with the **X-pol function** (button nr 4 in the main menu). The instrument will measure the strength of the selected peak and then automatically "jump" to the other polarisation and measure there as well (same frequency and settings).

The difference (for ex. -7dB) is presented on the right handside of the display.

Choose a suitable transponder (put the cursor on top of a "peak") and select function 2 in the Mainmenu (Digital).

- ## The monitor displays, in the left upper corner, the so called, constellationdiagramme (QPSK).
- ## To the right of it, four "lock-parameters" and a time counter (that shows the "lock-time" on a bit-stream") are shown.
These "lock parameters" should be turned On (become white) and the clock should start counting as soon as a Digital transponder is found.
If not, or if the signal "comes and goes" then the signal is very poor and/or weak.
Try to adjust the dish better and/or check the setting of the LNB to improve the signal.
- ## The other measured data like the S/N-ratio (signal/noise ratio) och BER (bit error rate) are displayed just under the constellationdiagramme in the shape of Bar-graph's (thermometer-scales). The higher level, the better signal !

A locked frequency can look like this.



The window also displays the following Digital readout:

| | |
|-------|--|
| Freq: | The tuned in frequency. |
| AFC: | Automatic frequency control -the instrument automatically adjust the frequency and tells the offset frequency from center of carrier. |
| SR: | Symbol rate. The instrument readout, automatically, the correct symbol rate of the transmission. |
| FEC: | Forward Error Correction. The instrument readout, automatically, the correct FEC. |
| CB: | Corrected Bits –Bits that have been corrected in Viterbi. Should be as low as possible. |
| UCB: | Uncorrected Blocks – Blocks unable to be repaired. Value should be zero. Very small numbers of uncorrected block will result in loss of picture (mosaic). |

NIT - Network Information Table.

The word "searching" will lit on right handside of the picture as soon as a digital transponder is found.

After about 5-10 seconds, if the satellite is transmitting NIT, the satellite position will appear (and in some cases the satellite name also), for ex Astra 19.2

Pressing button nr 4 "Channels" will show a list of the present TV- and Radio-channels on that certain transponder/frequency.



When performing Digital installations, please notice:

- ⚡ The constellationdiagramme is like "a shower of hail". No signal will spread out the noise over the window. The better signal, the more concentrated and focused "hailstorms" in the windows.
- ⚡ SNR. The signal/noise ratio should be as high as possible. A good signal should have at least 8.0 dB S/N-ratio.
- ⚡ BER. The Bit Error Rate should be as low as possible.
As the values are really small, on the other side of zero (presented as something raised to minus something), they should be as high as possible.
A BER at 5.00 -05 is therefore better than 9.00 -04.
A BER at 4.00 -05 is therefore better than 5.00 -05.
It can be said, in general, that a signal should be at least x.xx -04 to be accepted.

Other Digital functions:

1. Search + Automatically search for the next digital transponder higher in frequency. Searching is displayed at the bottom of the monitor.
2. Search - Automatically search for the next digital transponder lower in frequency. Searching is displayed at the bottom of the monitor

3. Memory

For storing **digital transponders** (digital channels - frequencies). Tune in the "right" frequency before entering this function (ex. 1650 MHz).

Enter the Memory function (button nr 3) and push Save (button nr 1). The instrument asks: -"SAVE. ARE YOU SURE ?"
Check that the Memory position is the right one (displayed at the right bottom on the monitor). If not, chose a new one with the knob (0-99). Free positions are named: Pos free

After selecting a position, push button nr 1 (YES). Notice that even the preselected 13V/18V, 22 kHz on/off will be memorized.

- Load a memory-position by pushing the control-button - "Memory" will appear on top of the LCD and a memory-position will be shown in the bottom of the LCD-display.
Step between the stored memory-positions with the knob.

Text-editor:

When the channel (frequency) is saved, the Text-editor appears on the monitor which makes it possible to enter a name for that memory-position (ex. Digital).

Use the knob to select the first letter (ex. D) and save it with the control-button. Move to the next letter (ex. i) and so on.

If a mistake is made and wrong letter is saved, simply correct by pushing button nr 1 (Delete) and the cursor will jump one position backward.

4. Channels

Shows a list of the present TV- and Radio-channels on that certain transponder/frequency (if the satellite is transmitting NIT).

5. DiSEqC

Chose between the different DiSEqC commands by using the buttons on the side of the instrument.

Submenu 7 (SWx) shows the extended DiSEqC-commands (DiSEqC 1.1).

Submenu 8 (Motor) shows the command-list for DiSEqC actuator-control (DiSEqC 1.2).

Even 13/18V and 22 kHz can be adjusted under the DiSEqC-menu.

7. Beeper

It might be tricky to install a Sat-dish and, at the same time, try to watch the signal-level on the instrument.

Therefore the instrument has a very useful "beeper"-function to help finding the max-strength signal. It works with a pitch tone that gets higher and higher the better the signal gets.

The beeper is turned on and off with button nr 7.

0. 13/18V

Selection of 13V alt. 18V. Chosed position is displayed at the top of the LCD-display.

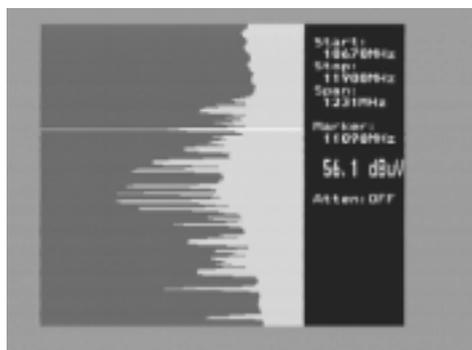
#. 22kHz

22 kHz on/off. Chosed position is displayed at the top of the LCD-display.

3. Full spectrum - "Max zoom in" - Span Min /Span Max.

This function makes it easy to "jump" between full spectrum (920-2150 MHz) to "Max zoom in" (250 MHz bandwidth).

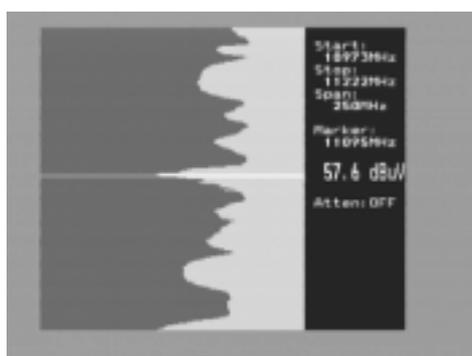
The "Max zoom in"-function is very good to use when adjusting the cross-polarisation.



Move the cursor to any desired frequency (peak).

Push the nr 3 button (**span Min**) on the keyboard.

The instrument will "zoom in" max. at that selected frequency (250 MHz bandwidth).



Rotate the LNB so that either the Horizontal or Vertical polarisation will be in its maximum position –adjusting the **cross-polarisation**.

Pressing the nr 3 button again (span Max), gets You back to "Max zoom out".

4. X-pol Test the maximum Cross-pol setting with the X-pol function.

The instrument will measure the strength of the selected peak and then automatically "jump" to the other polarisation and measure there aswell (same frequency and settings).

The difference (for ex. -7dB) is presented on the right handside of the display. The function is very usefull for checking the correct setting of the LNB cross-polarisation.

5. DiSEqC Chose DiSEqC command with the keypad.

Submenu 7 (SWx) shows the extended DiSEqC 1.1 commands.

Submenu 8 (Motor) shows the DiSEqC actuator-control commands (DiSEqC 1.2).

Even 13/18V and 22 kHz on/off can be adjusted in this mode.

6. Setup Basic-operation setup:

1. **LNB L.O.** Select the LNBs L.O. for showing the correct LNB frequency. Default setting is button nr 9 (IF).

2. **Analog.** Chose between Normal (KU-band) or Inverted (C-band) video.

3. **Motor.** Chose the type of actuator to be used; standard DiSEqC 1.2, SatSelect or SATSCAN.
4. **Display.** submenu **units:** Select dB-presentation: dbuV, Dbm or dBmV. Under submenu LCD can contrast (level) and Backlite (on/off) be set.
5. **AutoOff.** Chose between some automatic turn-off alternatives (timer).
6. **Version.** Tells about the units serie-nr and manufactured date.
7. **Keyclick.** On or off.

7. Beeper It might be tricky to install a Sat-dish and, at the same time, try to watch the signal-level on the instrument. Therefore the instrument has a very useful "beeper"-function to help finding the max-strength signal. It works with a pitch tone that gets higher and higher the better the signal gets.

The beeper is turned on and off with button nr 7.

Notice that the function works with a narrow bandwith (one transponder) and not with the full bandwidth.

To use the function: put the cursor on top of a selected "peak" and align the dish.

8. Spec Special-functions. Select with button nr 8 in the Mainmenu.

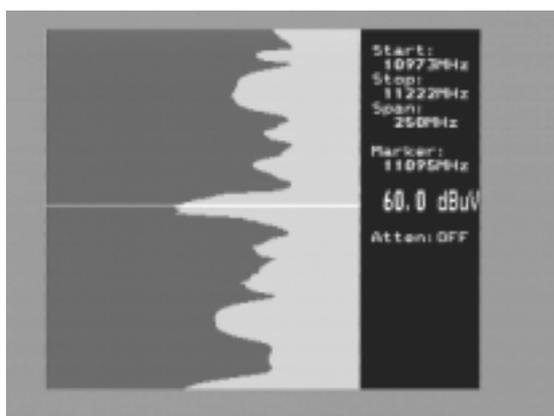
1. Max hold

Max hold is a very good function for, over a longer time period, watch a certain frequency-range. This to see how/if temporary signals/disturbances can affect the picture quality.

Adjust the frequency-bandwidth (see Function 3) and put the cursor on the frequency (peak) to watch. Chose with button nr 1 the "Max hold"-function. The instrument starts to sample all top-values in the shown bandwidth and only updates the presentation if there´s any new measured data with higher dB-values than the previous measured.

Turn off the function by pressing the button nr 1 again (No hold).

Measured data can be stored. Read more about the Memory-function under section 4 below.



2. Reference cursor and signal to noise ratio.

SATLOOK Digital NIT has the capability to perform measuring of the signal/noise alt. Picture-carrier/audio-carrier ratio.

The function is relatively difficult to implement fully automatic and a more simple, manual, tool is used in this instrument.

Do like this:

- * Select function 2 Refmrkr
- * Tune in the "right" frequency with the cursor (so it stands on the "top" of the signal to measure on).
- * Push button nr 1 (Ref set) and a new cursor appears on top of the earlier.
- * Turn the knob and place the cursor on another carrier or on the noise-floor.
- * The relation between cursor nr 1 and cursor nr 2 is presented in the lower right hand corner of the picture-screen

Notice that 13/18V and 22 kHz on/off can be adjusted in this mode with the "0" resp. "#" buttons.

3. Span Min – Span Max

This function is described under "Mainmenu" section 3 above.

Push button nr 3 (**span Min**) on the keypad.

The instrument "zoom in" max. at the chosen frequency (250 MHz bandwidth).

Another push on the nr 3 button (span Max) takes the instrument back to "Max zoom out".

4. Memory

Memorypositions. Same function as described under Mainmenu section 9, below.

5. Multichannel

Channels (frequencies) that have been memorized under Mainmenu section 1 and 2 are displayed and measured at, together here.

Up to 10 channels can be measured at simultaneous.

Notice that all the channels can have individual setup of 13/18V resp. 22 kHz on/off.

The function is very useful when "scanning" a satellite and see that all parameters are right/max values received on both V/H and low/high.

Pg down To step down the pages. 10 pages with 10 frequencies per page can be stored (10 analog + 10 digital = 200 frequencies).

Pg down To step up the pages.

Max hold "Locks" the dB-values and will only change when higher values are received.

Turn off the function by pressing the button again (no hold).

6. Attenuator

Attenuation 15dB. Manuell on/off with button nr 6.
Selected position is displayed at the right hand side of the monitor.

0. 13/18V

Adjusting of 13V alt. 18V. Selected position is displayed up to the left in the LCD-display.

#. 22 kHz

Adjusting of 22 kHz on/off. Selected position is displayed up to the left in the LCD-display.

9. Memory Storing spectrum-pictures.

All spectrum-pictures can be stored in the SATLOOK-Digital NIT.

This is very useful for documentation and to use later on for recognizing/identifying of that satellites characteristic spectrum

The Mix-function helps to identify and “find the way back” to already known (and previously stored) satellites.

The function places a previous memory in the background of the spectrum.

When the “right” satellite is found it will be like “fitting a hand to a glove”

To store measured-data, do like this:

- * Chose the spectrum to store (i.e. exactly as displayed on the monitor) and push button nr 9 in the Mainmenu (Memory).
- * Select ”Save” button nr 2.
- * The instrument asks: -”SAVE. ARE YOU SURE ?”
- * Check that the Memoryposition is the right one (shown down to the right in the monitor). If not, chose one with the main-knob (Pos free: 00-99).
- * Having select a position, press button nr 1 (YES).
- * Notice that the setup of 13V/18V, 22 kHz on/off will be stored to.

Text-editor:

When the spectrum is saved, the Text-editor appears on the monitor which makes it possible to enter a name for that memory-position (ex. ASTRA 1D).

Use the knob to select the first letter (ex. A) and save it with the control-button. Move to the next letter (ex. S) and so on.

If a mistake is made and wrong letter is saved, simply correct by pushing button nr 1 (Delete) and the cursor will jump one position backward.

To collect a stored spectrum:

- * Enter the ”Memory”-function with button nr 9 in the Mainmenu.
- * Select the spectrum to load (use the main-knob: pos 00-99 displayed down to the right in the i monitor).
- * Load the spectrum to the monitor with button nr 1.

Notice that the function **Reference cursor**, Ref mrkr, is enabled when a stored spectrum is loaded.

To mix a stored spectrum with an ongoing measuring, do like this:

- * Enter the ”Memory”-function with button nr 9 in the Mainmenu.
- * Select the spectrum to load (use the main-knob: pos 00-99 displayed down to the right in the i monitor).
- * Mix the spectrum with the ongoing measuring with button nr 4.

- Turn off the Mix-memory by pushing the nr 4 button again.

IV. Maintenance.

The instrument is equipped with a rechargeable battery and it is important that the battery is maintained.

Recharging should be done with the, enclosed car-adaptor or external power supply of 220v/13.5v DC, center-pin -plus and chassi -earth.

Note, the instrument can be operated, for shorter periods of time, by the external power supply. However, the SATLOOK Digital NIT is not made for permanent operation. Contact Your dealer for more information.

Adjustments for vertical hold, brightness and contrast are located under the instrument. Contact Your dealer for proper adjustments.

The battery needs recharging when the battery-symbol at the top of the LCD-display is empty.

Remember that a cold battery has much lower capacity than a warm one.

SATLOOK Digital NIT is designed for outside use in rough conditions but it should not be exposed for rain or snow as this can damage or shorten the lifetime of the instrument.

Checking/charging the battery.

As the instrument has been stored for some time before transportation it is important to check the battery-condition.

To do this turn the mainswitch On.

When starting the instrument, the monitor and LCD-display turns On.

There´s a battery symbol at the top of the LCD-display that shows the status of the battery. All black means that the battery is fully charged. If the symbol is empty it means that the battery is empty to.

If the battery needs recharging, use the power-supply attached with the instrument. A thermometer-scale (0-100%) will lit on the LCD-display as the recharging starts.

Notice. The instrument should be turned of when being recharged.

Recharging from fully discharged battery to about 98% capacity takes aprox.30 hours.

When the battery been recharged, SATLOOK Digital NIT is ready to be used.

V. Technical specification.

| | |
|-----------------------------------|---|
| Input frequency: | 920-2150MHz, easily reduced to 250 MHz (max zoom in). |
| Frequency display: | Yes, IF default. All standard LNB L.O. can be setup. |
| Min level in, | About 35 dBuV (noiselevel). |
| Max level in, | About 90 dBuV. |
| Attenuation: | 15 dB manual attenuator on/off. |
| Display of signallevel (analog): | dB-level on LCD and monitor. Pitch-tone on loudspeaker. |
| Accuracy: | ±2 dB (at +20 C) |
| Display of signallevel (digital): | S/N (signal/noise-ratio) BER (bit error rate) Constellationdiagram (QPSK) |
| Symbolrate readout: | 1 – 30 Megasymbol. |
| Satellite identification: | Yes, NIT readout (Network Information Table) according to the DVB-standard. Identifies Satellite and name of TV- and Radio-channels. |
| TV/Audio standard: | Multi TV/Audio (PAL, NTSC, SECAM). |
| KU- C-band: | Yes, selectable. |
| Audio bandwidth : | Adjustable between 5.5 MHz and 8.5 MHz |
| Input impedance: | 75 Ohm, BNC-connector. |
| Picture-screen: | 4.5”-monitor, svart/vit. |
| Menus: | On LCD 64x128 next to the monitor. |
| Memory: | -100 spectrum pictures can be stored with name. Stored spectrum can be mixed for easy identification of satellite. -“Maxhold”-function. |
| Favouritechannels | Both analog and digital frequencies can be stored (with name). Simultaneous measuring of up to 10 channels at the same time. Each channel with individual setup of 13/18v and 22 kHz on/off. |
| PC-connection | Yes, RS232-output |
| Spänning ut: | Yes, 13-18V (can be adjusted). |
| 22 kHz tone: | Yes, on/off. |
| DiSEqC | Yes, all 1.0 and 1.1. Also Toneburst on/off. |
| DiSEqC actuator: | Built in positioner for DiSEqC 1.2, SatScan and SatSelect. |
| Battery: | Rechargable 12v, 3.5 amp/tim. |
| Operational: | About 1.5 hour on a fully charged battery. |
| Weight: | About 5 kg incl.battery. |
| Accessories: | Nylon carrying-case. Power-supply of 220v/13.5v, 1.7amp. Car-charger. BNC-male/F-female adapter. |

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