

LABGEAR
DAS202Tools v1.0.0
for DAS202
Operating Manual

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1 General Information

You can control operation of your DAS202 DVB-S/S2 Signal Analyzer via PC. For connection to PC use **USB** connector on the bottom panel of your Analyzer. The software DAS202Tools software allows the following:

- measurement of satellite signal level and other parameters;
- viewing the RF signal spectrum at the Analyzer input;
- viewing the constellation diagram;
- viewing the list of transponder channels;
- viewing and editing the satellite lists;
- viewing and editing the LNB profile logs;
- viewing and editing of the measurement logs of the input signal quality parameters;
- saving and management of the local copies of the satellite lists and logs of the Analyzer;
- saving and documenting the measurement results;
- firmware updating (only DAS202).

2 PC Configuration Requirements

Minimal system requirements for your PC:

- a) Microsoft Windows 7/Vista/XP/2000 operating system;
- b) 6 MB of hard drive free space (15 MB while installation);
- c) free USB 2.0 port.

3 Software Installation

The installation of the required software is executed by «**Install DAS202Tools X_X_X.exe**» program (X_X_X – software version), which performs all the actions necessary for saving program to the computer.

Before installation, close all active applications. If you use Windows 2000 or XP, to proceed with installation you should log in with administrator rights.

After you have started the installation program the installation wizard window will appear. Choose the program language and click «**OK**» to confirm your choice. Click «**Next**» to initialize installation.

Enter the user information into the corresponding fields. For Windows XP, Windows 2000 it is possible to select installation either for all users or solely for the current user. Click «**Next**» when you have completed all the fields.

Next, select the folder where you want to store DAS202Tools program files. By default, the files are stored into «**C:\Program Files\LABGEAR\DAS202Tools**». To save the files in a different folder, click «**Browse**» button. Select the required path and click «**OK**».

Next window shows all the entered information. If you wish to proceed with the installation, click «**Next**». To return to previous steps and modify any information, click «**Back**».


The following steps will be completed automatically. If everything ran correctly, the information window indicating the successful installation will be displayed on the screen. Click «**Finish**» to complete the installation.

After the installation is complete, a new folder named «**LABGEAR**» will be created in the «**Start**» menu, and this folder will contain a shortcut for accessing «**DAS202Tools**» program.

When reinstalling or updating the program, it is recommended to delete the older program version. To do this, «**Install DAS202Tools X_X_X.exe**» file must be activated; in case the program had already been installed, select «**Delete program**» option in the dialog window and click «**Next**» button, which will initialize correct process of deleting the program from your PC and provide notification about successful completing of the task. New installation procedure is the same as the one described above.

ATTENTION It is not recommended to delete files from the program catalogue since it may lead to further incorrect operation of the program. To delete the program, use a corresponding mode within the installation wizard.

4 USB Port Driver Installation

Connect the Analyzer to your PC using USB cable and turn the Analyzer power on. Enter the PC Operation mode by selecting the  icon in the Analyzer service menu. The Waiting for command message will appear in the top line of the screen. After that the new device installation wizard will start.

Perform the installation manually indicating the following path to the driver: ".\LABGEAR\DAS202Tools\Drivers".

After the installation has been completed a new device indicated as DAS202 DVB-S/S2 Signal Analyzer will appear in Device Manager (see figure 1).

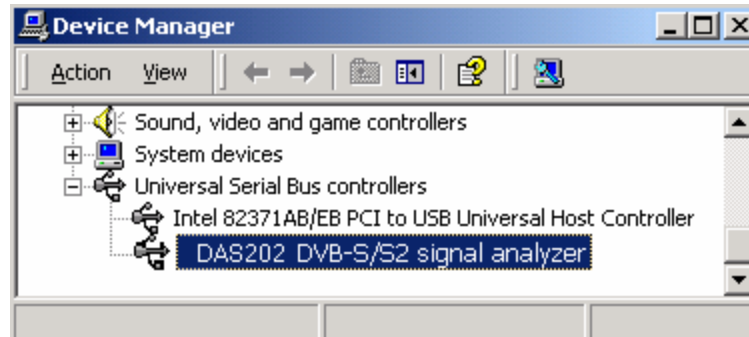


Figure 1

5 Starting the Program

Use one of the following ways to run DAS202Tools software:

- From the Start button menu: choose **Start->All programs->LABGEAR->DAS202Tools**.
- From the desktop: choose DAS202Tools label.

The DAS202 control panels are provided for setting the parameters and modes of operation with the Analyzer from the program window.

The control panels include the following:


- Document management panel;
- Cyclic (*real measurement refresh*) measurement activity panel;
- High-frequency channel settings panel;
- Analyzer profiles panel.

Document management panel is represented in figure 2.





Figure 2

This panel buttons are equivalent to «**File**» command group of the menu.

 Icon opens the saved document from the PC hard-drive.

 Icon saves the document to the PC hard-drive.

 Command implements printing of the current document using a printer.  Icon opens the Firmware updating manager window.

In **Device** tab, select “Measurement mode”. Measurement control panel is represented in figure 3.



Figure 3

- This command is available for cyclic (*real measurement refresh*) activity mode.
- This command pauses the cyclic measurements. In case of an error related to connection to PC or discharged batteries during the operation, the cyclic measurement is paused automatically.

To restart the measurements, click  again.

High-frequency channel settings panel is represented in figure 4.

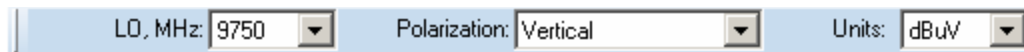


Figure 4

You can select operating signal frequency for the LO in the high-frequency converter using the «**LO, MHz**» field.

«**Polarization**» Enables selection of the following operating polarities:

Vertical / Horizontal / Left rotation / Right rotation / Unknown.

«**Units**» Enables selection of measurement in «**dBuV**» and «**dBm**».

Analyzer profile panel is represented in figure 5.

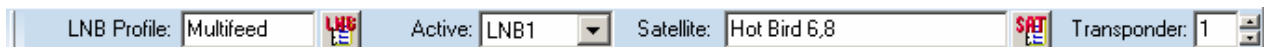



Figure 5

«**LNB Profile**» information field displays the LNB frequency of the active profile.

The selected profile can be changed using the  button; when you click this button, the

Analyzer LNB converter directory opens.

«Active» information field displays the selected LNB that is used for satellite signal reception. In case the configuration used supports several LNBs and the LNB profile is set incorrectly, then the «Active» field can be used to change the selected LNB.

«Satellite» information field displays the current satellite selected from the satellite logs. The current satellite can be changed using the satellite directory window, which can be activated by  button. Satellite parameters table is displayed. Select the required satellite by right clicking on the satellite and attaching it to LNB1 or LNB2.

«Transponder» Using the «UP/DOWN» arrow buttons, transponders within the selected satellite can be measured. All digital measurements will be displayed in the Measurement Mode box.

6 User Preferences

To open the preferences window, access «Device->Options» in the main program window. After performing this command, the settings window will be displayed (figure 6).




Figure 6

In «Aalyzers» field you can choose one of the devices from the list by their serial numbers (figure 6).

Make sure that you closed all the windows of the program before you select the device from the «Aalyzers» list.

«Interface language» field sets the current language used in the program interface.

7 Satellite Profile Logs

To view the contents of the satellite profile logs stored in the Analyzers memory, select the following command from the main menu: «Device-> Satellites table». See figure 7 for the

representation of the satellite parameter tables.

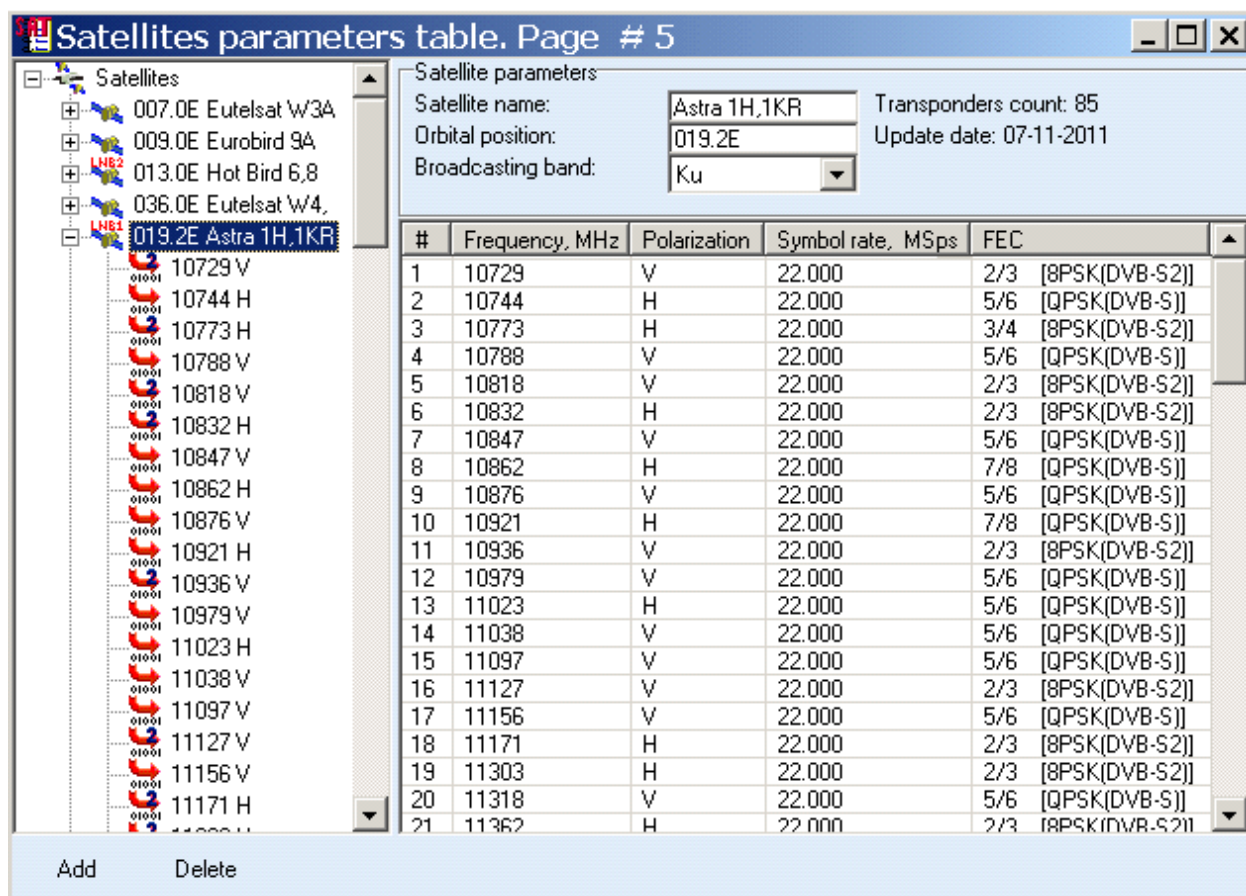


Figure 7

The satellite parameters window is divided into two panels. The left panel displays the satellite entries containing the description of the transponders. The right panel displays the information about the current satellite, as well as information about the transponders.

Select the satellite in the left panel and the information about all the transponders of this satellite is displayed in a table. Open the satellite by clicking on the + to display the transponders. If a transponder is selected, then its detailed information is displayed. The bottom part of the window contains «Add» and «Delete» buttons, this function is to add or delete elements of the current log.

To add new satellite entries, select the «Satellites» element in the left part of the window, as shown in figure 8.

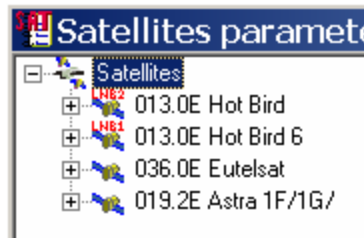


Figure 8

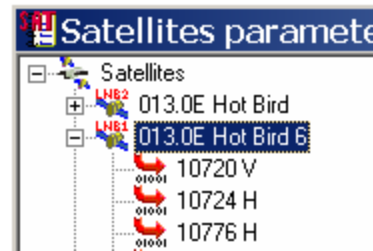


Figure 9

Next, click «**Add**» button from the bottom part of the window.

To add new transponder entries, select the corresponding satellite, for example, as shown in figure 9.

Next, click «**Add**» button in the lower part of the window. Adding a satellite entry can be done using the saved local copy as follows:

- Open the local copy of the satellite reference directory and drag and drop the required satellites into the «**Satellites**» element in the Analyzer directory window;
- Drag and drop files of the local copies of the satellite directory entries from the Windows Explorer.

To edit the satellite entries, a corresponding element of a satellite or a transponder must be selected from the left side of the window, as shown in figure 9.

When the required element is selected, the following satellite parameters can be edited in the right panel of the window:

- Satellite name (text field);
- Orbital position according to the format;
- Broadcasting band.

To edit the transponder entries, a corresponding transponder element must be selected, for example, as shown in figure 10.

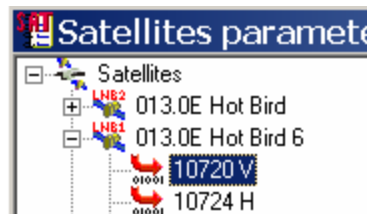


Figure 10

After the required element is selected, the following transponder parameters can be edited in the right window panel:

- a) Frequency value of transponder signal;
- b) Operating frequency polarization;
- c) Type of modulation;
- d) Symbol rate value;
- e) FEC.

To set the satellite that is being used in the DAS202 profile, i.e. the default satellite, a corresponding element of the satellite must be selected from the left side of the panel. Further, make a right click on the element with the mouse, and select LNB corresponding to this particular satellite from the context menu that appears. See the context menu in figure 11.





Figure 11

To delete satellite entries, a corresponding satellite must be selected from the left side of the panel, as shown in figure 9. Next, click «**Delete**» in the bottom part of the window.

To delete transponder entries, a corresponding transponder must be selected, as shown in figure 10. Then click «**Delete**» in the bottom part of the window.

The PC software allows saving local copies of the satellite directory as separate files on the hard-drive for further operation.

To save a local copy of the directory to the PC hard-drive, first open the satellite directory window. Then access the following command from the main menu: «**File->**  **Save**». Alternatively, you can just click  button located on the document control panel.

To open a local copy of the directory, access the following program from the main menu:

«**File->**  **Open...**». Alternatively, click  button located on the document control panel.

In the standard dialogue window select the required file(s) containing satellite entries, using single or multiple selection. This type of files has *.slf extension and is marked «**Satellite listing files (*.**


sIf)». The window containing local copy of the satellite directory has format similar to the main DAS202 directory window.

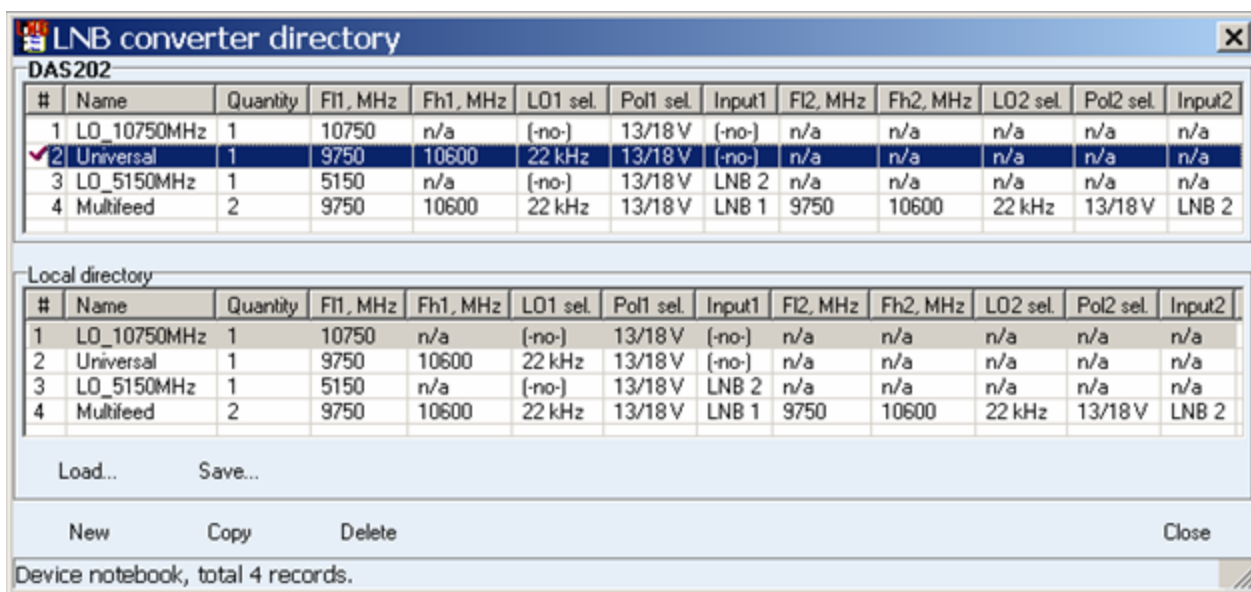
NOTE Each satellite entry contains all transponders and is saved in a separate file on the hard-drive.

8 LNB Profile Logs

LNB settings directory in the PC program is organized in such a way that it simultaneously provides access to both the contents of the Analyzer settings tables and to a local table containing LNB settings.

The local settings table allows saving separate table entries from the Analyzer to the PC hard-drive with a further availability of copying them to the Analyzer memory.

To open the window with LNB settings table, select «**Device->**  **LNB parameters**». See the window in figure 12.



#	Name	Quantity	FI1, MHz	Fh1, MHz	LO1 sel.	Pol1 sel.	Input1	FI2, MHz	Fh2, MHz	LO2 sel.	Pol2 sel.	Input2
1	LO_10750MHz	1	10750	n/a	(-no-)	13/18 V	(-no-)	n/a	n/a	n/a	n/a	n/a
2	Universal	1	9750	10600	22 kHz	13/18 V	(-no-)	n/a	n/a	n/a	n/a	n/a
3	LO_5150MHz	1	5150	n/a	(-no-)	13/18 V	LNB 2	n/a	n/a	n/a	n/a	n/a
4	Multifeed	2	9750	10600	22 kHz	13/18 V	LNB 1	9750	10600	22 kHz	13/18 V	LNB 2

#	Name	Quantity	FI1, MHz	Fh1, MHz	LO1 sel.	Pol1 sel.	Input1	FI2, MHz	Fh2, MHz	LO2 sel.	Pol2 sel.	Input2
1	LO_10750MHz	1	10750	n/a	(-no-)	13/18 V	(-no-)	n/a	n/a	n/a	n/a	n/a
2	Universal	1	9750	10600	22 kHz	13/18 V	(-no-)	n/a	n/a	n/a	n/a	n/a
3	LO_5150MHz	1	5150	n/a	(-no-)	13/18 V	LNB 2	n/a	n/a	n/a	n/a	n/a
4	Multifeed	2	9750	10600	22 kHz	13/18 V	LNB 1	9750	10600	22 kHz	13/18 V	LNB 2

Load... Save...

New Copy Delete Close

Device notebook, total 4 records.

Figure 12

The window contains two tables; the upper one contains information about settings of the LNB profiles, the lower one contains local copies of LNB settings profiles. Every table contains the following columns:

number of a memory cell occupied by the current profile in the Analyzer table; the

	reference number of a local directory;
Name	user's comment for the current profile;
Quantity	quantity of LNBs described in the profile;
F11, MHz	frequency of low LO of the first LNB;
Fh1, MHz	frequency of high LO of the first LNB;
LO1 sel.	LO selection command type supported by the first LNB;
Pol1 sel.	polarization selection command type supported by the first LNB;
Input1	selection of the switch input to which the first LNB is connected;
F12, MHz	frequency of low LO of the second LNB;
Fh2, MHz	frequency of high LO of the second LNB;
LO2 sel.	LO selection command type supported by the second LNB;
Pol2 sel.	polarization selection command type supported by the second LNB;
Input2	selection of the switch input to which the second LNB is connected;

To add new entries to the LNB settings table, open the LNB settings table window (LNB converter directory). To add an entry, select an active table (either located in the Analyzer memory or the local table directory) by clicking on the area occupied by that table with the left mouse button (the heading of an active table will be highlighted in bold letters). Next, click «**New**» button located at the bottom part of the window. These actions will result in creation of a new blank entry in the current active table.

To modify fields in the LNB settings table, select a required field using the mouse. Note that some fields can only take on strictly defined or fixed values. When selected, each field displays the range of possible values, and the user can select a required value among the available ones.

Update your settings within the fields and use the «**Enter**» key, or click onto the next field to store the settings. For the table with local copies of settings, saving has to be done after every change of parameters; otherwise all changes will be lost

To set default LNB profile, select a corresponding element from the available profiles list located in the LNB settings table (stored within the DAS202). Next, make a right click on that

element with your mouse, and select «**Activate**». The current active profile will be indicated by ✓ sign in the table.

To remove the entries, select the required entries either using single or multiple selection. Next, click «**Delete**» key in the bottom part of the window.

To store copies of LNB profile settings on your PC hard-drive, the records can be copied from the Analyzer table to the local table of LNB settings. To copy the entries between the LNB settings tables, open the LNB settings table window. Next, select an active table within the window that appears ✓. Select the required records using single or multiple selections. Finally, click the «**Copy**» button in the lower part of the window. The entries are copied from the active table into the inactive table.


To store data relating to LNB configurations on your computer there is a special option of saving local copies of LNB logs.

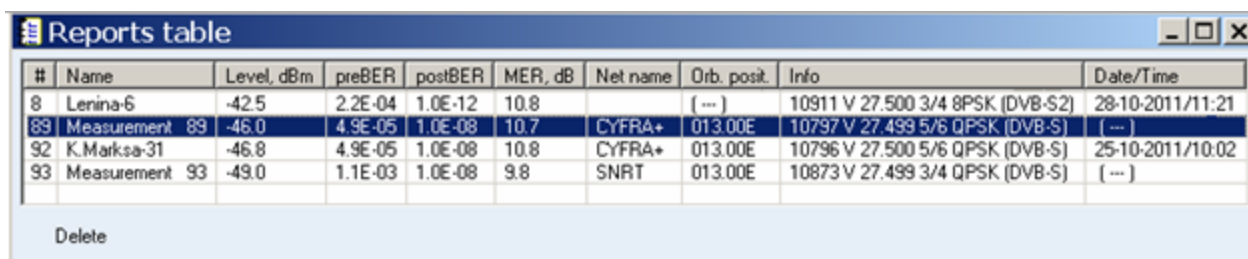
A local copy of LNB profiles directory is a set of data describing LNB profiles settings saved on a PC hard-drive. The current copy is located in a file which can be opened using the «**Load**» button located on the bottom part of the local table of LNB settings.

An unlimited number of local tables of LNB settings are available, and can be used at a different time. Any data modified within the local table will have to be manually saved. (This operation provides protection of the directory contents against un deliberate damage).

To save the directory, click «**Save**», and then indicate where the current file directory shall be saved. Last opened or saved file will automatically become the current working file used by the program.

9 Measurement Table

To open the window with saved measurements, select «**Device->  Reports Table**» in the program main menu. This window can also be opened automatically when switching to data stream parameter measurement mode. The reports table window is shown in figure 13.



#	Name	Level, dBm	preBER	postBER	MER, dB	Net name	Orb. posit.	Info	Date/Time
8	Lenina-6	-42.5	2.2E-04	1.0E-12	10.8		(...)	10911 V 27.500 3/4 8PSK (DVB-S2)	28-10-2011/11:21
89	Measurement 89	-46.0	4.9E-05	1.0E-08	10.7	CYFRA+	013.00E	10797 V 27.499 5/6 QPSK (DVB-S)	(...)
92	K.Marksa-31	-46.8	4.9E-05	1.0E-08	10.8	CYFRA+	013.00E	10796 V 27.500 5/6 QPSK (DVB-S)	25-10-2011/10:02
93	Measurement 93	-49.0	1.1E-03	1.0E-08	9.8	SNRT	013.00E	10873 V 27.499 3/4 QPSK (DVB-S)	(...)

Delete

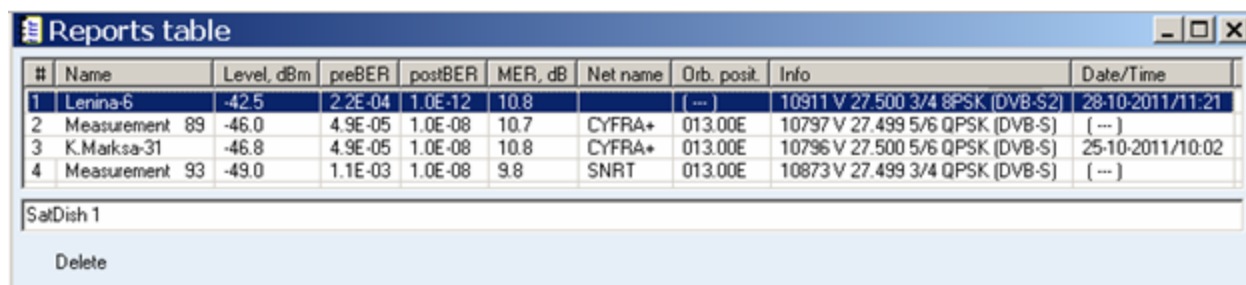
Figure 13

The table contains the following columns:

#	Number of memory cell occupied by the current profile in the Analyzer table; for local copy of measurement table – reference number;
Name	A short user's comment eg: Outlet 1
preBER	Relative bit error ratio before Viterbi error correction
postBER	Relative bit error ratio after Viterbi correction
MER, dB	Modulation Error Ratio;
Netw.Name	Network name
Orb. Posit.	Satellite orbital position;
Date/Time	Date and time of changes performed (optional).

Editing of the reports table can be made. Changing of name can be done by clicking on the name tab.

To delete entries from the measurement table; select the number to delete and click the «Delete» button located in the bottom part of the screen. Shown in figure 14.



#	Name	Level, dBm	preBER	postBER	MER, dB	Net name	Orb. posit.	Info	Date/Time
1	Lenina-6	-42.5	2.2E-04	1.0E-12	10.8		(...)	10911 V 27.500 3/4 8PSK (DVB-S2)	28-10-2011/11:21
2	Measurement 89	-46.0	4.9E-05	1.0E-08	10.7	CYFRA+	013.00E	10797 V 27.499 5/6 QPSK (DVB-S)	(...)
3	K.Marksa-31	-46.8	4.9E-05	1.0E-08	10.8	CYFRA+	013.00E	10796 V 27.500 5/6 QPSK (DVB-S)	25-10-2011/10:02
4	Measurement 93	-49.0	1.1E-03	1.0E-08	9.8	SNRT	013.00E	10873 V 27.499 3/4 QPSK (DVB-S)	(...)



SatDish 1



Delete




Figure 14

PC software allows saving local copies of the measurement tables as separate files on the PC

hard-drive for further operation. To save a local copy of the directory to the computer hard-drive, open the measurement table window.


Next, select the following command from the program main menu: «File->  **Save**» or click  icon on the control panel. Indicate the name of the file where the copy will be saved.

To open a local copy of measurement table, select «File->  **Open**» command in the main menu or click  icon on the control panel. Select the file required. The current file types have *.tmf extension and are called «**Measurement log files (*.tmf)**».

To print out the measurements log, first activate the log window. Next, access the «File->  **Print**» command, or click  icon located on the control panel. «File->  **Print parameters**» command implements adjustment of printer parameters.

10 Measurements

10.1 Performing Single Measurements

Before you perform any measurements it is necessary to connect the Analyzer correctly to the PC and set all the connection parameters in the program. To switch to measurement mode, select the following command from the main Device menu: «Device->  **Measurement mode**». This will open measurements window and measurements table stored in the Analyzer memory.

See figure 15 for the representation of measurements window.



Figure 15

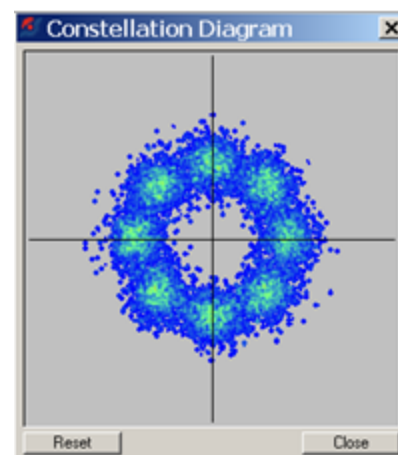


Figure 16

«**Signal level**» contains numerical and graphical indicators of the input signal level, in (dBuV) or (dBm). The peak signal level is displayed on the graphical indicator as a black vertical line. «**Reset**» button is intended to reset the peak value to the lowest level. The indicator of the input signal synchronization is located above the «**Reset**» button. If the indicator is green, synchronization has been achieved, if the indicator is red, there is no synchronization.

«**Signal frequency, MHz**» field contains signal frequency in MHz, which enters the LNB input. This field can be edited by the user.

«**IF, MHz**» field contains predetermined value of signal frequency in MHz within the intermediate frequency channel at the LNB output. This field can be edited by the user.

«**LNB frequency offset, MHz**» - displays the calculated value of the input signal mismatch relative to nominal value in MHz. Useful to eliminate faulty LNBs.

«**Modulation**» field contains the type of modulation of the transponder signal.

«**Symbol rate, MSps**» field displays the value for the symbol rate of digital data stream, represented in million symbols per second.

«**FEC**» field displays the value of the relative rate of Forward Error Correction

«**preBER**» field contains relative bit to error ratio within the stream prior to Viterbi correction

«**postBER**» field contains relative bit to error ratio within the stream after the Viterbi correction

«**MER**» field contains the value of relative modulation error ratio.

«**Network name**» field contains the network name.

«**Orbital Position**» field indicates orbital position of the satellite.

To perform measurements of the signal, set the following parameters within the RF channel settings table:

- Polarization type
- current LNB, working polarization
- LO
- Attenuation.

Next, either key in the transponder frequency within the «**Signal Frequency, MHz**» field, or key the intermediate frequency value within the «**IF, MHz**» field. Once the above steps have been completed, the window will display the level and the corresponding parameters of the input signal.

If you prefer simplified setting of the satellite, you can select the required transponder from the transponder tab. Any transponder available in the current profile can be installed using «UP/DOWN» keys located on the profiles panel. The current profile can be changed by means of switching to satellite directory.

When the «Save» button is pressed, the bottom part of the window displays saving of the current measurement into the Analyzer measurements table.

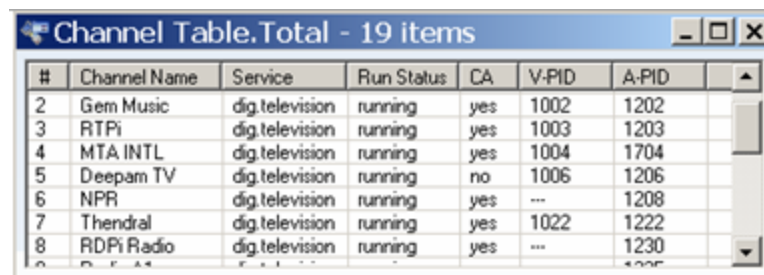
Clicking «Constellation» button will open the window with the constellation diagram.

The view of the constellation diagram window is shown in the figure 16. Each point on the diagram represents a sample of the input signal. Red color of a point shows that the sample occurs most often, blue color indicates most rare samples. The manner of point distribution over the diagram reflects the quality of the input signal and main distortions in the signal. A wide scatter of points indicates a low quality of the input signal. E.g. the signal represented in the above figure has MER = 11 dB. (Figure 16)

To clear the diagram click «Reset» button. To close the window click «Close» button.

Click the «Channel» button in the measurement window to open the Channel Table window (Figure 17). The channel table enables you to view the list of the transponder channels. If no synchronization with the input signal is achieved, the channel table function is grayed out.

NOTE; Depending on service provider information from the satellite: the Network name, Orbital position and Channel table may not be displayed



#	Channel Name	Service	Run Status	CA	V-PID	A-PID
2	Gem Music	dig.television	running	yes	1002	1202
3	RTPi	dig.television	running	yes	1003	1203
4	MTA INTL	dig.television	running	yes	1004	1704
5	Deepam TV	dig.television	running	no	1006	1206
6	NPR	dig.television	running	yes	---	1208
7	Thendral	dig.television	running	yes	1022	1222
8	RDPi Radio	dig.television	running	yes	---	1230



Figure 17




The following columns comprise the table:



channel number;

Channel Name channel name;

Service	(channel) service type;
Run Status	service run status;
CA	service coding;
V-PID	video packet ID;
A-PID	audio packet ID;


The channel table can be saved to the PC hard drive for further processing. To save the channel table, make the table window active and select the «File->  **Save**» command in the main menu or click  button on the document control panel. Then enter the required file name in the dialog box.

To open the saved channel table, select the «File->  **Open...**» command in the main menu or click  button on the document control panel. Select the «**Channel Table (.chl)**» file type and the required file in the dialog box. The «File->  **Print options...**» command opens the print settings window.

To print the channel table, make the table window active and select the «File->  **Print...**» command in the main menu or click  button on the document control panel.

10.2 Measurement in Spectrum Analyzer Mode

In this mode the software allows measuring the relative signal level at the Analyzer input within operating frequency range. The measurement result is represented as a spectrum diagram in the program window. The measurements are performed automatically, band by band within a defined frequency range. Prior to making these measurements, properly connect your Analyzer to a PC, and set the connection parameters in the program window.

To select the spectrum mode, select «**Analyzer->  Spectrum Analyzer**» in the main menu of the program. When this measurement mode is active, the following panels will appear on the screen: cyclic measurement activity panel and RF signal measurement settings panel.

Also control bar of this mode will be added into the toolbar. The view of this bar is shown in figure 18.

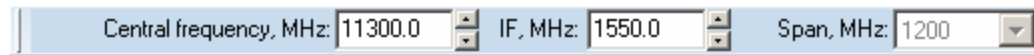


Figure 18

The bar contains the following fields:

- a) **Central frequency, MHz** – viewing and editing the currently set center frequency of the spectrum displayed, in MHz;
- b) **IF, MHz** – viewing and editing the set central **Intermediate Frequency (IF)** displayed in MHz;
- c) **Span, MHz** – viewing and editing the frequency bandwidth being analyzed;

To measure the signal parameters, first perform the settings on the RF signal measurement panel. (Polarization type, current LNB, operational polarization and LO).

The Spectrum Analyzer mode supports more additional settings and viewing capabilities.

11 Spectrum Viewing Window

The view of the window is represented in figure 19.

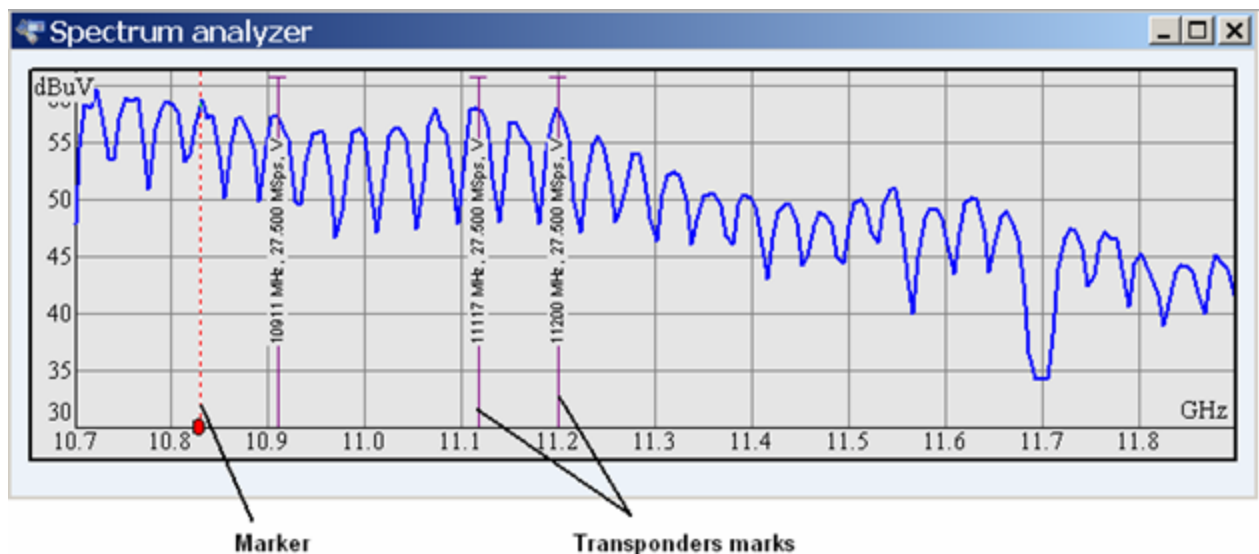


Figure 19

In the window you can view the graphs of the following spectra:

- a) Measured in Spectrum analyzer mode;
- b) Opened from file saved on PC hard-drive;
- c) Added by drag-and-drop from another spectrum window.


The horizontal axis of the diagram (bottom of spectrum window) represents the frequency of the spectrum. Double mouse clicking on the axis allows for the selection of either: the satellite high frequency or the IF frequency. The vertical axis represents relative signal levels at the Analyzer input in dBuV or in dBm.


Marker is intended for precise measurements of the desired frequency elements of the spectrum. You can shift the marker by clicking and dragging it to the desired frequency. The pop-up note will display the precise frequency value and signal level at the current point. The marker is located on the vertical axis, left of the spectrum.


The view of this control panel is represented in the figure 20.




Figure 20

 Button activates interactive interface for selection of the spectrum part to be displayed. This function is used for a more detailed viewing of the desired spectrum region.

To operate; first click the  button. Place the mouse on the preferred area of the spectrum, click & drag the mouse. This highlights an area for closer analysis. By rolling the mouse wheel, the spectrum frequency will move, by holding the «**Shift**» key and simultaneously rolling the mouse wheel, the spectrum (span) resolution will change. At any time you can re select the marker for another frequency.

 Button enables x2 zoom-in — opens the spectrum (span)

 Button enables x2 zoom-out — closes the spectrum (span)

 Button activates auto-zoom mode for zoom tuning along the axis of levels.

When you open the spectrum window, additional panel appears for managing spectrum view, and spectrum manager menu is activated. The **Spectrum Manager** access button is represented in figure 21.

Spectrum Manager

Figure 21

The button is only active if at least one spectrum window is open. The spectrum manager window is represented in figures 22 and 23.

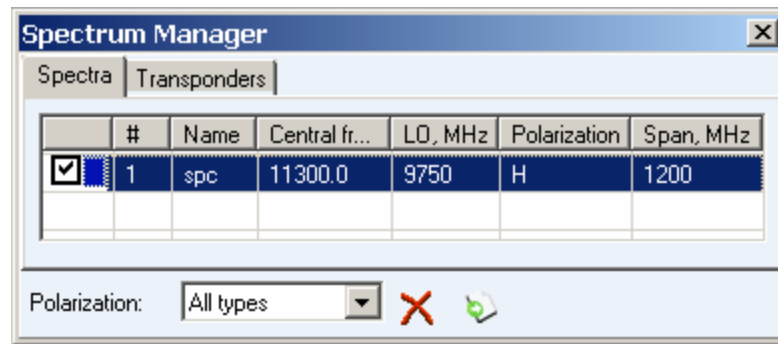


Figure 22

The window contains two tabs: **Spectra** (figure 22) and **Transponders** (figure 23).

The **Spectra** tab represents the table with the list of spectra displayed (or hidden) in the spectrum window. The first column of the table represents the show/hide checkbox and the spectrum line color. The checked box indicates that the spectrum is displayed in the spectrum window; the unchecked box indicates that the spectrum is hidden.

The other columns of the table are as follows:

#	Number;
Name	Spectrum name;
Central Frequency, MHz	Central frequency;
LO, MHz	Local oscillator frequency during measurement;
Polarization	Signal polarization during measurement;
Span, MHz	Frequency span.

The **Transponders** tab represents the table with list of transponder markers displayed (or hidden) in the spectrum window. The first column of the table represents the show/hide checkbox. The checked box indicates that the transponder marker is displayed in the spectrum window; the unchecked box indicates that the transponder marker is hidden.

The other columns of the table are as follows:

#	Number;
Frequency, MHz	Transponder frequency;
Polarization	Transponder, signal polarization;
Symbol	Digital data stream symbol rate;
Rate, MSps	
FEC	Forward error correction.

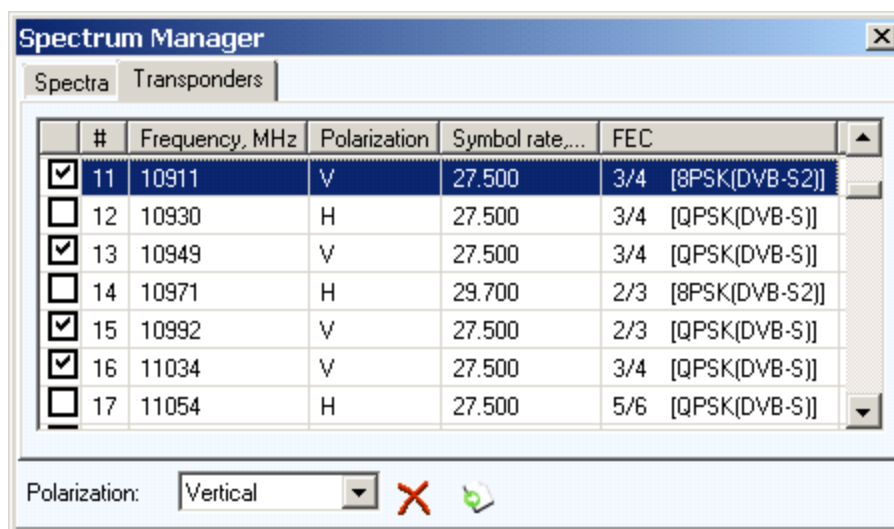


Figure 23

At the bottom of the window you can see the **Polarization** field, the «Delete» and «Export» buttons.

The polarization field allows immediate check marking of all the spectra or transponders with the required polarization. The filter can take on independent value in each tab.




The button deletes a spectrum or transponder from the corresponding table.

The button saves the spectrum window records in *.jpg graphics format or in *.csv table format. Only spectrum reports can be saved in *.csv format. Transponder data cannot be saved in this format. You can select the format in the «Save as...» dialog accessed by button.

The « Export to...» submenu in «File» menu enables the same function as button.


The records in the spectrum window can be saved to the PC hard drive or printed out.



To save the spectrum, make the table window active and select the «File-> Save» command in the main menu or click button on the document control panel. Then enter the required file name in the dialog.

To print the spectrum, make the table window active and select the «File-> **Print...**» command in the main menu or click  button on the document control panel. The «File-> **Print options...**» command opens the print settings window.

12 Local Copies of Spectrum Logs

The PC software allows saving the local copies of the spectrum into the separate files on the PC hard-drive for further operations. By saving spectrum graphs, they can be compared with other graphs overlaid. See Figure 19.

To save a spectrum graph: first click on the graph, in the «File» tab click on the  **save as** and call it a name. Be sure it is saved as a **(.trr)** file.

To open a copy of the spectrum graph, select «File-> **Open...**» tab in the main menu, or click  button located on the document toolbar. In the pop-up dialog window open the name of the file containing the measurement logs. You may have to select file type «**Transponder log files (.trr)**».

13 Additional Tools for Spectrum Data Operation

The viewing window has a number of additional tools. It is possible to display **Transponder marks** and **Additional spectra** in the spectrum graph field.

Transponder marks - to add the mark into the viewing field drag and drop it from the window of satellite logs of the corresponding transponders, satellites with transponders, etc. If the transponder's frequency is within the spectrum frequency span, the marks will be displayed in the graph. To execute select; **device, satellite tables**. Select satellite by clicking and dragging it onto the spectrum window. Markers will be displayed over the transponders.

The **Additional spectra** can be added to the graph by drag and drop of the desired elements of the spectrum window or the window of the spectrum local copy. This function can be useful for comparison of several spectra (results of different measurements).

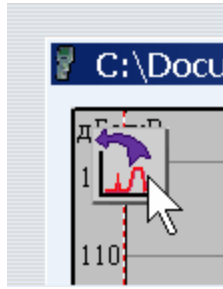


Figure 24

To compare two spectra, open the required file of the spectrum local copy. Make a left mouse click on the icon in the upper left corner of one of the opened windows and drag and drop it to the spectrum window for comparison.

This mode allows easy access to the information on type, modification, serial number and firmware of the device. To close the window, click the «Close» button.

14 Device Information

The «**Device->Device Information**» command in the main menu opens device information window (figure 25).

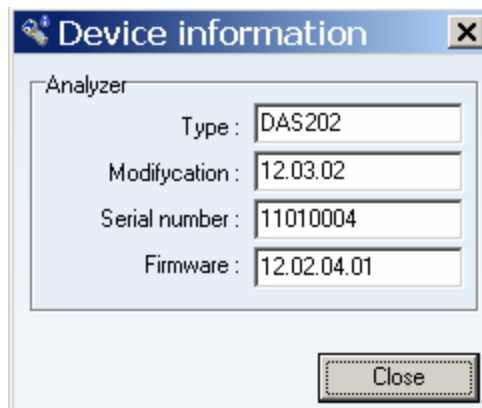


Figure 25

This mode allows easy access to the information on type, modification, serial number and firmware of the device. To close the window, click the «Close» button.

15 Firmware updating

To perform DAS202 firmware update, select  icon on the control panel. Firmware

updating manager window will appear.

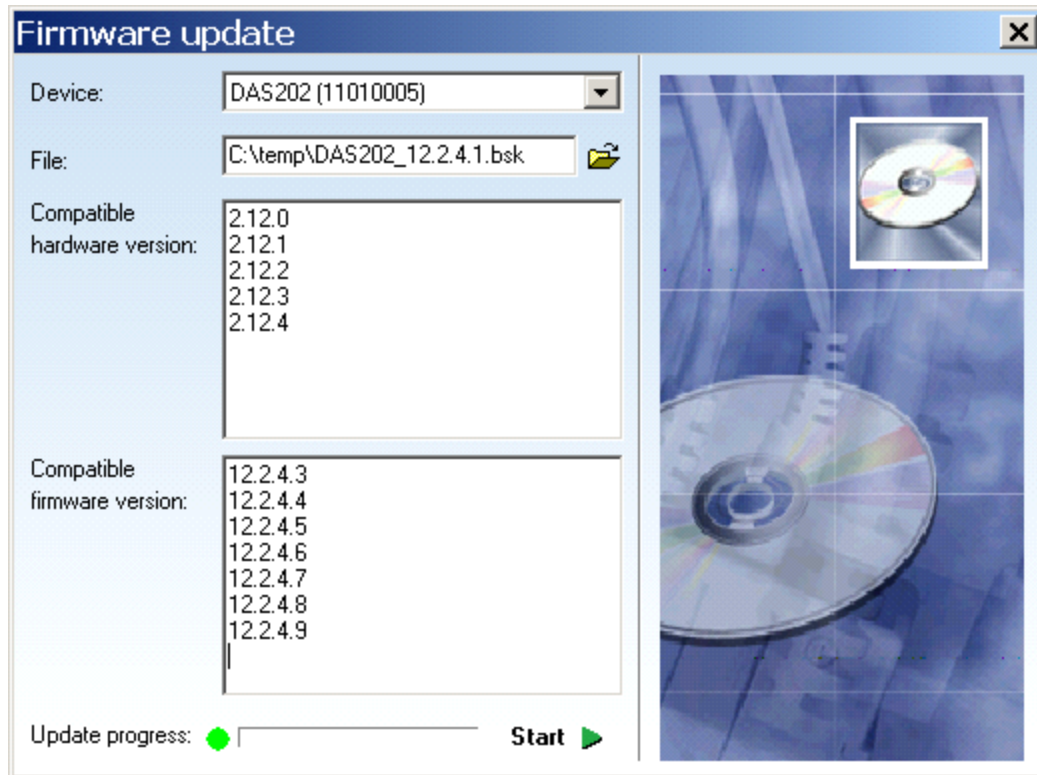



Figure 26

Firmware updating manager window includes the following elements:

- List of devices. You can choose one of devices from the list by their serial numbers.
- Full file name. You can select a file for downloading by clicking  button. In the standard dialog window for file opening, select the required file with *.bsk extension.
- List of device's hardware versions, which are compatible with the selected update file;
- List of device's firmware versions, which are compatible with the selected update file;
- Update progress indicator and «Start» button.

To update device's firmware, perform the following steps: select the device, select the firmware file, click «Start» button, and follow the step-by-step instructions, which will appear on the screen during updating.

If your Analyzer functions properly, USB port cable connected correctly and the firmware updating file is compatible with DAS202, the process of program updating onto your Analyzer will automatically start. **The Analyzer must be powered from an external power source.** After the download is over the pop-up window will announce that the operation has been successfully

completed. The DAS202 will reboot and start operating similar to when it has been powered up.

CAUTION Do not interrupt the firmware uploading process. This can lead to malfunction of the Analyzer. But, if this does occur, turn the Analyzer power off. Then turn the Analyzer on again while holding down the «F2» key. The **DAS202 Bootloader** window will appear on the screen of the Analyzer. Repeat the firmware updating process.

After rebooting the following message 27 can appear on the screen informing about the data stream decoder (DSD) software updating. Please wait until the updating process is completed and do not power the Analyzer off. After updating is completed you can go on with the Analyzer operation.

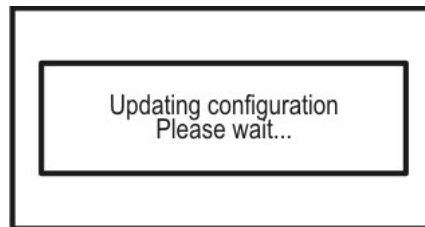


Figure 27

