DVB
Digital Video
Broadcasting

CW-4813   ASI & OFDM TS Analyzer

USER'S GUIDE

CableWorld Ltd. has carried out developing activity in the field of digital television for more than a decade, and developed the whole range of professional digital television devices. The goal with developing the portable CW-4813 ASI & OFDM TS Analyzer was to create a device, which along with a PC or notebook is capable of analysing the parameters of the digital TV signal down to the bit level, quickly, easily and effectively, especially in the fieldwork.

The CW-4813 is equipped with both ASI and OFDM input. The ASI input can advantageously be used in the head-end environment, whereas the OFDM input at any reception point of the DVB-T transmission system.

1. MECHANICAL CONSTRUCTION

The CW-4813 ASI & OFDM TS Analyzer is built in a 90 × 50 × 160 mm instrument box. It is delivered along with following accessories:

1. Power line adaptor (adjusted to 5 V DC)   1 ea
2. Crossover cable with RJ45 connectors   1 ea

The power consumption of the device is very low therefore no cooling or ventilation is needed.

2. ELECTRICAL CONSTRUCTION

Behind the 'Input 2' IEC socket the device comprises a *DVB-T demodulator*, which receives the high frequency DVB-T signal and demodulates it to base-band parallel transport stream.

Behind the 'Input 1' BNC socket the device comprises an *ASI input module* which converts the ASI signal into parallel transport stream.

Both inputs are equipped with loop-through outputs so that the device can easily be inserted into the network without the need for any distributor device.

The device's *Ethernet controller* converts the parallel transport stream into IP stream, which is available at the 'CW-Net' RJ45 connector for being led to the computer, where it will be analyzed.

The device is supplied through the 'DC 5 V' input socket from a switching mode power adaptor, which is factory adjusted to 5 V. The '5 V' label prevents accidental readjusting of the voltage.

3. PREPARATIONS PRIOR TO PUTTING THE DEVICE IN OPERATION

Download the SW-4875, SW-4841 and SW-4811B software from 'Software' page of the www.cableworld.eu homepage, and install them on your computer. The above pieces of software are exe files, which are available always in their latest version and can be installed very easily just by running them.

During the installation procedure the C:\Program Files\CableWorld library will automatically be created, all pieces of software install here and create their icons on the desktop.

When using Windows 7 or Vista operation system, be careful, because here writing the files is strongly protected. With the software installed to the usual place, writing files here will be permitted after registering as system administrator only. Suggestion: in this case install the software to among your documents instead of the offered library.

The installed pieces of software will provide following functions:

3.1 SW-4875 OFDM Demodulator controller software

The SW-4875 software serves to set the receiving parameters of the OFDM demodulator.
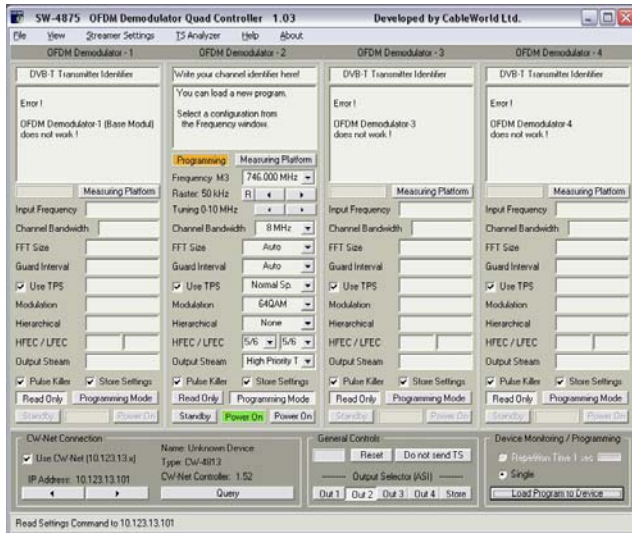

3.2 SW-4841 ASI to IP converter software

The SW-4841 software serves to set the modes and parameters of the parallel to IP conversion and the modes and parameters of sending the IP stream over the CW-Net.

The connection between the device and the controller computer is established by the CW-Net.

CW-Net is a 100 Mbit/s Ethernet network, which due the use of CableWorld's instruction set is referred to as CW-Net.

Download from the 'Papers' page and use the 'CW-Net' and 'Using CW-Net' guides for getting acquainted with computer networking and the CW-Net, for supporting your first steps, and learning tricks for making own applications.

The SW-4841 permits also setting the IP address of the devices.
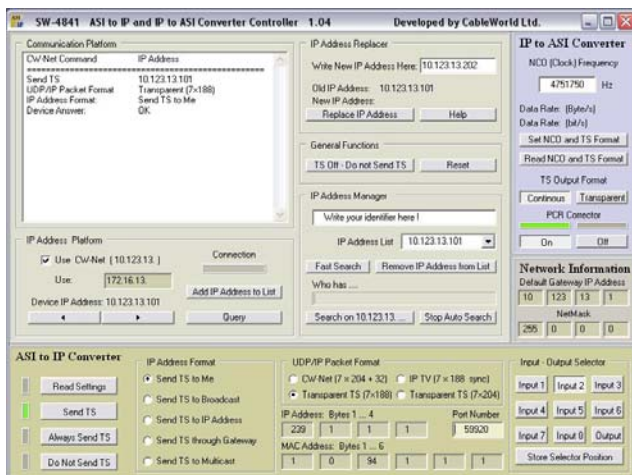
3.3 SW-4811B TS Analyzer software

The SW-4811B software serves to analyze the transport stream in order to get known the structure, components and content of the TS, both for testing and operating digital television equipment and networks, as well as for developing and education purposes.
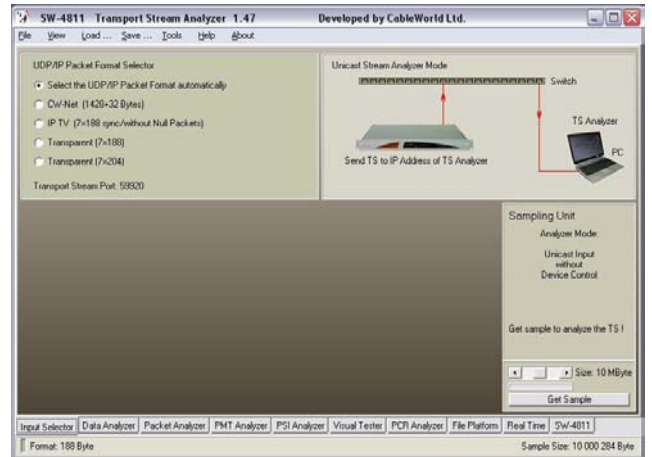
Please note, that each piece of our software is equipped with detailed instruction manual in their Help files, which is also available in pdf format in the 'Software' page 'Software User Manual' section.

4. PUTTING THE DEVICE IN OPERATION

Steps of establishing connection with the device, in the simplest case:

- Set the IP address of your computer to the fixed address 10.123.13.102 or to any other value within the 10.123.13.x range (x = 0 ... 255); the mask should be 255.255.255.0.

- Connect the device to the computer <u>directly with a crossover cable</u> (100Base-T), or <u>through a switch with straight cable</u>.

- Connect the power adaptor to the device.

- Run the SW-4875 software by clicking its icon on the desktop.

- In order to address the device set its IP address in the software, in the left bottom corner of the QFDM Demodulator controller screen.

  (All devices are delivered factory set to the IP address 10.123.13.101. It is strongly recommended to change the IP address to avoid IP address conflict when using more than one device in a system.)

- Click the 'Query' button. If everything is right, the software immediately displays the type number of the device, which at the same time indicates the existence of correct communication between the device and the computer.

In case of error consult the 'Using CW-Net' description. Until the communication between the computer and the device functions right, the work cannot be started.

5. SETTING THE PARAMETERS OF THE DEVICE

5.1 OFDM Demodulator

Connect the DVB-T signal of proper level and quality to the 'Input 2' socket.

The SW-4875 software is running.

In the SW-4875 controller graphic user interface (GUI)

− click 'Read Setting from Device', on which the GUI displays the actual parameter settings of the device.
− Click in the 'OFDM Demodulator-2' panel 'Programming Mode' and set the reception parameters as follows:
− Select in the 'Frequency' drop down list the frequency value next to the desired receiving frequency.

In the course of programming you will see, that for saving space in the screens, sometimes the names of the buttons change or buttons appear/disappear.

− Using the 'Raster' and 'Tuning' buttons set the desired receiving frequency.
− Set the 'Channel Bandwidth' according to the standard of the transmission to be received (e.g. in Europe in the UHF band 8 MHz)
− Set the 'FFT Size', 'Guard Interval' and 'Store Settings' to Auto, and check the 'Use TPS' and 'Pulse Killer' checkboxes.
− Click 'Load Program to Device' on which the device will automatically lock to the receiving frequency
− Click 'Read Only' and 'Read Setting from Device', on which the actual receiving parameters will be displayed.

Remark: If the input frequency is above 800 MHz and red 'UnLocked' appears, pull out and push in again the power plug, click 'Read Settings from Device' and check if the demodulator has locked.
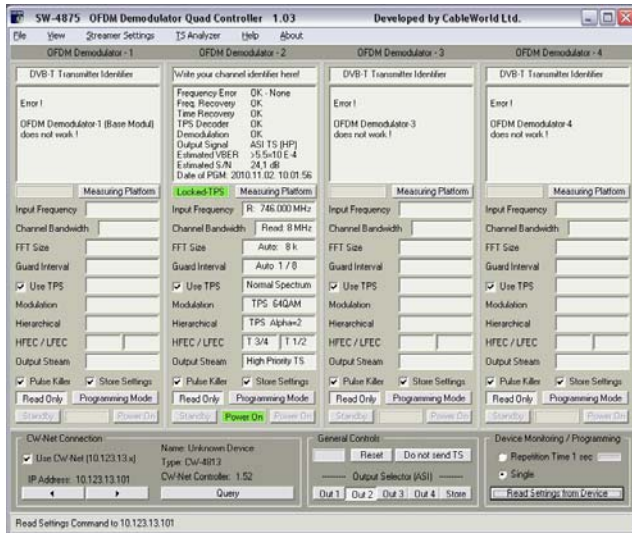

Now as the demodulator is tuned you can inspect the parameters of the modulation and reception:

− Click 'Programming Mode'.
− Select in the 'Output Stream' drop down list 'HP Constellation', click the 'Load Program to Device' click 'Measuring Platform' and select here the 'Constellation' button. On clicking 'Read', or selecting 'Repetition Time 1 sec' the constellation diagram will be displayed.

With this setting the tuner will deliver instead of the TS the constellation points, which can be displayed in

diagram and which permit performing a couple of measurements (Constellation, BER, MER etc.).
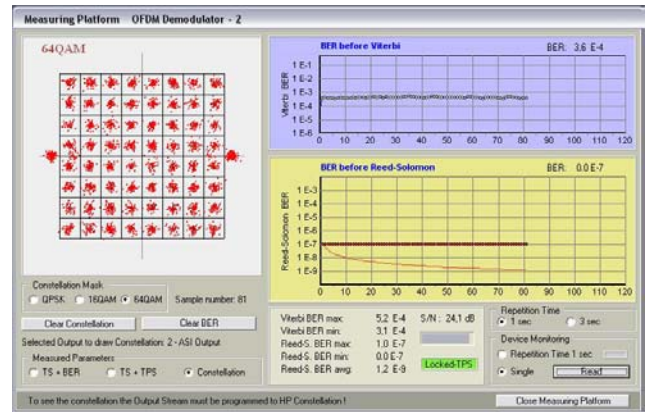

− For BER measurement select 'TS+BER' and click 'Repetition Time 1 sec'.

For analyzing the TS reconfigure the demodulator to deliver the TS again: 'Programming Mode' > 'High Priority TS' > 'Load Program to Device' > 'Read Only' > 'Read Settings from Device'.

5.2 ASI to IP converter (Ethernet converter)

After the demodulator has been tuned, and the received TS (or the TS coming from the ASI input) is available in parallel form, it needs to be converted into IP stream (packed in UDP/IP packets), which can then be sent to the computer. The conversion is made by the SW-4841 converter software.
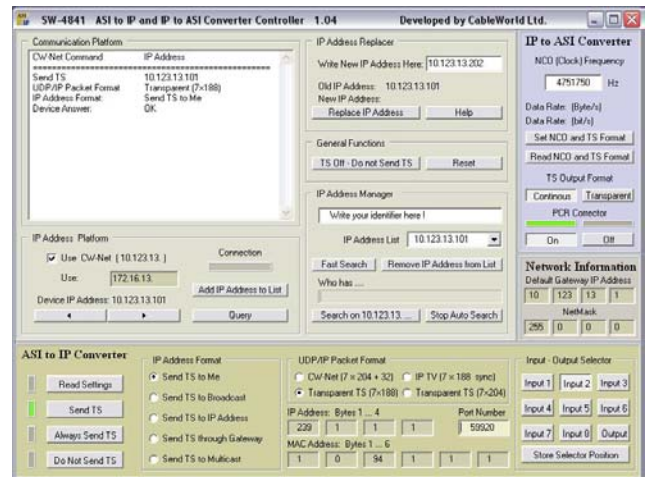
− Run the SW-4841 converter software.
− In order to address the device set its IP address in the software, in the 'IP Address Platform' of the converter screen and click the 'Query' button.
− <u>Select in the right bottom corner selector 'Input 1' when analyzing from the ASI input and 'Input 2' when analyzing from the HF OFDM input.</u>
− Set the modes and parameters of the conversion and the transmission to the computer:

  set 'IP Address Format' to 'Send TS to Me', 'UDP/IP Packet Format' to 'Transparent TS (7×188)' 'Port Number' to 59920 and hit 'Enter' on the keyboard.
− Click 'Send TS' and the Converter will send the TS to the computer for being analyzed there.

5.3 TS Analyzer

− Run the SW-4811B TS analyzer software.

− In the starting screen select the 'Input Selector' tab and click 'View' > 'Unicast Stream Analyzer'

− Click 'Select the UDP/IP Format automatically'.

− Click 'Get Sample', on which you will see the green bar, and after some seconds in the very right bottom corner the 'Sample Size' of the acquired sample of preset size will appear.

The analyzer is now ready to perform the desired analyses:

− Select the 'Data Analyzer' tab for displaying the bit level analysis of the stream.

− Select the 'Packet Analyzer' tab for displaying the tables, data rates etc.

− Select the 'PMT Analyzer' tab for displaying all services (programs) of the TS down to elementary streams.

− Select the 'PSI Analyzer' tab for displaying the details of the tables.

− Select the 'Visual Tester' tab for visual/audio display of the programs. Here select the requested program by its Video PID and click 'Play'. You will see and hear the selected program. The analyzer software can reproduce MPEG-2 programs. For MPEG-4 you need to install on your computer the PowerDVD software.

− In the 'File Platform' the TS can be recorded in file (e.g. for sending/archiving) or read from file.

− In the 'Real Time' page you can inspect the data rates.

For details of the TS analysis see the Help file of the SW-4811B software.