INSTALLATION GUIDE

OTX 0200

DVB-T Terrestrial Processor

English

411 249 a

Contents

1. Introduction

Thank you for purchasing an WISI product. The OTX 0200 is a revolutionary solution for reception and modification of terrestrially transmitted TV-content into various transmission formats for cable-TV and SMATV.

The OTX 0200 is delivered with hardware and software that supports DVB-T reception, MPEG2/MPEG4 H.264 AVC, ASI output, VSB RF modulation with NICAM audio, IP control and management. All hardware needed for upgrade with software options is available from the start. See section 7 for more information.

OTX 0200 can be upgraded for enhanced functionality and various formats for transmission and processing of digital-TV content by upgrade of its firmware. Software options will be available from WISI, please ask us for the specifications and complete price list of all options.

2. Unpacking the unit

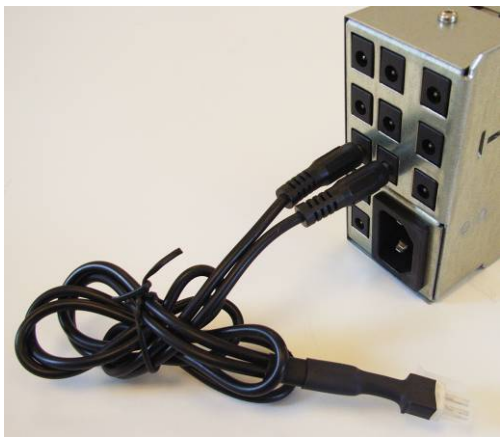
Following components are included in the package:

Amount	Description
1	OTX 0200 Terrestrial Processor
1	Installation guide
2	Front panel screws

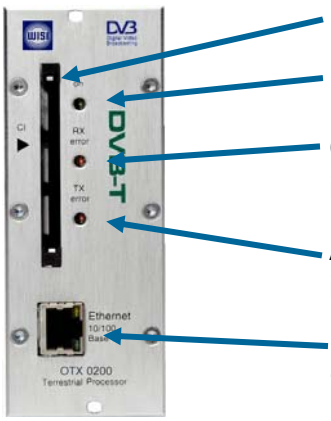
Every unit is quality controlled by us before delivery. Should any items be missing when unpacking please contact our support service (see page 3 for contact info).

Important information about power supply to OTX 0200

To avoid problems with OTX 0200 and/or OPP 0100 it is very important that both DC plugs on the OTX power cord are inserted into the OPP 0100, i.e. each OTX unit needs to be fed from two DC outputs at the rear end of OPP 0100.
(See picture to the right).



3. Connections and indications



Common Interface slot

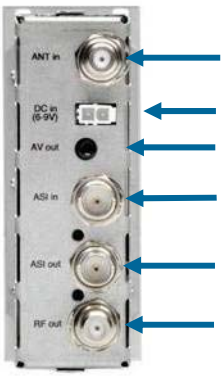
Power on indicator

COFDM Rx error indicator

Access/Tx error indicator

Ethernet port (RJ 45) for control and settings

Front panel view of OTX 0200



Antenna in

DC in

A/V out

ASI in

ASI out

RF out

Rear panel view of OTX 0200

Common Interface Insert your Common Interface Conditional Access module into this slot

Power on indicator Green light indicates that power is on.

Rx error Red light indicates that the receiver is not locked to the terrestrial transmission.

Access/Tx error Red light indicates that the smart card is not authorised or analogue output signal is missing.

Ethernet port Ethernet for connection to a PC or handheld device with web browser

Antenna in Connect your outdoor aerial to this input.

RF out Connection to Cable TV or SMATV network.

3. Connections and indications (continued)

A/V out *)	Connection for monitoring or to an RF modulator.
ASI in *)	Input for ASI (Asynchronous Serial Interface) for high speed transport stream reception.
ASI out	Output for ASI (Asynchronous Serial Interface) for high speed transport stream transmission.
DC in	Connect a DC voltage to this input (6-10V).

**) Optional function*

NOTE! *We recommend to use only WISI original power supply for correct functionality and life cycle. Warranty will be void in case of damages caused by power supplies not supplied by WISI.*

4. Settings

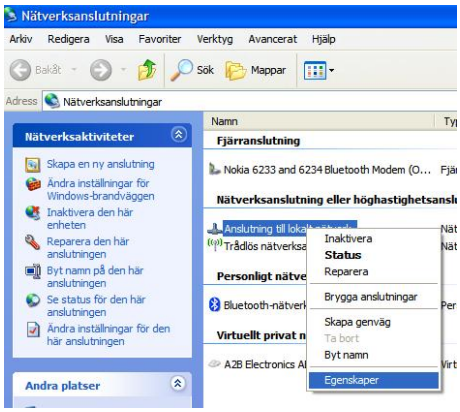
OTX 0200 has an embedded web server allowing standard web browsers (Internet Explorer, Firefox, Opera etc.) to connect to the unit for settings and management.
No controller software is needed.
The OTX 0200 has by default a static IP address for connecting your PC to the unit.

The OTX 0200 is delivered with IP address: 192.168.0.20. First time installation requires that you set a static IP address on your computer. For example set your PC to IP address: 192.168.0.19 and Net mask: 255.255.255.0

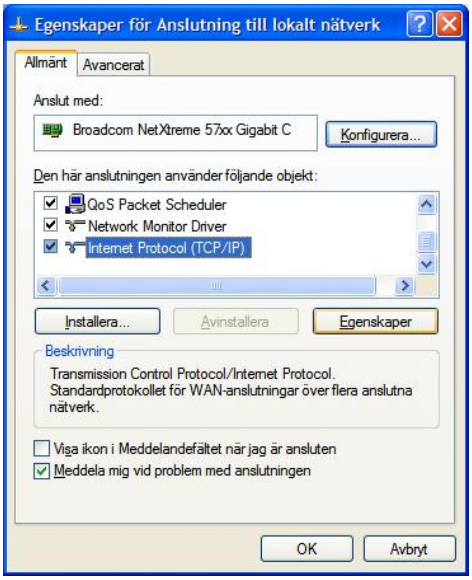
4. Settings (continued)

4.1 TCP/IP settings for Windows XP (setting your PC to 192.168.0.19)

Click ”Start”, select ”Control panel” and select ”Network connections” and then select “Network and Internet settings”.”Right click” on [Settings for local network] and select [Properties].

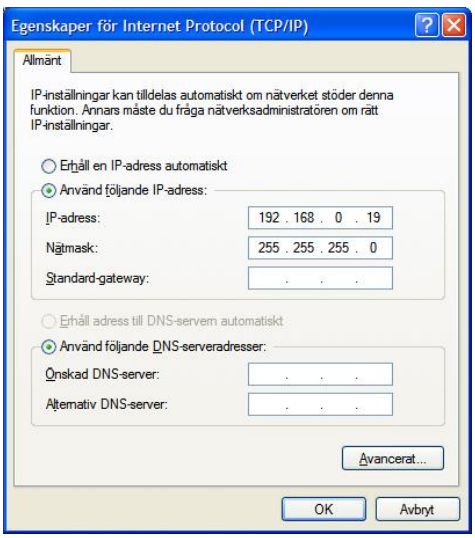


In Properties click [Internet protocol (TCP/IP)] and select [Properties].



Select [Use this IP adress] and write: 192.168.0.19 and select [Net mask] 255.255.255.0. Click [OK] and then click [Close].

NOTE! *For PC with other Operating Systems (OS) than Windows, please consult the Owners manual for your PC for [IP/Network settings].*



4.2 Connecting your PC to OTX 0200

Connect the OTX 0200 to a DC power supply (OPP 0100).
See section 6 for installation.
Next connect your PC to the OTX 0200 with a network cable.
Start your web browser (IE, Firefox, Opera etc.) and write the IP address 192.168.0.20 in the address field in your browser.

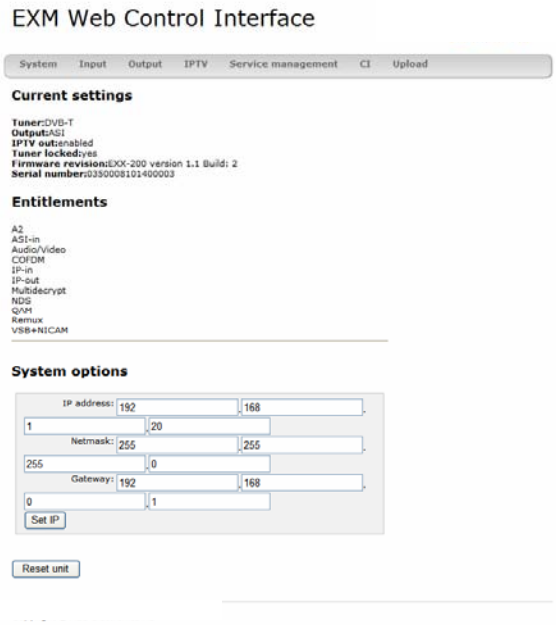
4. Settings (continued)

4.3 OTX Web Control Interface

4.3.1 System menu

The following **[System]** menu should appear when you connect to the OTX 0200. The **[System]** menu contains basic information about current settings and entitlements.

Menu buttons for **[Input]**, **[Output]**, **[IPTV]**, **[Service management]**, **[CI]** and **[Upload]** are available in top of the menu.



Current settings
Contains information of current input and output signals, if the tuner is locked to a signal, serial number and firmware revision.

Entitlements
Entitlements are software options that are available in this unit (e.g. output signal format, input signal entitlements etc.)

System options
This menu contains current IP address for the OTX 0200.

[Reset unit] gives a possibility to restart the unit at any time.

4.3.2 IP address settings

The OTX 0200 is set to an default IP address from factory (192.168.0.20). However, it is possible to change the IP address and/or the Netmask and/or the Gateway. This is an important function when you install two or more OTX units in a Head End and want to connect all units together through a switch or a router.

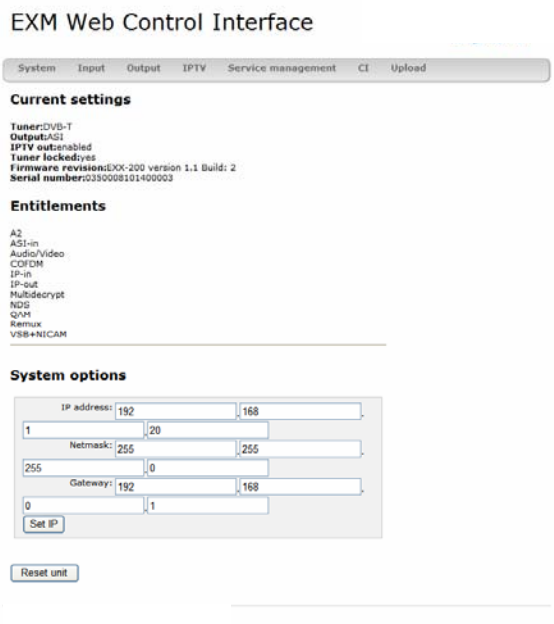
4. Settings (continued)

IP address settings (continued)

Setting new static IP address in the OTX 0200

Connect your PC to each OTX unit after that you have done all other settings in the units and change to a specific IP address for every unit.
A recommendation is to use from 192.168.0.21 and higher.

NOTE! Almost every switch/router use 192.168.0.1 as default IP address so make sure you don't use the same IP address in any OTX 0200 unit.

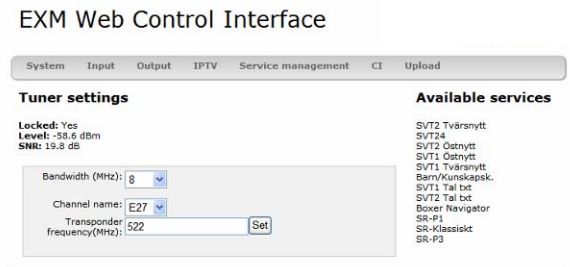


To continue installation press **[Input]**

4.3.3 Input settings

Select the bandwith of the channel you want to receive. Next select the channel number according to CCIR or enter the correct frequency (in MHz). Be sure to press [Set] to enter the frequency to the OTX 0200.
A list of the available services from the multiplex you tuned to, will be shown on the right hand side.
Below [Tuner settings] information of the received signal is displayed.

Note! We recommend that the [Level] reading is better than -60 dBm and SNR better than 25 dB for best performance.



4. Settings (continued)

We suggest that you consult your local terrestrial operator for correct parameters for each multiplex you want to receive.

Click **[Output]** to continue with the output settings.

4.3.4 Output settings

ASI

The output selection ASI disables all RF modulation on the outputs and all selected services will be transmitted only through the ASI output connector. ASI is a high speed interface for digital TV transport streams. Use this output mode if you run IPTV out.
Under **[ASI options]** you can select the output bitrate which is the same bitrate as for IPTV out.

Analogue

The selection **[Analogue]** is set as factory default as RF output .
You can select output **[Channel name]** (E2 to E69) or **[Frequency]** within steps of 1 kHz (for example 306,167 MHz). Country specific settings can be done by selecting **[Country]**. By selecting a specific country, transmission standard and languages are automatically preset. **[Audio language]** gives you the choosen language if there is more than one language ín the received signal.
Subtitling type, subtitle priority and subtitle charset can be selected.

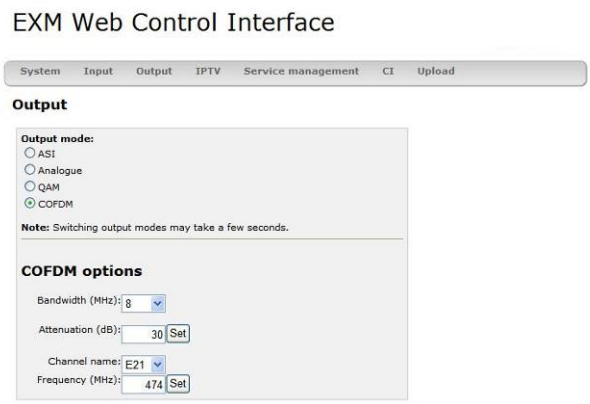
4. Settings (continued)

4.3.5 OUTPUT settings (continued)

It is possible to select scaling of the picture format to fit with connected TV-sets. This is handled in the **[Aspect ratio]** drop down list where it's possible to choose between the different types. **[WSS]** (Wide Screen Signalling) is available in the video for signalling the aspect ratio to be displayed by the TV sets.

[Bitrate] can be set and this gives you what the bitrate will be at the ASI output. **NOTE!** Refer to the table in page 16 about correct values. **[Attenuation]** can be choosed between 0 to -31 dB

The **[Frequency]** can be set in steps of 1kHz (e.g. 306.167 MHz) in all three output modes (Analogue, COFDM or QAM). Click **[Set]** to save all settings.



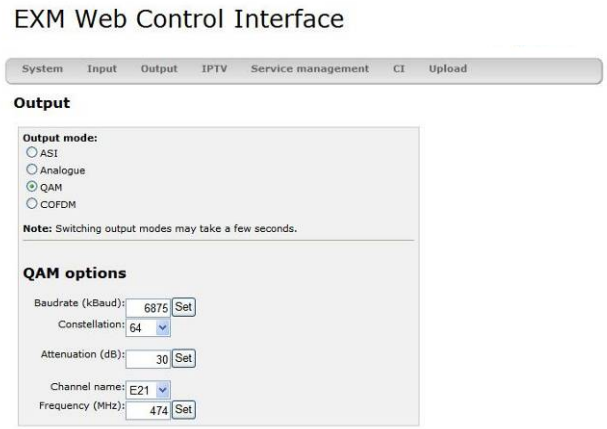
COFDM
For **[COFDM]** (DVB-T) output you can select Output channel (E2 to E69) or Frequency and Output signal attenuation (0 to -31dB). You can also select bandwidth (6,7 or 8 MHz). The maximum output TS bit rate in COFDM is 31,67 Mbps.

Note! Some of the choices may need optional software to be uploaded before they can be selected.

4. Settings (continued)

QAM

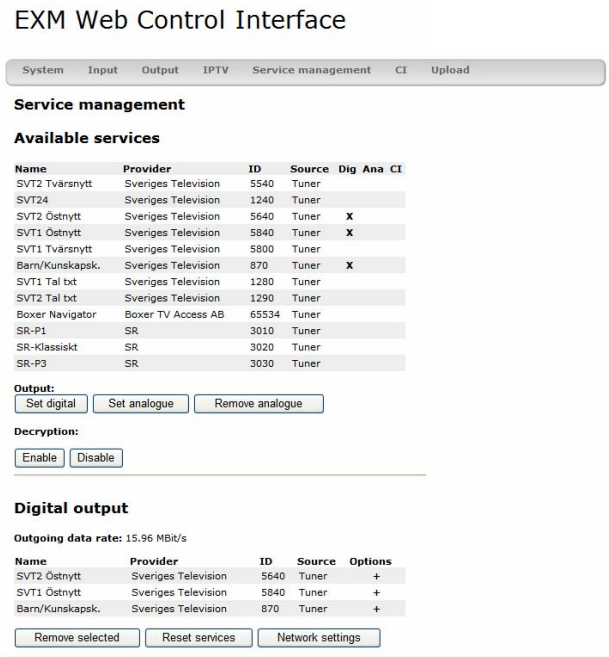
When selecting **[QAM]** DVB-C output, there are settings for Output channel (E2 to E69) or Frequency, QAM-mode (16, 32, 64, 128 or 256QAM), Baud rate (kHz) and Output signal attenuation (0 to -31dB).



Click **[Service management]** to select service(s) and/or create new multiplexes.

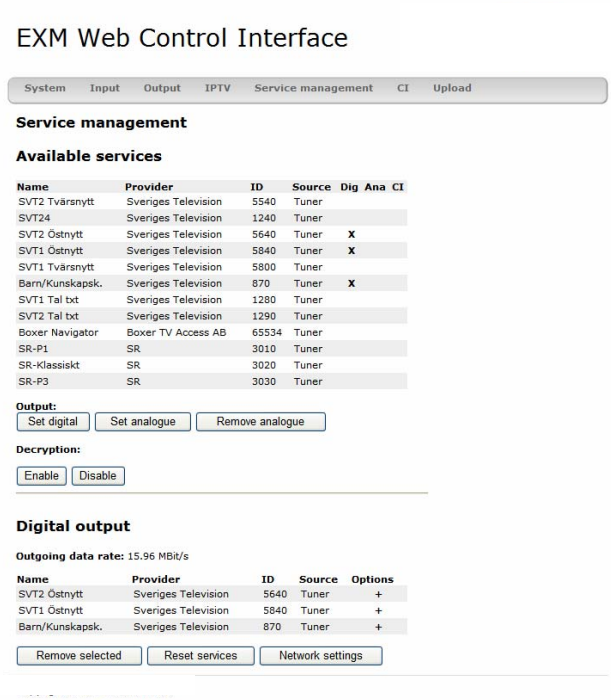
4.3.5 Service Management

The Service management menu gives an overview of available services from antenna input or the ASI input (if enabled). Remultiplexing (remuxing) is possible after downloading a appropriate SW option. To build your own MUX you combine several incoming services. These can be received either from the tuner or from the ASI in. Under the **[Digital output]** section in this meny you can see the actual “Outgoing data rate”. This helps you to avoid overload for the output (see section 5 for information).



4. Settings (continued)

In the menu to the right a list of all services the unit receives, both from the **[Tuner input]** and from the **[ASI input].**
To select the service or services you want at the **[Digital output]** mark a service by clicking the line where the service is presented and than click the “Set digital” button. Now an “**X**” should appear in the “**Dig**” column. Do the same to choose a service as “Analogue out”. Make your choice of which services you want to select as outputs and you will see the selected service(s) in the **[Digital output]** list in the menu.



The ASI output contains the services you have selected for **[Digital output]**.

For decryption you mark the service by a click on the service name line and by clicking on “Enable” under the **[Decryption]** headline.

Note! *To decrypt more than one service requires a multidecryption CA module and a smartcard that is activated for more than one service. Some smartcards can handle two or three services at a time. Please, refer to your smartcard service provider for further information.*

Click the “Network settings” and select “Network ID” and “Transport ID”. If a choice is made you have to click on **[Save]** to store the ID:s. The DVB standard recommends following Network ID ranges:
DVB-S: 0 to 8191 (0 should be avoided)
DVB-T: 8193 to 13568
DVB-C: 40961 to 65281 (ComHem in Sweden 41001 and up)

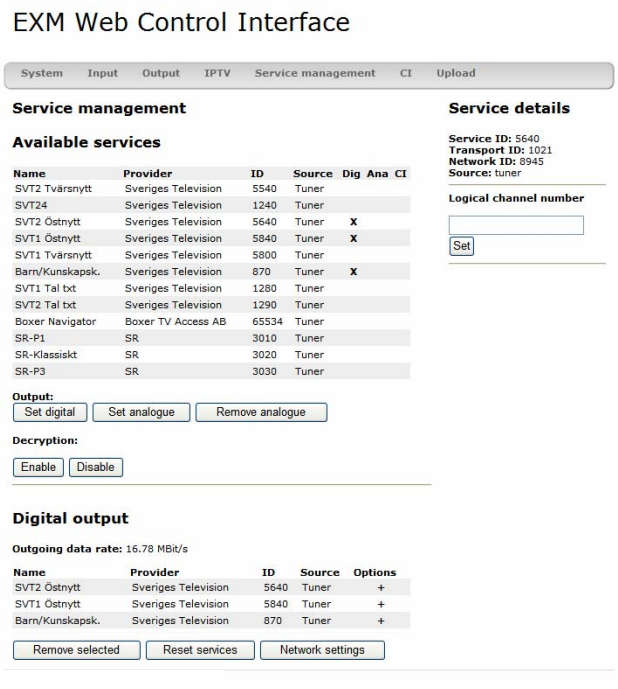
The OTX 0200 is designed to perform remultiplexing fully automatically of both audio and video streams as well as full remultiplexing and regeneration of PSI/SI data.

The advantage for you as a user is much lower risk of failure and the process is much less time consuming.

4. Settings (continued)

4.3.5 Service management (continued)

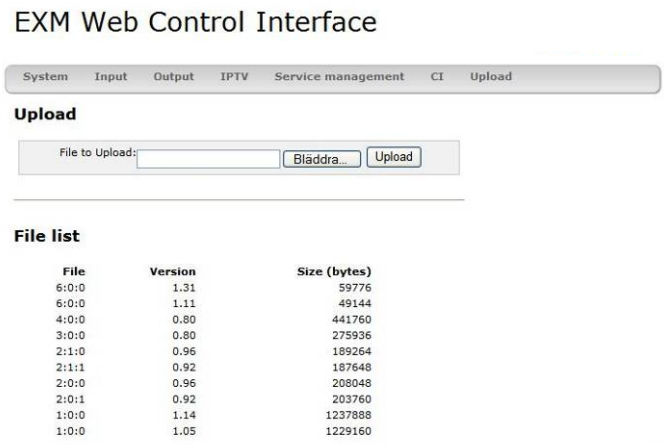
For setting the LCN (Logical Channel Number) you click on the **[+]** sign under the column named **[Options]**. In the box under the label **[Logical channel number]** you write the number you want for the service you have choosed and click on the **[Set]** button.



Note! LCN is not supported in all DVB receivers i.e. refer to your manufacturer for specification for the DVB receivers in your cable TV network.

4.3.6 Upload

Update of the OTX 0200 firmware or upload of enhanced functionality is done via the Upload menu. Select **[Browse]** and search for the correct file on your computer. When the file is selected press **[Upload]** and the file is uploaded into the OTX 0200. A power reset will always ensure that the OTX 0200 reboots with the uploaded software.

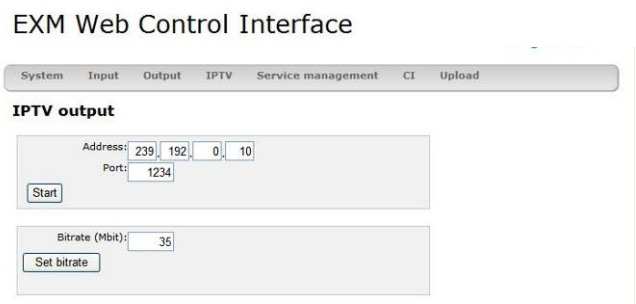


Please refer to the installation information for each specific SW.

4. Settings (continued)

4.2.6 IPTV settings

This menu allows for settings required to transmit a digital-TV transport stream as IPTV. IPTV output is optional and can be ordered separately.

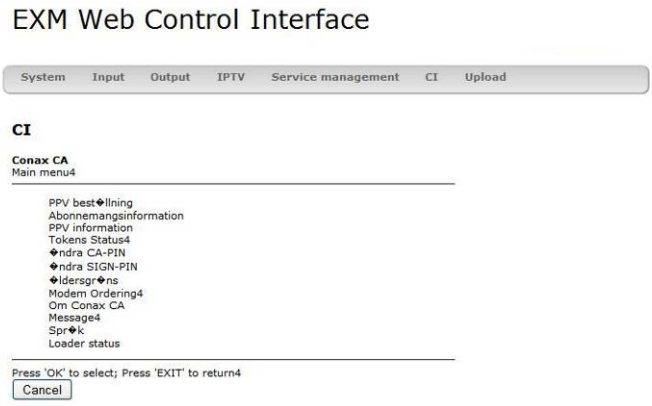


For IPTV out you have to set **[UDP/RTP]** values for Port and Address.
For example: IP address 239.192.0.10 and Port 1234. In the box named ”Bitrate” you can choose what bitrate you want on the IPTV TS out and the maximum value is 55Mb/s. Click **[Set bitrate]** to save settings. Click on **[Start]** to get the IPTV stream on the output (RJ 45 connector). To check the IPTV out signal you can use a player like VLC Player.

Note! *To avoid overload it’s not recommended to run other RF output at the same time i.e. choose ASI as Output. The choosen bitrate will be the same on the ASI output*

4.2.7 CI and Smart card information

This menu allows you to view information about your CA System and current subscriptions.



5. About remultiplexing

To be sure that you don't exceed maximum bit rate for an output MUX, please control that you don't select to many services.

The website: http://www.satcodx.com/eng/ lists bit rates for satellite services. The services are named TS and marked red and by clicking on one service you can get both average and peak values. It is recommended to select the peak value when planning a new MUX.

The table below gives max bit rates for COFDM and QAM out from OTX 0200. Due to bit rate fluctuations from statistical multiplexing, we recommend that you only use 85% of the maximum available bit rate

Output signal	Modulation	Baudrate/BW	Max bitrate (Mb/s)	85%
COFDM	64QAM	8 MHz	31,67	26,92
COFDM	64QAM	7 MHz	27,71	23,55
COFDM	64QAM	6 MHz	23,75	20,19
QAM	16QAM	6.875 Mbaud/s	25,34	21,54
QAM	32QAM	6,875 Mbaud/s	31,68	26,93
QAM	64QAM	6.875 Mbaud/s	38,01	32,31
QAM	128QAM	6.875 Mbaud/s	44,35	37,70
QAM	256QAM	6.875 Mbaud/s	50,69	43,08

Table 1. Max bit rates for COFDM and QAM.

The formula for calculating QAM output bitrate is: [Baudrate x "A"/(204/188)]where "A" is 4 for 16QAM, 5 for 32QAM, 6 for 64QAM, 7 for 128QAM and 8 for 256QAM mode.

6. Installation

The OTX 0200 can be installed either as a stand alone unit (Wall mount plate) or in base unit (OBU 0100).

Before connecting power to the OTX 0200, make sure that all other connections have been made.
A coaxial cable of good quality with a F-connector should be connected from the aerial to the Antenna input and another one from the RF output to the cable TV network.
Connect a power supply and make all necessary settings as described in section 4.

Note! Important information in page 4 about connecting the DC cable.

Installation in a base unit with 5 OTX modules and common power supply.

Accessories

OPP 0100 power supply100W, 11 outputs

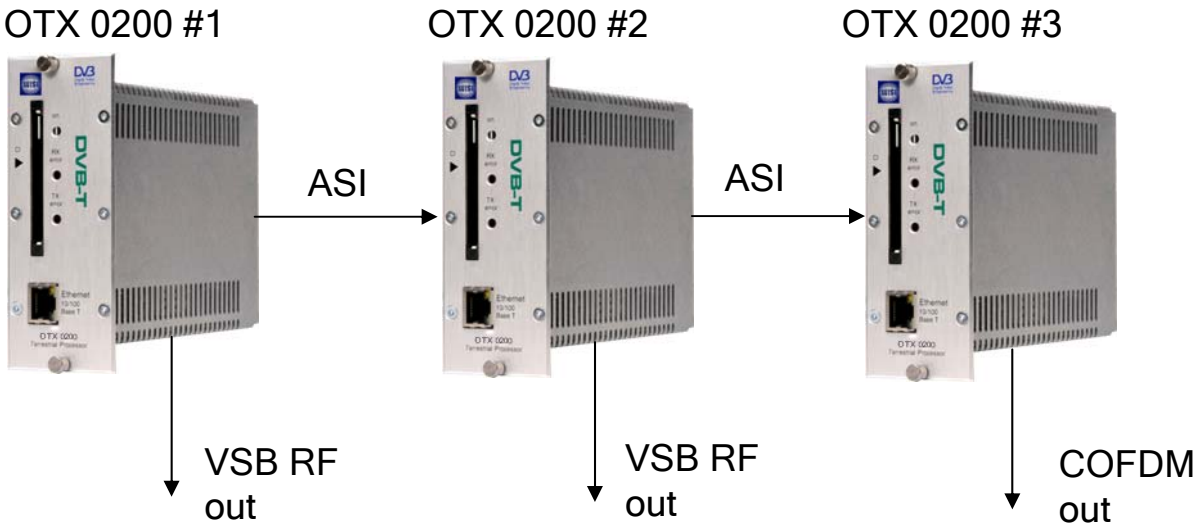
OWMP 100 Wall mount plate

ODCC 100 DC-cable for OTX 0200

OBU 0100 Base unit for 5 OTX 0200 modules and power supply

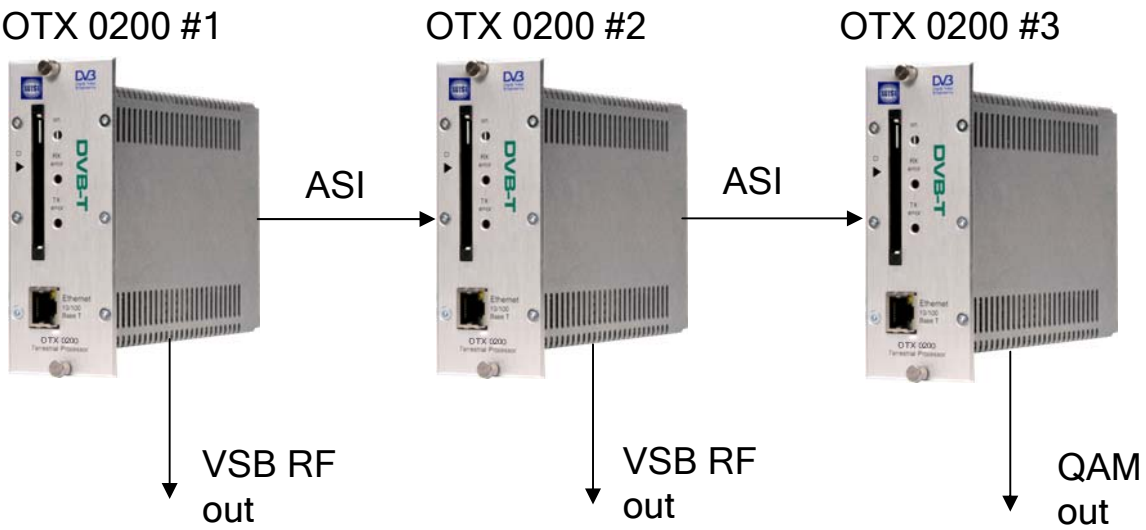
6.1 Installation examples

6.1.1 Installation of 3 pcs of OTX 0200 and one COFDM mux out.



NOTE! Unit #2 and unit #3 has SW option for enhanced functionality with ASI in and COFDM out. VSB RF is default modulation format.

6.1.2 Installation of 3 pcs of OTX 0200 and one QAM mux out.

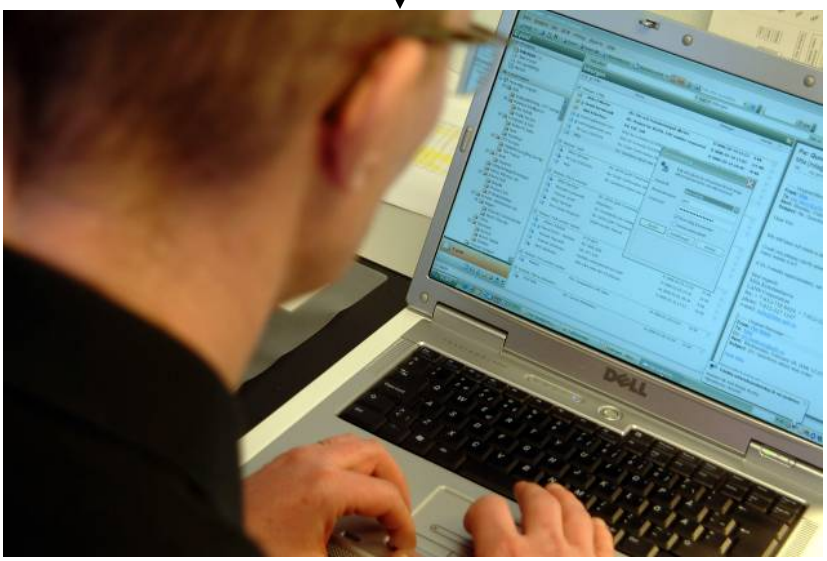


NOTE! Unit #2 and unit #3 has SW option for added functionality as ASI in and QAM out. VSB RF is default modulation format.

6.1.3 Installation of OTX 0200 units through a switch with DHCP with possibility for remote management over VPN connection between office and Head end.

OTX 0200 connected through a switch with DHCP

VPN connection



NOTE! If you have questions about how to set up the VPN connection ask your network administrator for detailed information.

7. Technical specification

OTX 0200 DVB-T Terrestrial processor

Connectors and Interfaces

Control and IP out connector	RJ-45, 10/100 BaseT
RF input connector	F female, 75 Ω
RF output connector	F female, 75 Ω
ASI input connector	BNC female, 75 Ω
ASI output connector	BNC female, 75 Ω
CAM connector	PCMCIA (5 VDC)
LED Indicator lights	Power on, COFDM/Rx error, Tx/Access error
Remote management	RJ-45, 10/100 BaseT
A/V out connector	3,5 mm 4 pole

COFDM Terrestrial Receiver

Input frequency	50 - 858 MHz (centre freq.)
Input freq step size	250 kHz
Input level range	-60 to -30 dBm *)
Input impedance	75 Ω
Input return loss	12 dB
C/N limit	18 dB *)
Bandwidth	6/7/8 MHz
DVB compliance	DVB-T
Co/adj channel PAL	Compliant to Nordig 2 PAL
Automatic mode change recovery	Yes
Echo performance	Compliant to Nordig 2 unified

*) QEF reception with test signal: 8k, 64QAM, 1/8 guard interval, 2/3 FEC

RF Modulation (analogue)

Standards	B/G, I, D/K, L, M/N
Sound	Mono, NICAM stereo or A2/A2* stereo
Modulation video	VSB AM, neg. or pos.
Modulation mono	Audio FM or AM
Output frequency	47 - 862 MHz
Output level	≥ 110 dBuV (47-470 MHz) ≥ 105 dBuV (470-862 MHz)
S/N weighted	≥ 57 dB
C/N, broadband	≥ 70 dB
NICAM standards	NICAM 728 (EN 300 163)
Power ratio (Vision/NICAM carrier)	B/G -20dB, I -24dB, D/K -24dB, L -27dB
Tolerance	+/- 1dB
Impedance	75 Ω

QAM modulation (Option)

QAM modes	16, 32, 64, 128 and 256 QAM
Symbol rate	4 - 7.2 Mbaud/s
MER (at RF out)	> 38 dB for 256-QAM
DVB compliance	DVB-C (EN 300 429)
QAM output frequency	47 - 862 MHz (1 kHz step)
Output level	Min 105 dBuV (47-470 MHz) Min 100 dBuV (470-862 MHz)
PSI/SI management	Yes
Remultiplexing	Yes

COFDM modulation (Option)

COFDM mode	2K
Guard interval	1/32
FEC	7/8
MER	>34 dB
DVB compliance	DVB-T (EN 300 744)
Max output bit rate	32 Mbit/s
Output frequency	47 - 862 MHz (1 kHz step)
Output level	Min 100 dBuV (47-470 MHz) Min 95 dBuV (470-862 MHz)
PSI/SI management	Yes
Remultiplexing	Yes

IPTV out (Option)

Max input bit rate	55 Mbit/s
Max output bit rate	55 Mbit/s *)
Connector	RJ 45 (same as control)
Output protocol	UDP, Multicast
PSI/SI management	Yes
Remultiplexing	Yes

*) With single TS input to IP

Miscellaneous

Power supply	7,5 VDC nom. (6-10 VDC)
Power consumption	Typ. 15 W
Dimensions	165x105x37 mm (ex. connectors)
Weight	Approx. 390 g
Controller	Embedded web server
Operating temperature	-20 to +50˚C, non condensing

This specification may change without prior notice.

ASI input(option) - output

ASI bit rate	270 Mbit/s	
Max payload bitrates:		
Max input bit rate	55 Mbit/s	*)
Max output bit rate	55 Mbit/s	*)
PCR restamping	Yes	
PSI/SI management	Yes	
Remultiplexing	Yes	

*) The input, output and throughput bitrate is highly dependent on the type of application that is run in the unit.

MPEG Decoder - Audio

Supported formats	MPEG 1 layer II, AAC HE,
Output	Selection of Dual mono in, Stereo or Mono
Impedance	< 100 Ω
Output level	0 dBu

MPEG Decoder - Video

Supported formats	MPEG2 MP@ML, MPEG4 h.264 AVC
Output standards	PAL, SECAM or NTSC
Impedance	75 Ω
Output level	1 Vpp @ 75 Ω
Aspect Ratio	Letterbox, Pan/Scan, or conversion Combined (14:9) programmable, WSS
Teletext	Insertion in VBI
Subtitling	Teletext or DVB subtitling
Decryption	Common Interface

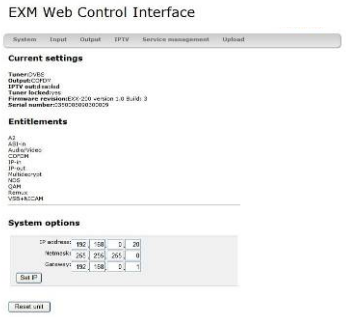
Remultiplexing (option)

Each OTX 0200 contains a remultiplexer for 2 incoming transport streams. The transports streams can be received from a terrestrial network and from the ASI input. All PSI/SI regeneration in a Head end system is handled over IP.

Following components can be remultiplexed:

Audio, Video, Subtitling, PAT, PMT, NIT, EIT, TDT, CAT, SDT

Graphical User Interface (GUI)



Graphical User Interface for easy set up of complex systems. Simple handling of remultiplexing and creation of new multiplexes from any input.

Default setting of PSI/SI tables to avoid clashes in the output multiplexes.
Simple structure for setting input, output and processing parameters.

Each OTX 0200 contains an embedded web server. Standard web browsers (Internet Explorer, Mozilla Firefox etc.) are supported

This specification may change without prior notice.

8. Declaration of Conformity

CE

9. Glossary

DVB	Digital Video Broadcasting (Standardization body)
MPEG-2	Compression format for digital TV
MPEG-4	Compression format for digital-TV (SD and HD)
H.264 AVC	Format for compression of the video in HDTV
VSB	Vestigal Side Band (adjacent channel RF-modulation)
ASI	Asynchronous Serial Interface (High Speed Interface)
NICAM	Digital sound format for analogue TV-transmission
IP	Internet Protocol (defines how data is packetized for Internet broadcast)
IPTV	TV-content packetized for Internet Protocol
DVB-T	Modulation format (COFDM) for terrestrial transmission of digital-TV
QAM	Modulation standard for digital-TV in cable networks
COFDM	Modulation standard for digital-TV in terrestrial networks
Remultiplexing	Way of recombining services from different multiplexes
DHCP	Dynamic Host Configuration Protocol is a protocol used by networked devices (*clients*) to obtain the parameters necessary for operation in an Internet Protocol network. This protocol reduces system administration workload, allowing devices to be added to the network with little or no manual configuration.
Common Interface	Connector for a PCMCIA module used for decrypting encrypted TV-programs. Modules should comply with the DVB_CI standard
SD	Standard definition TV (576i in Europe)
HD	High Definition TV (720p or 1080i)
LCN	Logical Channel Numbers (method to give specific TV-programs a number that defines the order they appear in the program list on a TV or set-top box
VPN	Virtual Private Network (secure point to point connection in an unsecure network)

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