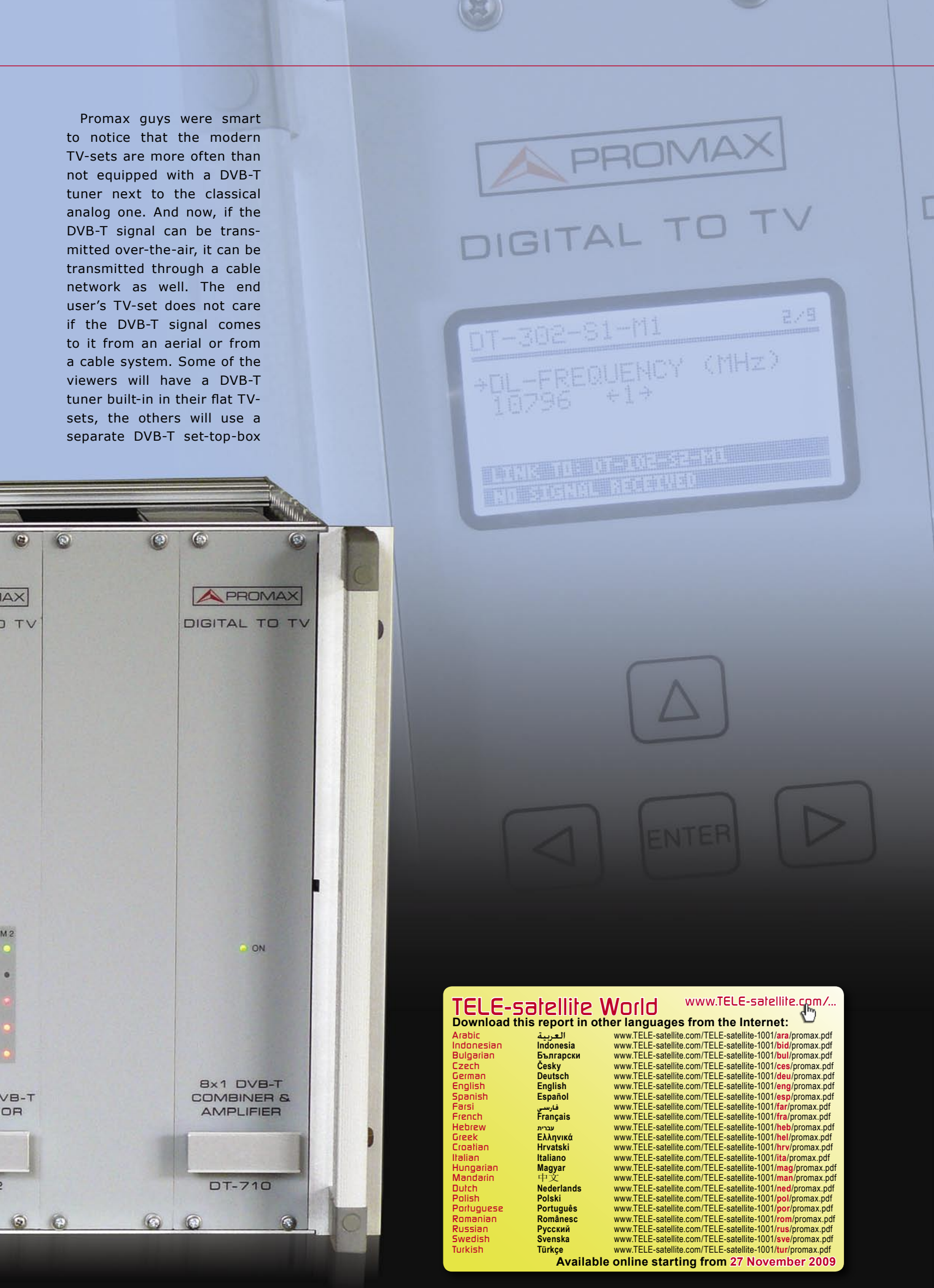
TELE satellite AWARD 12-01/2010
PROMAX DIGITAL TO TV
The perfect solution to distribute digital signals to a cable network in absolute error-free quality.

Promax Digital To TV headend

Digital cable TV? This is easy!

DVB-S is the standard for digital satellite TV. DVB-T - for digital terrestrial TV. And DVB-C – for digital cable TV. So if you want to create the cable network to provide digital TV to a number of end users you need to equip all of them with DVB-C set-top-boxes. You will also need the DVB-C headend. But is this the most cost effective way? The experts from Promax say: no, you can make it simpler and cheaper!

Promax guys were smart to notice that the modern TV-sets are more often than not equipped with a DVB-T tuner next to the classical analog one. And now, if the DVB-T signal can be transmitted over-the-air, it can be transmitted through a cable network as well. The end user's TV-set does not care if the DVB-T signal comes to it from an aerial or from a cable system. Some of the viewers will have a DVB-T tuner built-in in their flat TV-sets, the others will use a separate DVB-T set-top-box



for terrestrial reception. But one thing is certain: if they can receive a wireless DVB-T signal they will also be able to receive digital cable TV if only the cable headend outputs DVB-T compatible signal. And Promax Digital To TV (DTTV) headend just does it! The system works without any additional set-top-boxes installed at the end user side.

To make the cable network attractive, you not only need to retransmit all the terrestrial signals available over the air but you have to add content that is distributed via satellites. Quite often you would like to broadcast some content from A/V sources. For example, the hotels often play looped information for their guests. Finally, you can not forget about the Internet and the Internet TV (IPTV). Why not to make it available to the cable subscribers as well? All the above wishes are in fact the requirements that Promax engineers took into account when they were designing DTTV headend.

Modules description

The headend has a modular design so this is very easy to customize it accordingly to the specific needs. Everything is contained in a standard 19" rack. DT-800, the control unit and power supply, is located leftmost. It has a graphic LCD display and a few buttons you use to control all modules. Additionally, there is an Ethernet connector on the front panel. After connecting the module to the LAN, you are able to do all the settings more conveniently in a PC application. On the rear panel, we can see the power socket, power switch, mains voltage selector, sockets for the control cables and a cooling fan. In fact every module has a separate fan. This is typical in professional headends. The cooling fans create quite some noise but one usually does not install this stuff in the room where people are expected to work for hours. DT-800 is connected with every other module with a multi wire cable. It can control up to 7 modules.

Next module we had in the test rack was DT-302. DT-302 is the double DVBS/S2 receiver with transport stream outputs. If you connect 2 LNB's to its inputs, you can configure the unit to receive 2 different transponders. Each satellite receiver has two identical transport stream ASI outputs. ASI means Asynchronous Serial Interface and is the format of the transport stream transmission. DT-302 enables us to select the programs we want to pass. So we do not have to retransmit every channel from a given transponder but only the channels we want to show to our subscribers. Especially interesting in this module are the 2 CAM's accessible after a removal of the top cover. If you insert a valid smart card, you will be able to descramble satellite channels! That's how the premium channels are finding their way into cable networks.

DT-102 was the next module we put next to DT-302. DT-102 converts transport streams into DVB-T signal. It can be any transport stream but in our test we used the stream from its neighbor described above: DT-302. It has two ASI-TS inputs and one DVB-T output. There are 2 carriers (and thus 2 multiplexes) in the outputs if only we feed the unit with 2 separate transport streams. The next module is DT-202, a twin DVB-S to DVB-T transmodulator. This modules provides the simplest and most cost-effective solution to distribute FTA satellite channels, which of course do not require using any smartcard.

As you can see on the photo, DT-504 is the next

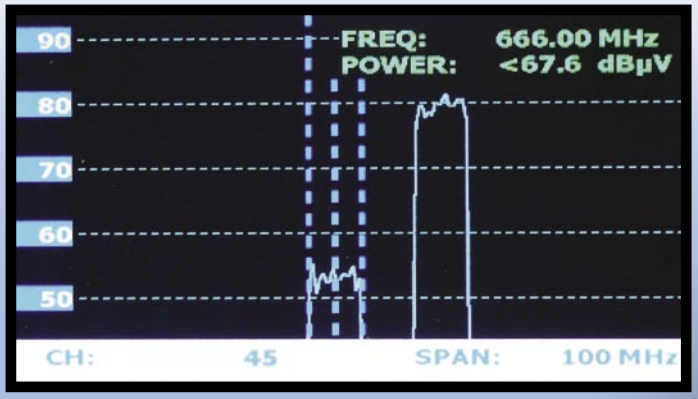
module. It has 4 A/V inputs which must look very familiar to all our readers. Yes, these are regular analog video and analog stereo audio inputs. The signals may come from DVD player, VCR, satellite receiver, security camera or other source. Every of those analog inputs is converted to the separate digital channel at the output of this module. In this way, you get one DVB-T carrier containing 4 channels.

The last but one module, DT-212, is a DVB-T transmodulator. After receiving a digital terrestrial signal we can shift it in the spectrum to different frequency. This can be done to avoid some undesired interaction between the signals in the network. Another important function of this module is improvement of signal quality. It demodulates the signal, corrects erroneous bits and remodulates the signal back to DVB-T. As a result, we get a signal with very good C/N ratio suitable even for large cable network.

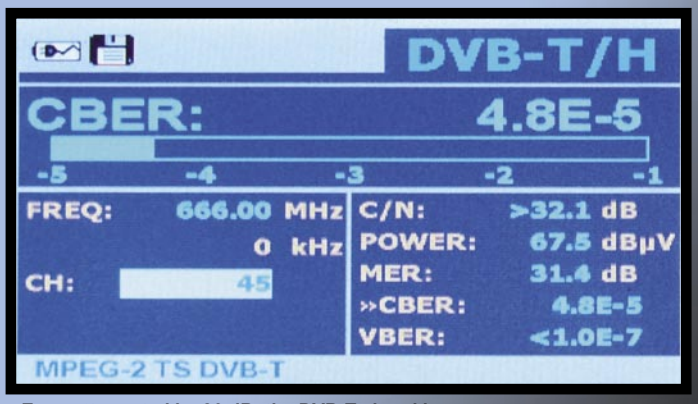
Finally, the rightmost module is DT-710. This is a combiner/amplifier that takes up to 8 DVB-T carriers and outputs all of them in one cable. This would normally be an output for the cable network.

Installation

Right after plugging in every module and connecting them on the rear panel with control and signal cables, DTTV is ready for setting up. Though the number of button is limited to six: four arrows, ENTER and ESC, setting up the instrument is surprisingly easy. Right after power up, the DT-800 control unit check what other units are connected to it. After a few seconds, we may press ENTER. Then you are asked for the password (PIN), and later you just select the module you want to configure (with right/left arrows). When the desired module is displayed, another ENTER allows you to start setting up the parameters. Up/down arrows change the value of the digit or letter of the alphabet while left/right arrows change the position in a number or name. Everything works very intuitively. When setting up the DT-302 you need to provide similar data to those in the receiver installation menu: LOF, frequency of the desired transponder, band (C/Ku), LNB supply (13/18 V, 22/0 kHz), standard (DVB-S/S2), symbol rate. There is also another option: service list. Once DT-302 locks to the transponder, this submenu will list all recognized services (TV, radio and data channels). You can mark only those services you want to be included in the output.



■ **DT-102 converts 2 transport streams to two regular DVB-T COFDM signals. You can see their spectrum on the photo. We set one of their levels 20 dB down. Otherwise, they would be equally strong.**



■ **Even attenuated by 20 dB, the DVB-T signal has excellent quality. See the CBER, VBER, C/N and MER readings.**

■ **4 FUN.tv channel from HOTBIRD satellite at 13°E re-modulated to DVB-T and seen on the signal analyzer screen.**

The remaining services will be blocked. If the services are scrambled, you can use a valid smart card and insert it in the CAM installed in the module. To get physical access to CAM, all you need to do is to unscrew a small lid on the top panel of the module. Actually, DT-302 has 2 such modules – separate for every input.

Other modules are configured in the same manner. If the module has a DVB-T output, we need to select the DVB-T parameters: Frequency, Attenuation, FFT Mode, Guard Interval, Constellation, Code Rate, and Channel Bandwidth.

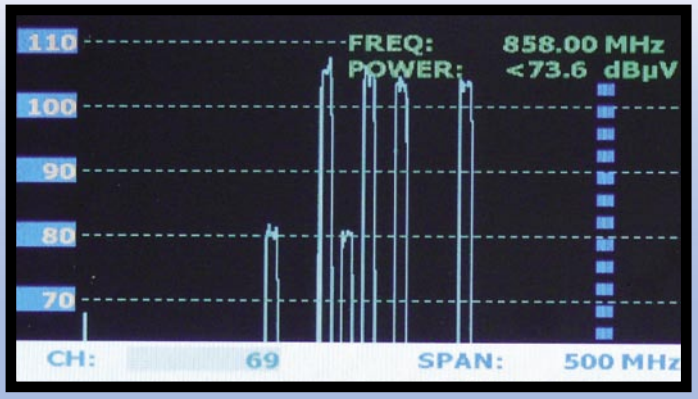
As you can see, the number of setting is rather high. If you just need to change DVB-S transponder data, it is not a problem. You can do it in no time. However if this is an initial setup, it may take a while. To make it more convenient, Promax developed PC software to control DTTV. Both PC and DTTV must first be connected to local area network. You set the IP address, submask and gateway in DT-800 module manually. DHCP is not supported. This is something natural in professional equipment. The application makes the whole configuration process much easier. This is a real help for the installer.

Performance

The quality of output signal is absolutely great. This is much, much better than you can get from the satellite LNB or terrestrial antenna. That's because the modules have very good front ends, they demodulate DVB-S/S2 or DVB-T, correct the bit errors and remodulate transport stream to DVB-T. Thanks to that, the output signal has practically no bit errors. All parameters related to signal quality: MER, C/N, CBER, VBER are absolutely excellent. Moreover, the signal level is very high. When you connect a modern TV-set even at the end of a very large cable network, the signal will still be very, very good. There is no single parameter we can complain about.

Conclusion

DTTV is a very high quality DVB-T headend of perfect output signal and very big configuration possibility. The modules we had in our test rack are but a few of the modules available from Promax. Visit their webpage www.promaxelectronics.com for more details. If you seriously think about the cable headend and want to make the whole enterprise economically sound, you have to consider DTTV!



■ DTTV unit in the test configuration we had was able to generate 6 DVB-T COFDM signals. Assuming that one can have 8-10 SDTV channels per every carrier, one DTTV unit can give us 48-60 digital channels!

■ Details of the satellite PATIO.TV channel converted to DVB-T.

■ Setting up DT 302 module. You can see setting the frequency of the transponder to be received and demodulated to the pure transport stream.

Expert Opinion

Jacek Pawlowski
TELE-satellite
Test Center
Poland

+

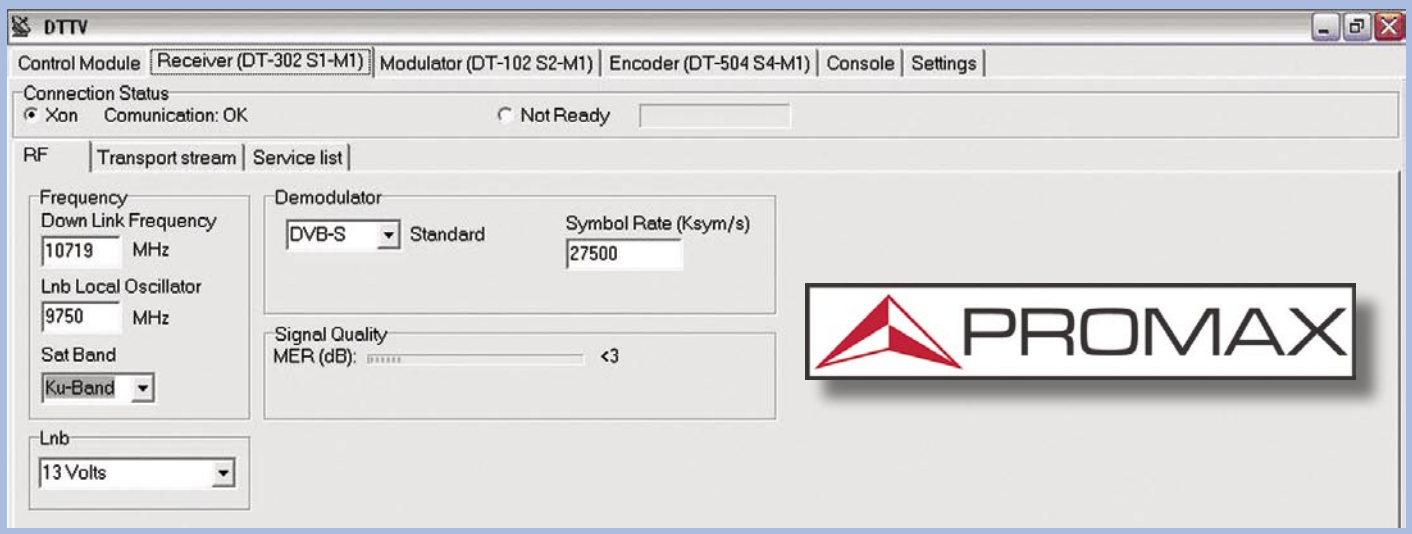
Very flexible configuration. Simple user interface. Extremely good and strong output signal. No DVB-C set-top-boxes needed at the customer side.

-

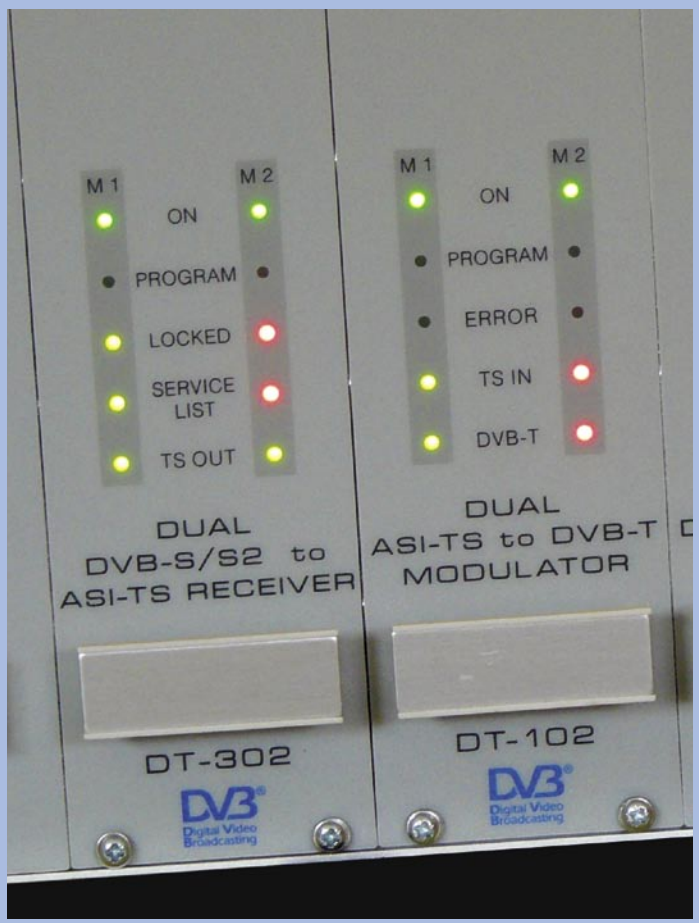
Some functionalities of the regular DVB-C (like the return channel) are impossible. Also the number of possible digital channels is lower than in DVB-C (but this is important only if you need to supply more than about 200 channels).

TECHNICAL DATA

Manufacturer	Promax Electronica, S.A., Barcelona, Spain
Internet	www.promaxelectronics.com info@promaxelectronics.com
Phone	+034 93 260 20 02
Fax	+034 93 338 11 26
Model	Digital To TV
Description	DVB-T headend for cable networks (SMATV)
Inputs	DVB-S/S2, DVB-T (e.g. from the aerial), A/V analog, IPTV, TS-ASI
Output	DVB-T COFDM
Power supply	120/240 V 50/60 Hz



■ **Screenshot of DTTV control application.**



■ **Green LED's indicate that DT-302 has locked to the satellite transponder and that DT-102 outputs correct DVB-T signal.**

■ **DT-302 module has 2 CAM's accessible from the top after removing a cover. They are capable to decipher scrambled channels. Of course, you need to put in valid smart cards.**