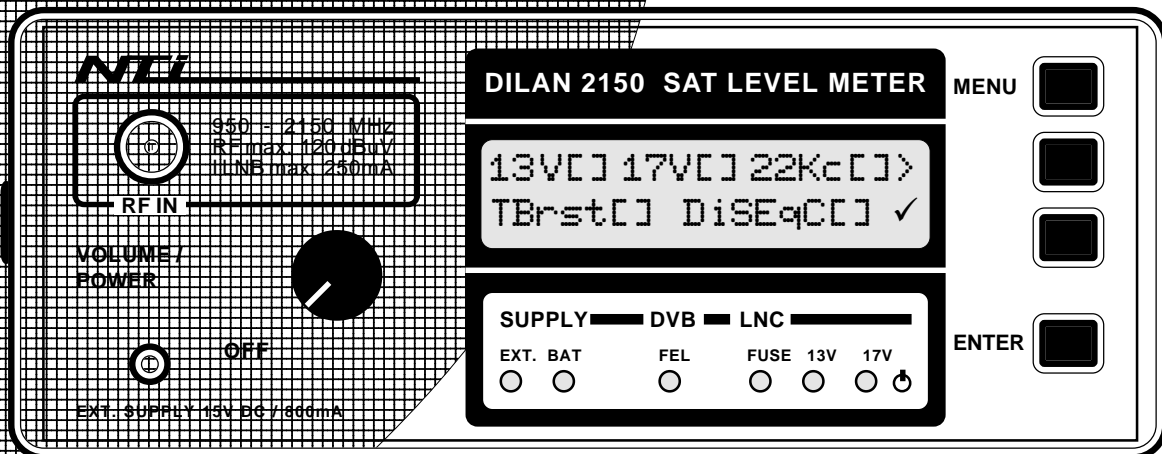


INSTRUCTION MANUAL

SATELLITE LEVEL METER

DILAN 2150



Version V4.0



Our main intention was to design an easy-to-understand and easy-to-operate instrument. All connected and important settings are put together in a separate self-explanatory menu. Only four buttons are all the device needs:

- **Call Menu: MENU key**
- **Changing Parameters: Two soft keys**
- **Acknowledgement: ENTER key**

Variable parameters or values are blinking and can be changed with the corresponding soft keys.

• Power Supply

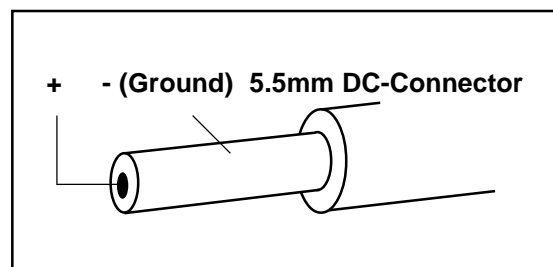
The portable operation of the device is possible with the optional rechargeable battery (accumulator).

For charging and operation an external power supply is needed. It must deliver 15V DC and a minimum current of 0.8A; for pure charging operation 0.6A are sufficient.

Attention: Cheap 12V power supplies are not suited; because the accumulator can not be charged completely. Also power supplies for multi-switches with 18V output voltage are not suited because the voltage regulators of the device are overloaded and the device could be damaged (excluding guarantee).

The external power supply is connected at the plug "EXT. SUPPLY" and the green LED "EXT." lights up simultaneously. An optional built-in accumulator is charged.

Connection to the EXT. SUPPLY-plug:



Charging time is about 2 hours; but the power supply can be connected also over a longer period (e.g. overnight) to the device because the charging current is reduced automatically when reaching the end of charging.

When the accumulator voltage drops down under a value of 11.5V during operation; the LED "BAT" begins flashing.

To prevent the accumulator from irreparable damages; measurement operation should be finished and the device should be switched off or connected to an external power supply.

The following message appears after switching on:



At the right side the current software version number is shown; this information is important for later software upgrades.

The line below shows the configuration. In case of a recognized plug-in A/V card the display shows "**DVB-S & ANALOG**" otherwise only "**DVB-S**" is shown. Some seconds later the main menu is available.

• MAIN MENU



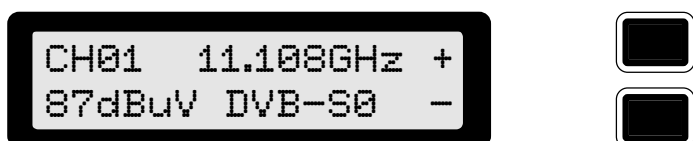
Two different operation modes are selectable:

- **Channel Mode: "MEM. CHANNELS"**
- **Continous Mode: "SETUP"**

• MEM. CHANNELS

The device can store up to 32 different configurations with analog or digital parameters, frequency, LNB voltage and switching signals and more. To simplify the measurement operation all important and often needed configurations can pre-stored.

The memory is pre-setted with default values, which can over-written individually. When selecting the **Channel Mode** the display may look like this:



At the left upper corner the channel number (CH01-32) appears and with the "+/-" soft keys it is possible to select a certain channel. If no channel number appears the device is running in the **Continous Mode**.

In the lower line besides the input level value the operation mode (digital/analog) is shown, the corresponding text is "**DVB-S***" (* = synchronization level from 0 to 3) or "**ANALOG**". With input levels below 30dBuV the message "<30dbuV" appears and by exceeding 100dBuV the message "**overld**" is shown.

By pressing the "**ENTER**" key it is possible to return to the **SETUP** menu.

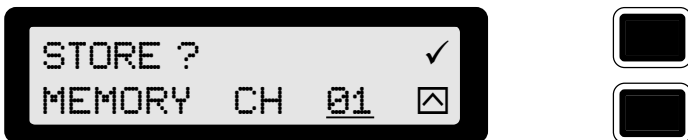
Here it is possible to choose the **Continous Mode** by pressing the "**SETUP**" soft key followed by "**ENTER**". In this way the frequency can be tuned in 1MHz steps with remaining pre-stored parameters (e.g. LNB voltage).

• SETUP & Continuous Mode

The menu **SETUP** allows to open further sub-menus like "**DVB-S / (ANALOG) / LNB / FREQUENCY**"; where the corresponding individual parameters can be selected.



By pressing the "**ENTER**" key it is possible to leave this submenu. By pressing the "**ENTER**" key again the question "**STORE?**" appears and it is possible to store the configuration in a memory channel (CH01-32).



The lower soft key allows the selection of the memory channel number and with the upper soft key the storing procedure is finally confirmed. If a memory channel was already programmed it is over-written with the new settings.

Returning to the **SETUP** menu is possible by pressing the "**ENTER**" key. The **Continuous Mode** is reached by pressing the "**ENTER**" key again. The frequency can be tuned in 1MHz steps with the corresponding "+/-" keys. Frequency deviations below 1MHz are automatically corrected by the internal AFC.

• Sub-menu DVB-S



This menu allows the setting of the present symbol rate. Four pre-set symbol rates (SYMB.RATE#1-4) can be selected with the upper ">" soft key. Confirmation and returning to the **SETUP** menu is possible by pressing the "**ENTER**" key. Now the **last selected symbol rate is valid**.

It is also possible to edit a pre-set symbol rate. The "**EDIT**" mode is selected using the corresponding soft key.



The lower ">" soft key allows the selection of the corresponding digit which is under-lined and flashing. The upper soft key "^" allows the variation of the corresponding digit. Pressing the "**ENTER**" key confirms the new value.

• Sub-menu ANALOG



This menu is only available with plugged-in A/V card. The menu is selected using the "**MENU**" key.

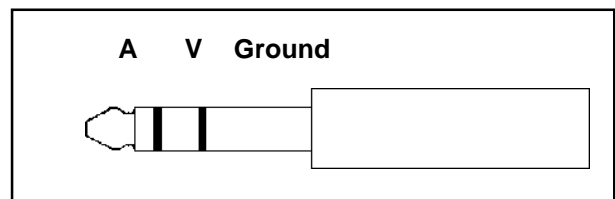
Important: If the "**DVB-S**" mode is selected, the A/V card is switched off for power-saving reasons. Enabling the "**ANALOG**" mode activates the A/V card (Continuous Mode & Memory Channels).

The corresponding soft key in the upper line menu allows to select between pure monitor operation (power-saving mode) "**A/V**" or monitor operation with simultaneous level measurement "**A/V&dBuV**".

The bottom line soft key selects between "**AUDIO**" and "**VIDEO**" menu; the selected menu is flashing and by pressing the "**MENU**" key the corresponding sub-menu is available.

The A/V signal is available at the rear panel's A/V socket.

Connecting the A/V plug:

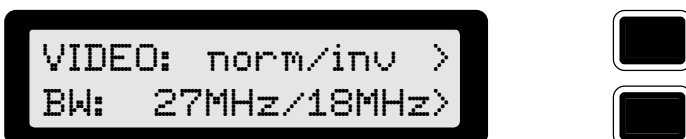


• AUDIO



Audio sub-carrier tuning is possible (100KHz-steps) by using the corresponding "+/-" soft keys. Pressing the "**ENTER**" key confirms the new value.

• VIDEO



The upper line menu determines the video polarity (normal/inverse); e.g. "**inv**" is necessary for C-band operation.

The bottom line menu determines the analog IF-bandwidth (27/18MHz). Selection is possible with the corresponding soft keys. Selected values are flashing and confirmation is possible by pressing the "**ENTER**" key.

• Sub-menu LNB

A further sub-menu which defines LNB voltage and switching signals:



The menu consists of two lines; the upper line determines the referring parameter which can be selected with the corresponding soft key. The line below and the corresponding soft key allows enabling [x] or disabling [] this parameter.

Attention: If no LNB voltage value is selected the antenna input remains without supply voltage, e.g. for measurements in networks. For reducing the battery consumption a high LNB voltage value should only be selected when it is absolutely necessary. 13V or 17V LNB voltage is also indicated by the "**13V/17V**" LEDs.

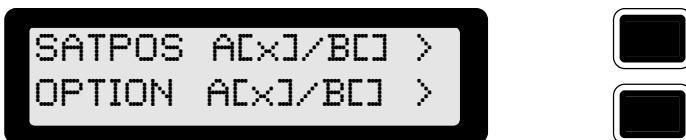
The LNB supply voltage is short circuit proof (electronic fuse). A short circuit is indicated by the "**FUSE**" LED and simultaneously the LNB voltage is regulated down.

With **enabled** LNB voltage the following sub-menu for selection of all LNB parameters appears:



With selected "**DiSEqc**" the additional command "**Send POWER ON**" for resetting connected DiSEqc-components is available after pressing the "**MENU**" key.

Pressing the "**MENU**" key again enables the corresponding DiSEqc sub-menu for selection of the commands "**OPT_A / -B**" as well as "**SAT_A / -B**":



Important: DiSEqc & TBrst (tone burst) commands are sent after leaving the sub-menu by pressing the "**ENTER**" key; while 13V/17V & 22KHz (Kc) are immediately present after enabling !

Pressing the "**ENTER**" key enables the **SETUP** menu.

• Sub-menu FREQUENCY

Two different frequency display modes are selectable in this sub-menu; "**DIRECT IF**" in the range from 900 to 2150MHz or the real satellite frequency "**SAT**" considering the local oscillator (LO) frequency of the LNB. Updated satellite frequencies are published in many popular satellite magazines.



The submenu "**SAT**" allows the selection of four pre-setted LO-frequencies:



The pre-setted LO-frequencies can be selected with the upper ">" soft key. It is also possible to edit a pre-setted LO-frequency. The "**EDIT**" mode is selected using the corresponding soft key. The lower ">" soft key allows the selection of the corresponding digit which is underlined and flashing. The upper soft key "^" allows the variation of the corresponding digit. Pressing the "**ENTER**" key confirms the new value.

Confirmation and returning to the **SETUP** menu is possible by pressing the "**ENTER**" key again. Now the **last selected LO-frequency is valid**.

Before returning to the **SETUP** menu the confirmation dialogue

LO < SAT ? or LO > SAT ?

appears. A selection whether the LO-frequency (LO) is lower or higher than the satellite frequency (SAT) is possible with the corresponding soft key.

Rule of thumb: SAT > 10GHz: LO < SAT SAT < 10GHz: LO > SAT

Pressing the "**ENTER**" key enables the **SETUP** menu.

• Auto Tuning Modes in DVB-S Mode

• Input Frequency

Especially in the low symbol rate range very accurate frequency tuning is necessary. Within a range of +/-1MHz a special software routine tunes automatically to the correct center frequency in 125KHz steps.

• Symbol Rate

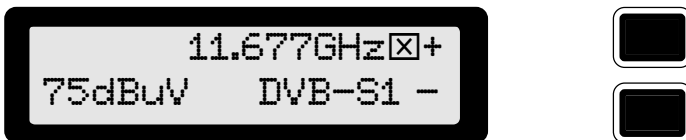
For symbol rates $\leq 4.000\text{MS/s}$ a special software routine starts if no Front End Lock (FEL) occurs. Therefore the given symbol rate is slightly varied in a range of +/- 3MS/s. In many listings slightly deviating symbol rate values are published, which never would lead to FEL.

• DVB-S Measurement Operation

Input: Frequency, polarity (V/H), symbol rate

Display: Signal level (dBuV) and additional signal tone; SYNC LEVEL (1-3) / FEL

When reaching Front End Lock (FEL): Symbol Rate (SR), FEC Rate (FEC), Bit Error Rate (BER) and also a selectable special sub-menu with digital C/N value, input level and rough reception quality



Attention: While the auto tuning is active, a rotating " \boxtimes " occurs in the upper line directly behind the frequency value. After trying out all variable parameters or reaching FEL the routine stops and the symbol disappears.

The auto tuning procedure lasts normally (correct symbol rate & small frequency deviation) only a few seconds. Under certain inconvenient conditions (very low symbol rate & huge frequency deviation) the procedure can last up to 35 seconds.

If no FEL occurs, the input frequency can slightly varied by pressing the "+/-" soft keys which activates auto tuning again.

When reaching DVB-S3 / FEL a new alternating sub-menu occurs and shows the following informations: Symbol Rate (SR), FEC Rate (FEC) & Bit Error Rate (BER)



The command "**MORE**" opens a special sub-menu with digital C/N value, input level and rough reception quality concerning BER :



BER:
 * = useless
 ** = bad
 *** = fairly useful
 **** = good

This menu is especially suited for optimization and antenna adjustment purposes.

• Analog Measurement Operation

Input: Frequency, polarity (V/H) and if necessary IF-bandwidth & video plarity

Display: Signal level (dBuV) and additional signal tone; A/V via connected monitor

Technical Data

Input Frequency Range: (900) 950 - 2150 MHz
Input Connector: IEC-standard (F) / 75Ω
Display Range: 30 - 100dBuV
Specified Measurement Range (+/- 2dB tolerance): 35 - 95dBuV
Additional Signal Tone: Variable audio frequency acc. signal strength
LNB Voltage(short circuit proof): 0/13/17V max.250mA
LNB Switching Signals: 22KHz / DiSEqC Vs. 1.0
(hardware for DiSEqC Vs. 2.0 is already integrated)
Memory: 4 symbol rates; 4 LO-frequencies; 32 individual configurations
Supply: 15V DC / ca. 380mA without LNB
Dimensions/Weight: 153 x 168 x 60mm / 0.5kg excluding accumulator
(accumulator is not included in basic version)

• DIGITAL SECTION / MPEG-2 - Transport Stream Analysis

Symbol Rate Range: (0.900) 2.000 - 45.000 MS/s
Auto-FEC-Viterbi Code Rates: 1/2;2/3;3/4;5/6;7/8
DVB Synchronous Levels: SYNC-LEVEL (SL)
SL:0 No DVB activity; SL1: Carrier regenerated; SL2:Viterbi-
Decoder synchronized; SL3: De-Interleaver synchronized;
SL4=FEL-LED lights up (Front End Lock)
C/N Measurement Range with Locked FEL: 4 - 20dB
Measurement Range BER (uncorrected Bit-Error-Rate): 10^{-2} to $< 10^{-7}$

• OPTION Analog A/V Card for Analog Satellite Signals

(with additional analog tuner section; plug-in module is automatically detected)

Tuner Input Frequency Range: 900 - 2150 MHz
Video Level: 1V_{ss} / 75Ω FBAS clamped
Audio Level: 0.6V_{ss} / 1KΩ
Video Polarity: Switchable normal/inverse
IF Bandwidth: Switchable 18 / 27MHz
Audio Sub-carrier Range: 5.00 - 10.00 MHz
Audio Tuning Step-width: 10KHz
Audio IF Bandwidth: 150KHz

• OPTION RS-232 Interface

Hardware is already integrated (9-pin SUB-D connector); software for remote control is planned.

• Accessories

Lead-acid Battery 12 V / 1.2Ah
Switching Power Supply 220-240V AC /15V DC max. 0.8A

Do not expose to moisture !