

ORCA

R E F E R E N C E M A N U A L

Version 044

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Doremi Labs, Inc.
Burbank, California - USA

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(b) This Agreement shall be construed and enforced in accordance with the laws of the State of California applicable to contracts made and to be performed entirely in the State of California.

(c) If any portion of any provision of this Agreement is ruled invalid or unenforceable under any applicable law, that provision will be enforced to the maximum extent permissible, and the remainder of this Agreement shall continue in full force and effect.

WARNING

THIS APPARATUS MUST BE EARTHED

IMPORTANT

WARNING

Power requirements for electrical equipment vary from area to area. Please ensure that your ORCA meets the power requirements in your area. If in doubt, consult a qualified electrician or your Doremi Labs dealer.

ORCA Capture Station

@60Hz for USA and CANADA rating 400W 4A 110V

@50Hz for Europe rating 400W 2A 220V

ORCA

@60Hz for USA and CANADA rating 100W 1A 110V

@50Hz for Europe rating 100W .5A 220V

AVIS

Le voltage peut differer d'un pays a l'autre. Il faut que le ORCA soit ajuste au voltage du pays.
LA SOURCE DE PUISSANCE DOIT AVOIR UN CONDUCTEUR CONNECTE A LA TERRE. Toutes
reparations doivent etre effectuees par une personne qualifiee. AFIN D'EVITER UN CHOC ELECTRIQUE,
VEUILLEZ NE PAS ENLEVER LE CAPOT.

PROTECTING YOURSELF AND THE ORCA

Never touch the AC plug with wet hands

Always disconnect the ORCA from the power supply by pulling on the plug, not the cord.

Allow only a Doremi Labs, Inc. dealer or qualified professional engineer to repair or reassemble the ORCA. Apart from voiding the warranty, unauthorized engineers might touch live internal parts and receive a serious electric shock.

Do not put, or allow anyone to put any object, especially metal objects into the ORCA. Use only an AC power supply.

Never use a DC power supply.

If water or any other liquid is spilled into or onto the ORCA, disconnect the power, and call your dealer.

Make sure the unit is well ventilated, and away from direct sunlight. To avoid damage to internal circuitry, as well as the external finish, keep the ORCA away from sources of direct heat (stoves, radiators, etc.).

Avoid using aerosol insecticides, etc. near the ORCA. They may damage the surface, and may ignite. Do not use denatured alcohol, thinner or similar chemicals to clean the ORCA. They will damage the finish.

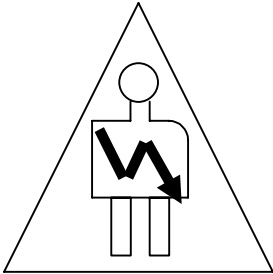
Modification of this equipment is dangerous, and can result in the functions of the ORCA being impaired. Never attempt to modify the equipment in any way.

In order to ensure optimum performance of your ORCA, select the setup location carefully, and make sure the equipment is used properly. Avoid setting up the ORCA in the following locations:

1. In a humid or dusty environment
2. In a room with poor ventilation
3. On a surface which is not horizontal
4. Inside a vehicle such as a car, where it will be subject to vibration
5. In an extremely hot or cold environment

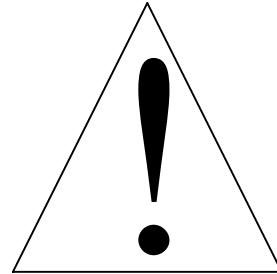
WARNING!!

To prevent fire or shock hazard, do not expose this appliance to rain or moisture

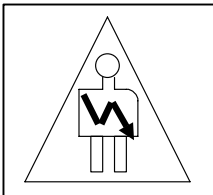


CAUTION

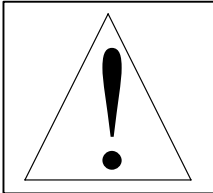
**RISK OF ELECTRIC SHOCK
DO NOT OPEN**



**CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.**



The lightning flash with the arrowhead symbol superimposed across a graphical representation of a person, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure; that may be of sufficient magnitude to constitute a risk of electric shock.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

CE NOTICE

Marking by the symbol CE indicates compliance of the device to the EMC (Electromagnetic Compatibility) directive and to the Low Voltage directive of the European Community. Such marking is indicative that this device meets or exceeds the following technical standard:

- EN 55022 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment."

A "Declaration of Conformity" in accordance with the above standard has been made and is on file at Doremi Labs, Europe, Valbonne, France.

1 INTRODUCTION

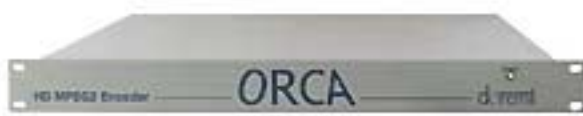
Thank you for your ORCA purchase. ORCA is a high quality HD and SD MPEG2 video encoder that encodes MPEG2 files up to 160mbs. It provides users with a wide choice of encoding parameters such as GOP structure, 4:2:0 and 4:2:2 encoding profiles and compression bit rate. These parameters provide the user with precise control of the encoding process and, consequently, the flexibility to encode content for a variety of applications.

ORCA encodes standard definition up to 50Mbits/sec and HD files up to 160Mbits/sec. ORCA comes in two different packages and has many options that can be added at a later time.

2 ORCA Packages

The ORCA MPEG2 encoder comes in two packages, as a standalone 1RU chassis and as a complete capture station.

2.1 ORCA-SD, ORCA-420, ORCA-422 and ORCA-422-Pro



ORCA-SD can encode all SD formats up to 80Mbps/sec in 422 or 420

ORCA-420 can encode all SD and HD formats in 420 up to 80Mbps/sec

ORCA-422 can encode all SD and HD formats in 422 or 420 up to 80Mbps/sec

ORCA-422-Pro can encode all SD and HD formats in 422 or 420 up to 160Mbps/sec

In this manual these units will be referred to as “standalone ORCA”.

These ORCA models are provided in a 1RU chassis with the following connections on the back panel:

HD-SDI input: Connect to your video source

AES/EBU input: Connect to AES/EBU audio of the video source

ASI output: Connect to an ASI decoder such as Doremi Labs’ Nugget-Decoder

Ethernet output: Connect to a PC running ORCA Control Panel via crossover cable or Ethernet Switch

RS422-1: For debug purposes (for Doremi technical use only)

RS422-2: Master P2 controller port for machine control

AC Power with a rear panel power switch



2.2 ORCA-CS, ORCA-CS-Pro



ORCA-CS can encode all SD and HD formats up to 80Mbps/sec in 422 or 420

ORCA-CS-Pro can encode all SD and HD formats in 422 or 420 up to 160Mbps/sec

In this manual these units will be referred to as “ORCA Capture Station” or “ORCA CS”.

ORCA-CS is a complete MPEG2 capture station that includes a decoder. The system is Linux based and has 2 major components; the Capture Station (3RU) and the Decoder (1RU).

Back panel connections include:

Standard computer connections: such as VGA, USB Keyboard and USB Mouse (not included)

Gigabit Ethernet: Connect to your LAN

HD-SDI input: Connect to your video source

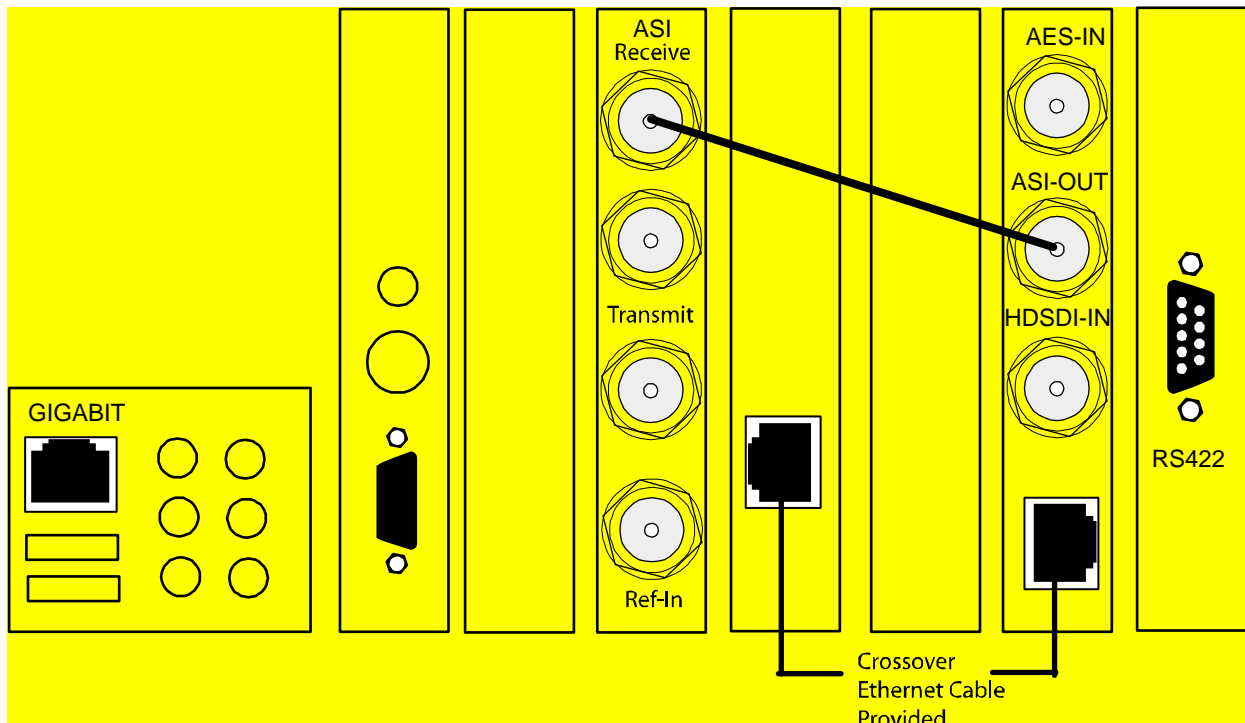
AES/EBU input: Connect to AES/EBU of the video source

ORCA-ASI output: Connect to ASI card Receive BNC

ASI card Transmit: 2 available connect any of them to the Nugget-Dec ASI input.

ORCA-100BT: Connect to Netgear’s 100BT using the provided Ethernet crossover cable

RS422: Connect to V1-UHD, V1-HD, HDCAM, D5, DVCPro, etc.



2.3 Available Options

ORCA-SD

- EDL: Allows encoding with machine control based on an EDL

ORCA-420:

- 422/420: adds 422 capabilities
- Pro: Adds 422 and bitrates up to 160 Mbits/sec
- EDL: Allows encoding with machine control based on an EDL

ORCA-422:

- Pro: Adds bitrates up to 160 Mbits/sec
- EDL: Allows encoding with machine control based on an EDL

2.4 Standalone ORCA vs. ORCA Capture Station

The standalone ORCA does not include a decoder and can only capture files to disk using the Ethernet port, which is limited to 60 Mbits/sec.

The ORCA capture station includes a decoder and it allows recording to disk up to 160Mbits/sec. During recording the decoder shows the encoded then decoded signal for instant verification. It can also play files and display them on an HD-SDI video monitor.

3 ORCA IP Address

All ORCA units are shipped with a default IP address of 192.168.100.181

You must change the IP address on your Windows PC to be in the same subnet mask of the ORCA to be able to connect to it. A good setup for your PC would be:

IP: 192.168.100.100

Subnet Mask: 255.255.255.0

Run the ORCA Control Panel and make a connection to the ORCA by typing its IP address. If the connection is made, the timecode window at the bottom of the window will show 00:00:00:00. If the connection is not made, the timecode window will display 01:02:03:04

To change the IP address select Config>Change IP

The image shows a 'Change IP address' dialog box with a purple title bar. It contains three input fields with their respective labels and default values. The first field is for the 'New IP address' (default: 7.1.1.3), the second is for the 'New NetMask' (default: 255.255.255.0), and the third is for the 'New Server IP address' (description: The IP address of the computer that updates the ORCA through TFTP. (default: 7.1.1.4)). At the bottom of the dialog are 'OK' and 'Cancel' buttons.

Type the new IP and subnet mask and hit OK

A pop up window will ask you to reboot the ORCA to set the new IP address, hit OK to reboot and start with a new IP address.

You will need to restart the ORCA control panel and connect using the new IP address.

4 Encoding

Before encoding, you need to check the five tabs labeled: Sources, Output, Compression, Advanced and External to ensure that all parameters are set properly.

The bottom line of the ORCA Control Panel, shown below, does not change and it allows you to start encoding from within any tab.



Every time you change a parameter on the ORCA, the **Encode** button will be grayed out until you press **Apply**. Selecting **Revert** will revert the configuration to the last one saved.

Press **Encode** to start encoding, the encoding will not stop until you hit **Stop**, the input signal disappears or changes, or when the file size limit is reached.

Pause will pause the encoding but keep the file open to continue recording. Pause is only available on units with the EDL option.

ORCA has 2 main outputs: ASI and Ethernet

4.1 Ethernet output

ORCA can capture files up to 60 Mbits/sec directly on the Ethernet connection. To get this bitrate, use a crossover cable or use an Ethernet switch on a small network. You can monitor the report tab during or after encoding to make sure no frames were dropped. The file transfer uses the TCP/IP protocol

4.2 ASI output

On the ASI output, ORCA can encode up to 160Mbits/sec.

5 ORCA Menus

FILE

- File>New..., not used
- File>Open..., open a previously saved configuration file
- File>Save, save a configuration file
- File>Save as..., save the current configuration to a file

CONFIG

- Config>Change IP, pops up a window to change the IP address
- Config >Reboot, reboots the ORCA unit, quit and connect again in about a minute
- Config>Save Encoding Parameters, save current configuration to the ORCA internal memory
- Config>Load Encoding Parameters, Load the configuration saved on the ORCA internal memory
- Config>Upgrade Firmware, upgrade the ORCA firmware using this menu. ALL NECESSARY FILES FOR THE NEW VERSION MUST BE DOWNLOADED TO THE ORCA BEFORE YOU REBOOT IT.
- Config>Licensing, use to add options to your ORCA. You can contact sales@doremilabs.com to purchase the available options

E.D.L

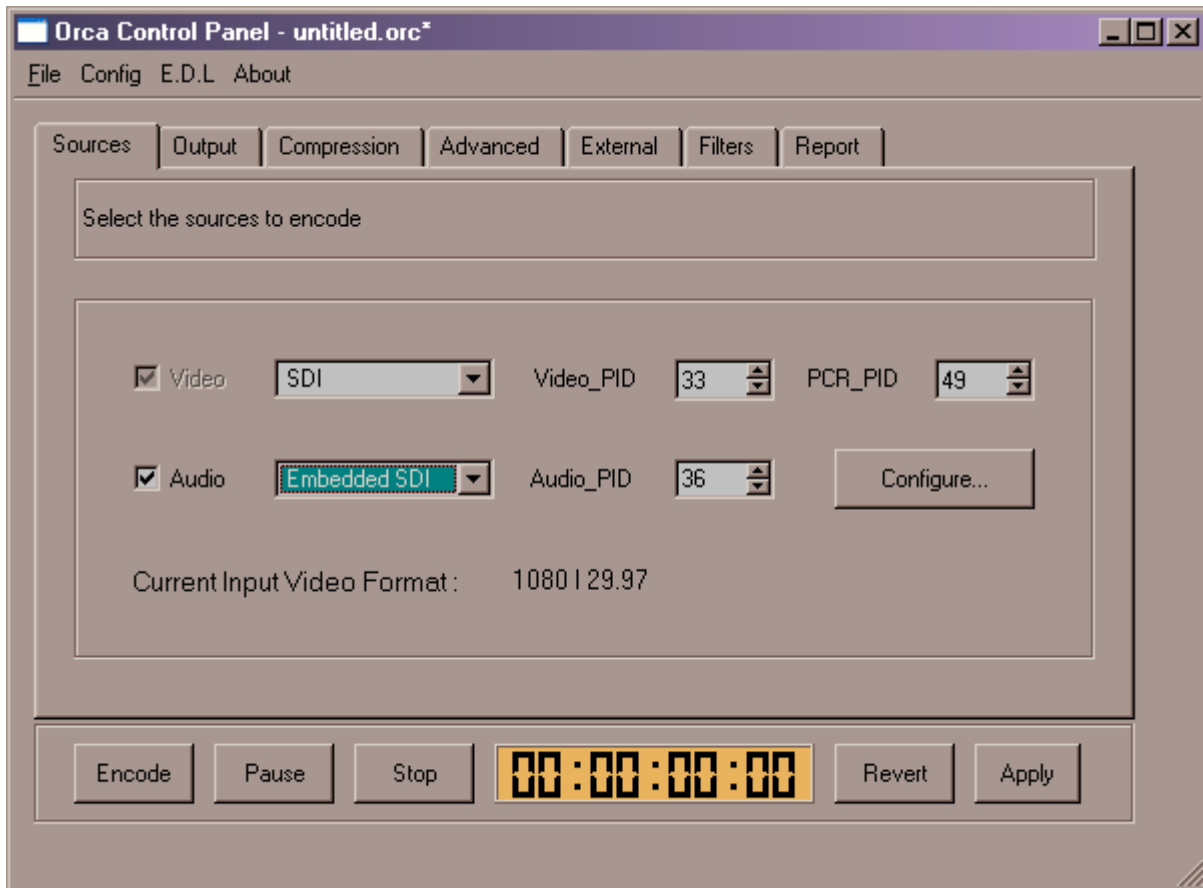
- EDL>New, creates a new EDL
- EDL>Open, open an existing EDL
- EDL>Save, save an open EDL
- EDL>Save as, save an EDL on the PC
- EDL>Edit, edit the open EDL
- EDL>Close, close the open EDL

ABOUT

- About>About ORCA, shows the current firmware version and release date, Control panel version (GUI) and installed options

6 ORCA Tabs

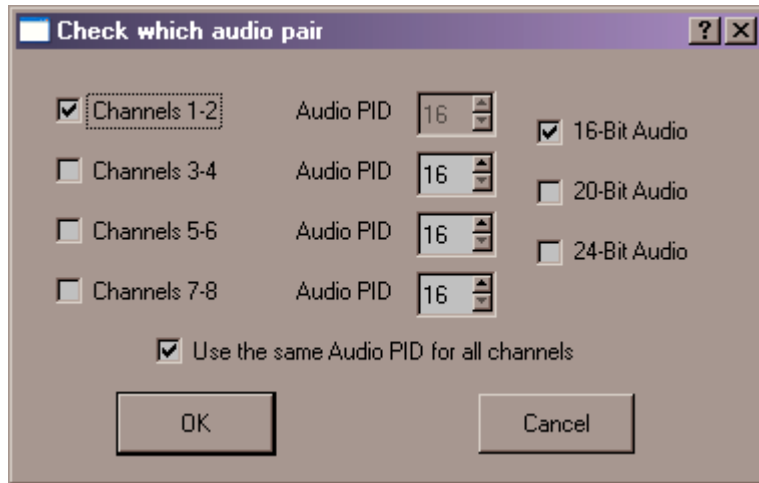
6.1 Sources



Use this tab to select the video source, audio source and various PIDs for the transport stream.

The only source available for video is SDI.
Available sources for audio are: Embedded SDI or AES/EBU.

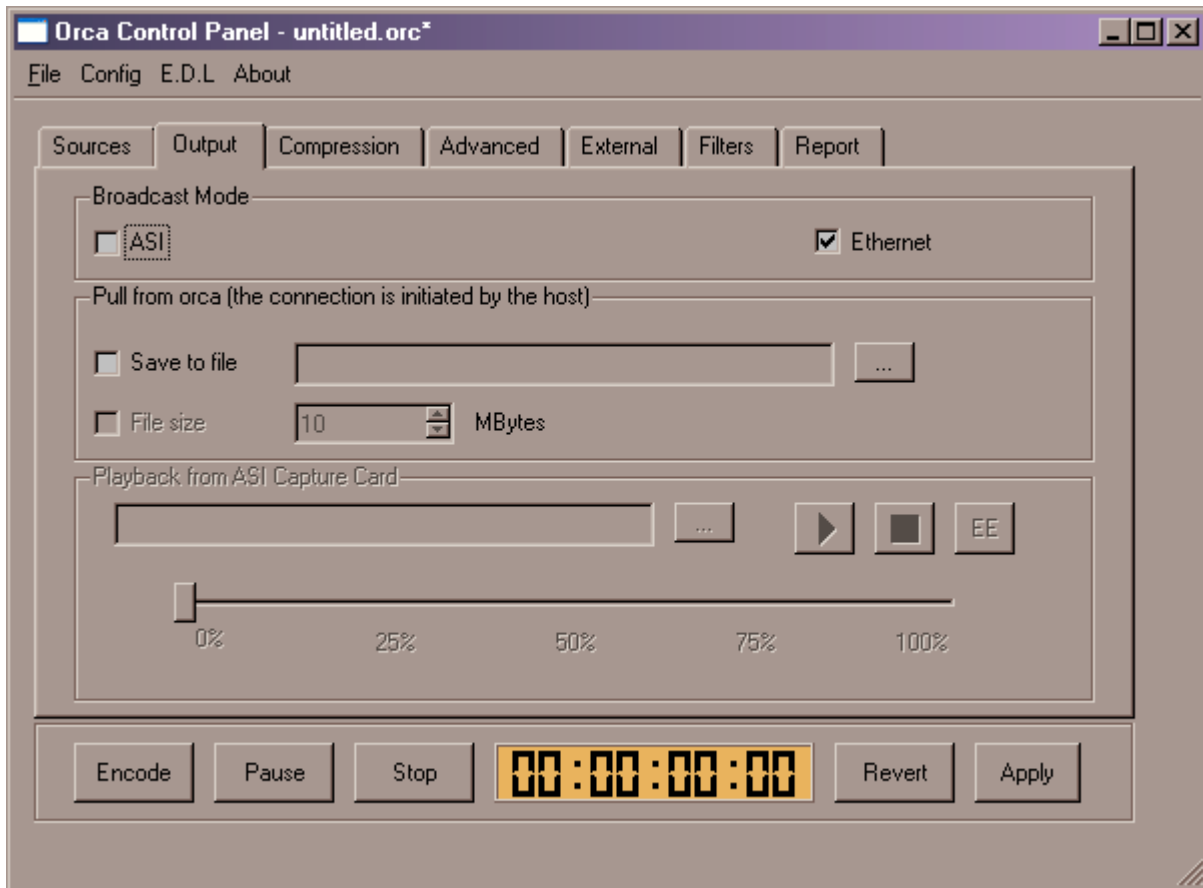
When Embedded SDI is selected, the configure button will become active to allow audio channel configuration.



The PID section of the audio configuration window will only show when uncompressed audio is selected from the Compression tab.

Current Input Video Format will show the input format in black or No Video Detected in red to indicate no input or un-supported input format.

6.2 Output



Select ASI or Ethernet as the output format.

When you select ASI, the Save to file tab will be grayed out on a Standalone ORCA, but it will be active on an ORCA Capture Station, where you can browse for the /data directory and type a filename to encode to. Use the .ts extension known for transport stream files.

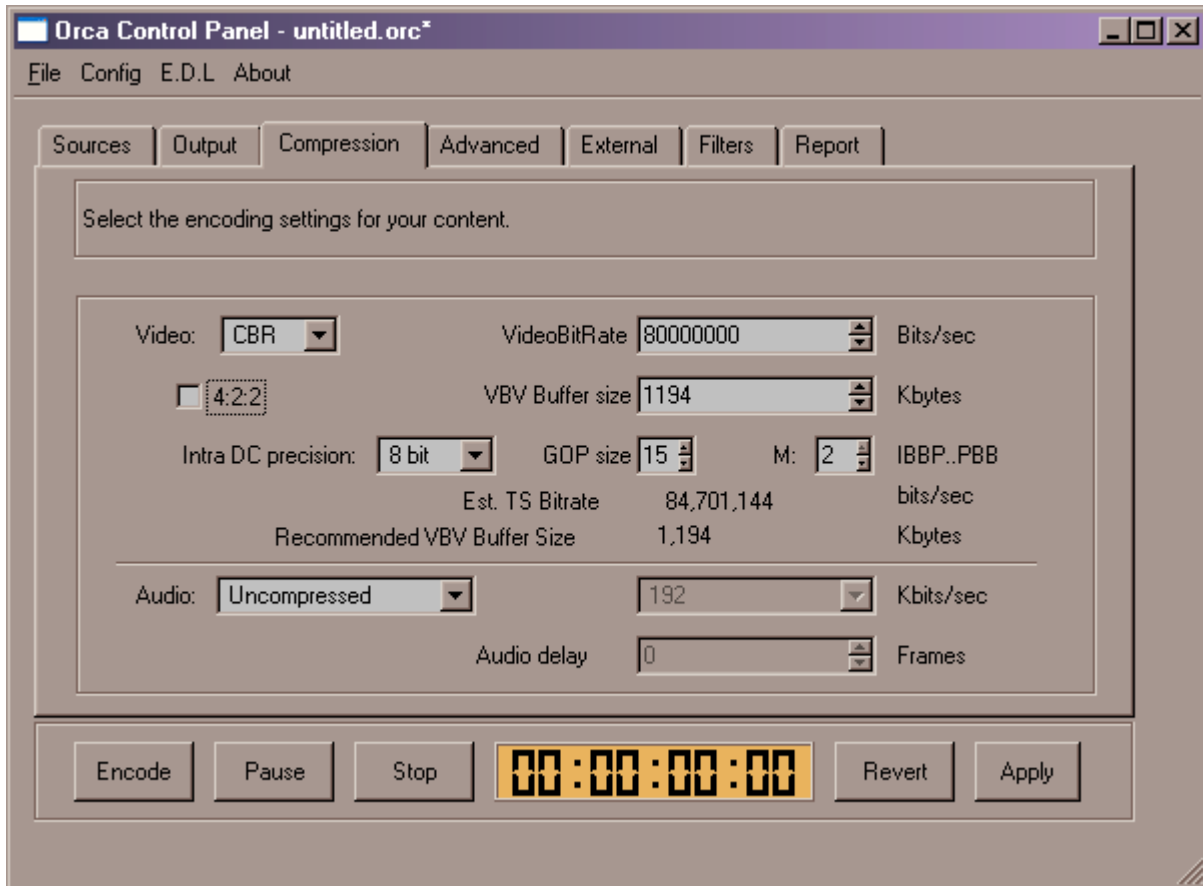
When you select Ethernet, the Save to file can be used to browse for a directory to store the transport stream files. If you are running the ORCA Control Panel on a Linux system, we recommend that you create a /data directory and put all transport stream files in it. It's a preference not a rule.

Check the File size tab to limit the file size.

The Playback from ASI Capture Card will only be active on an ORCA capture station. It allows loading a transport stream file and playing it on the ASI output for decoding using the ORCA capture station decoder, otherwise known as the Nugget-Dec decoder. Clicking the EE button will put the ASI card in passthrough mode.

6.3 Compression

Set all compression parameters for video and audio.



Video: Select CBR or VBR

VideoBitRate: Displayed in bits per seconds

VBV Buffer size: The control panel will suggest a VBV size each time you change the bitrate

Intra DC precision: Use higher numbers for better encoding quality but make sure the decoders you use support higher precisions. All decoders support 8bit and that is the default on the ORCA.

GOP Size: Specify the GOP size, most standardized GOP sizes are 15 and 1

M: Specifies the number of Bs in the GOP sequence. Most standardized M sizes are 2 (GOP=15) and 0 (I-Only)

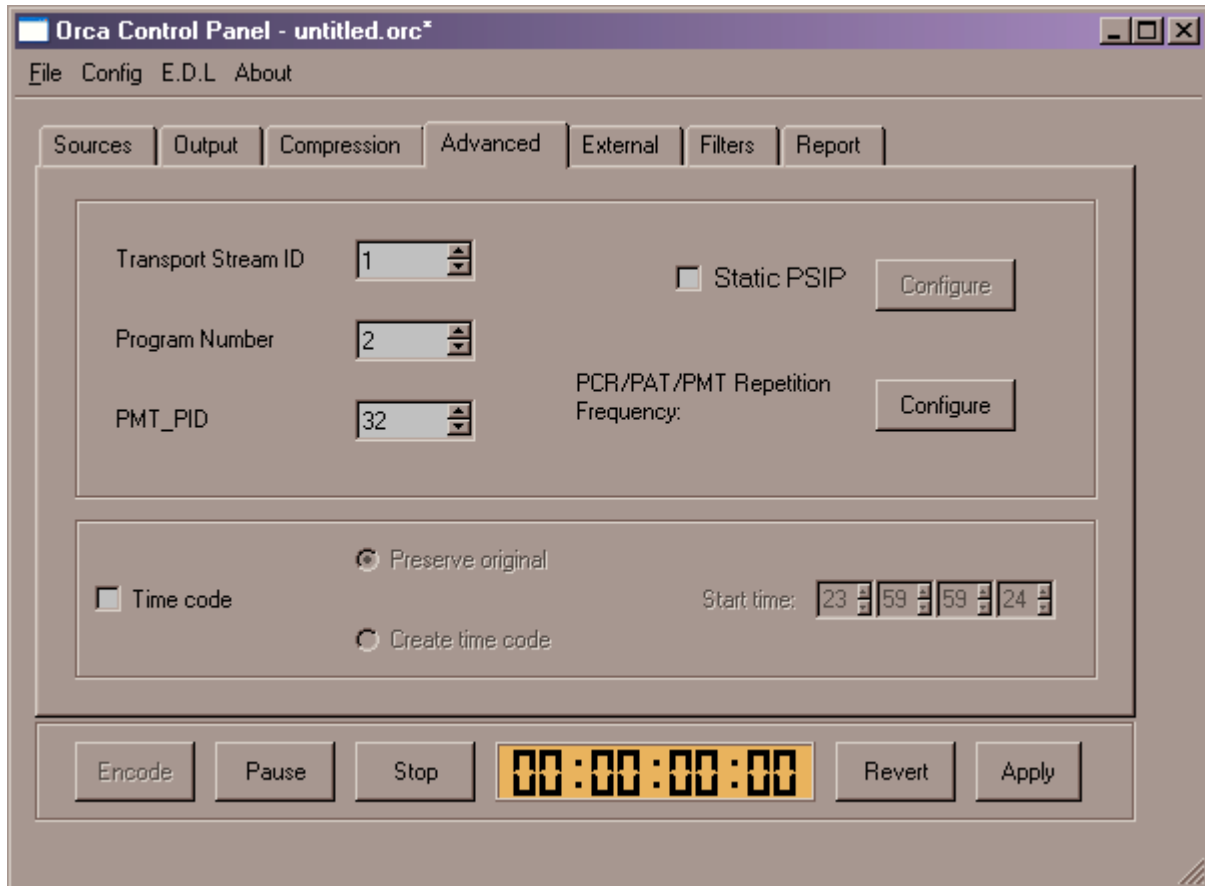
Audio: Select Uncompressed, MPEG1-Layer II or externally compressed. Use externally compressed if the audio input selected is already encoded by another device. Use MPEG1-Layer II to compress the audio input selected.

When MPEG-1 Layer II audio is selected, you can specify the audio bitrate: 192, 256 and 384 Kbits/sec

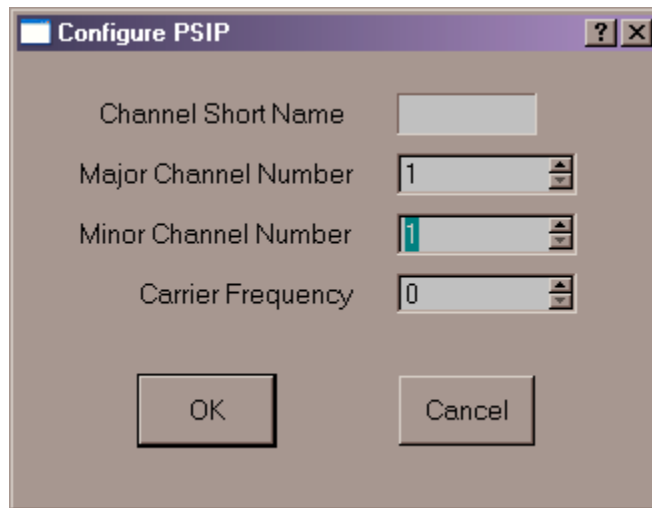
When externally compressed is used, you can specify a delay in frames to compensate for the audio encoder's delay

6.4 Advanced

Use to set transport stream information for broadcast applications, Timecode selection and PCR/PAT/PMT frequency configuration.

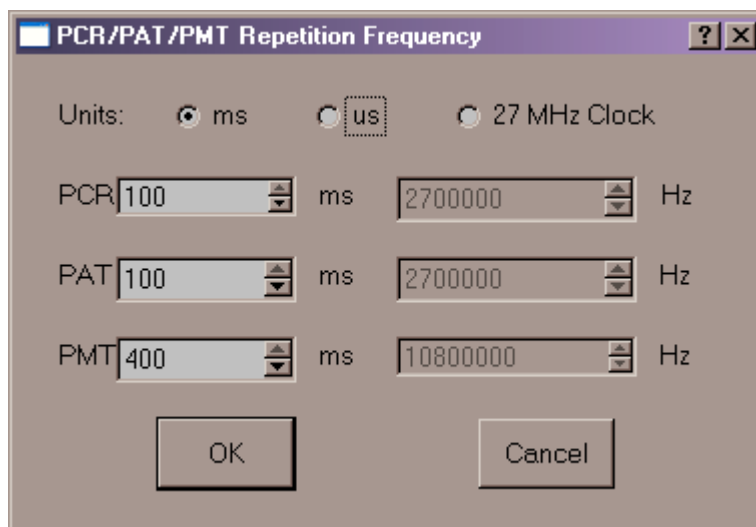


When Static PSIP is selected, the Configure PSIP window will become active



Enter the channel short name; major and minor channel numbers and carrier frequency

Selecting the PCR/PAT/PMT Configure button will pop up the window below:



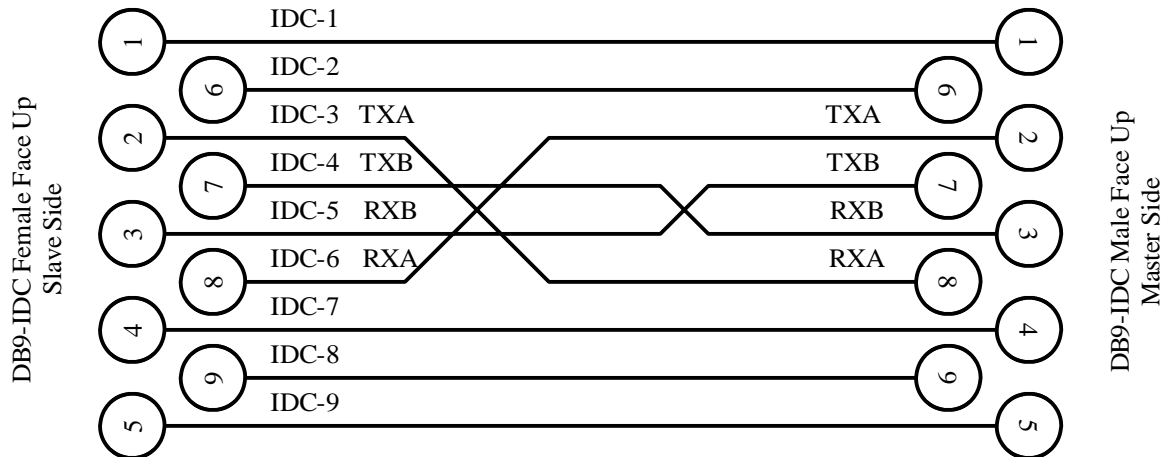
This defines the repetition clock for PCR/PAT/PMT. It can be defined in milliseconds, microseconds or based on a 27Mhz clock. Shown in the picture above are the most standard values.

Check the Timecode box if you want to either preserve the original timecode or start with a new timecode defined by the Start time.

6.5 External

Using this tab you can control an external device to create a file that starts and ends at specific timecode locations. Check the External device control box to enable.

- If External device control is shown in red, it indicates that the application cannot communicate with the external device using P2 protocol. Make sure that you have a proper connection between RS422-2 and the machine on the standalone ORCA or between RS422 and the machine on the ORCA capture station. Earlier standalone ORCA units were shipped with RS422-2 set as a slave port, a special adaptor should be connected to the RS422-2 port to make it a Master P2 port.



- If External device control is shown in green, it indicates a good connection.

Available commands are:

- **Locate:** type the timecode location and hit locate to cue the machine
- **LTC:** Reflects the Time Mode of the machine when you make the connection, you can change it to force the machine to use Control Track, LTC or VITC.
- **Transport Sontrols:** (from left to right) Step Backwards, Rewind, Pause, Play, Fast Forward and Step Forward

Use the Time in and Time out windows to either capture the current location or manually type the in and out points for you file.

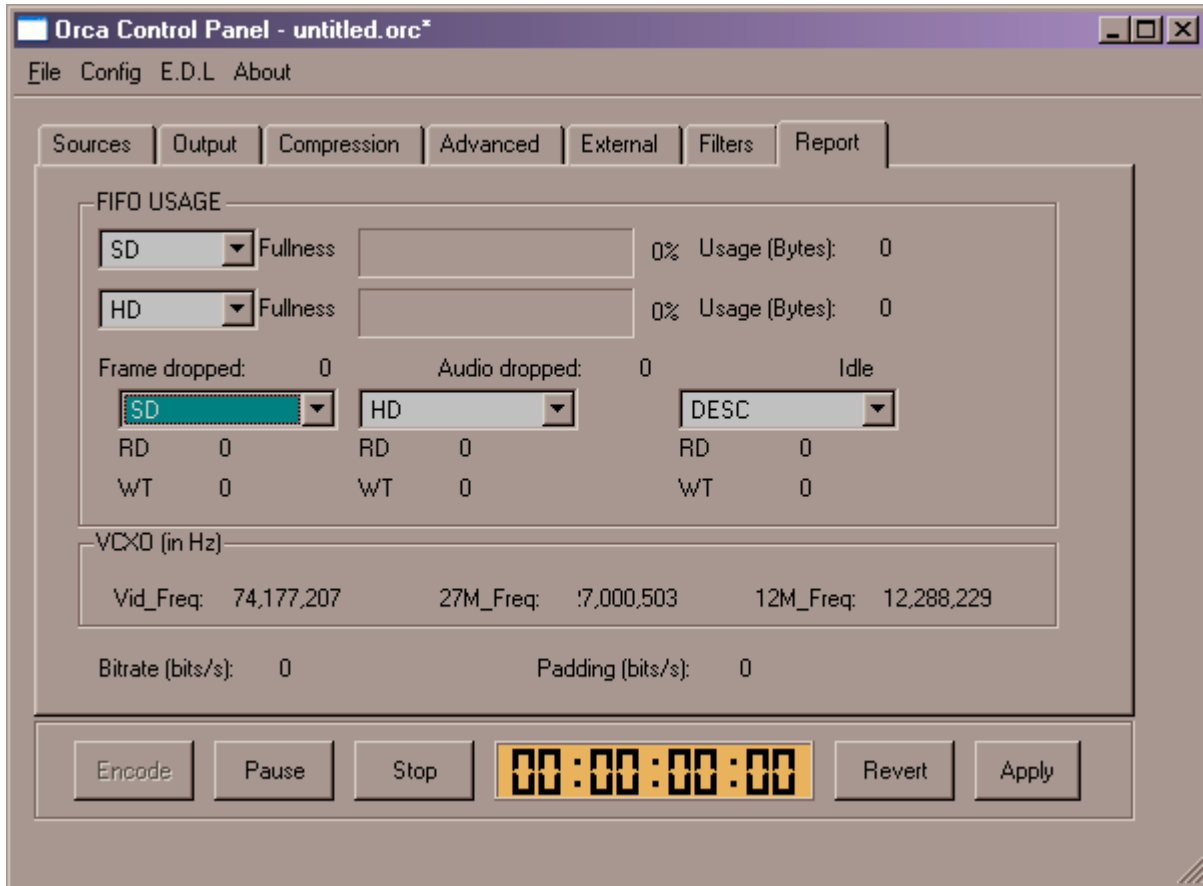
If your unit has the EDL option, you can check the Use EDL box to use the open EDL.

6.6 Filters

The Filters tab is reserved for future use

6.7 Reports

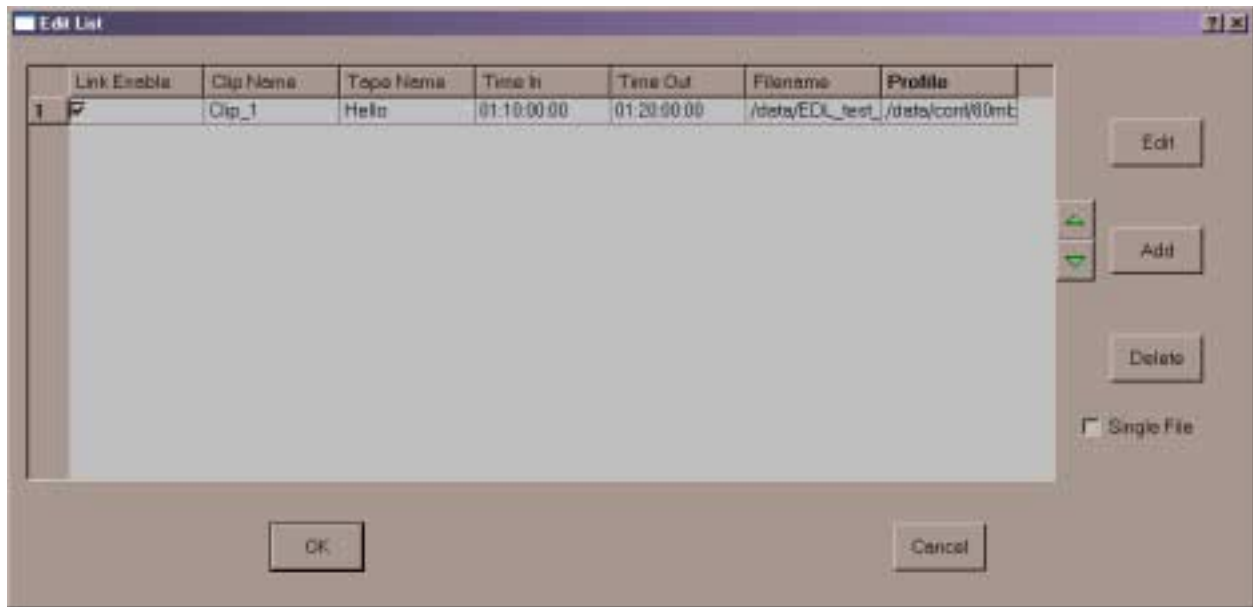
Displays reports and statistics during encoding



Most of the information provided by this tab is for Doremi technical use only. The most useful parameter for client's use is the "Frame Dropped". Watch this parameter as you encode through Ethernet to make sure the file generated does not have any dropped frames. If you get dropped frames at lower than 60Mbits/sec, you need to check your Ethernet connection.

7 EDL

The EDL options allow the ORCA to encode one or many files automatically based on an edit decision list or EDL. The information contained in the EDL tells the unit which tape to use and the IN and OUT point of every edit. You can invoke the EDL by selecting EDL>New



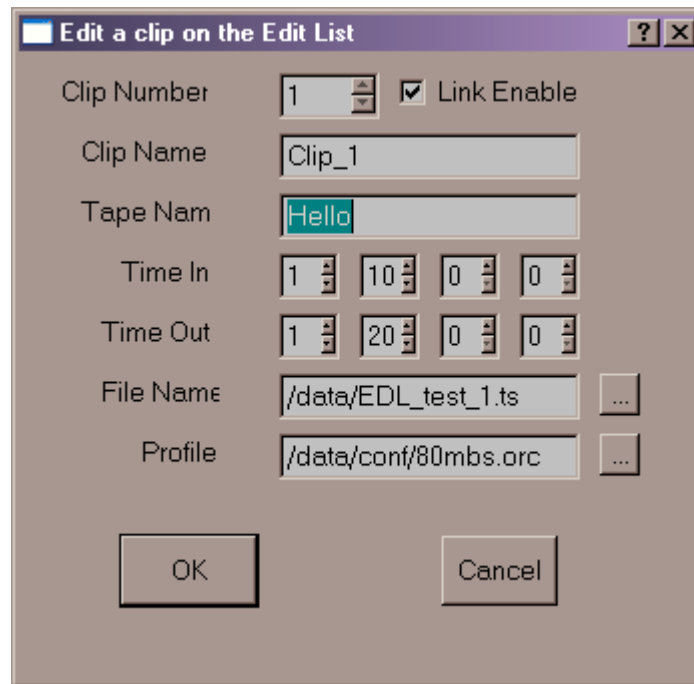
Click **Add** to add a new entry to the EDL

Click **Edit** to edit the selected entry

Click **Delete** to delete the selected entry

Click **Single file** to have the unit generate a single file instead of individual files per edit.

The edit window:



Clip Number: Clip number in the EDL

Link Enable: Must be checked to enable execution of the edit.

Clip Name: Name assigned to the edit

Tape Name: If you want to alert the user to change tapes, the ORCA will stop every time the tape name changes.
Time IN and Time OUT

File Name: The transport stream file to create

Profile: the configuration file to use for the edit

If Single file is selected, the configuration file will be the one specified for the first edit. If non exist on the first edit, the ORCA will use the current configuration.

During EDL entry and before encoding, the ORCA does a sanity check on the EDL and signals warning and errors by adding colored icons on the EDL Window. Remove all errors before executing the EDL.

To use the EDL, make sure you select Use EDL on the External tab before you hit Encode.

8 ORCA Capture Station

The ORCA capture station is based on Redhat Linux 9 (kernel 2.4). It has a single internal drive, 400GB or smaller depending on the largest drive available at shipping time. All recording, configuration files and EDLs should be placed in the /data directory. On earlier installations, the /data used to refer to a RAID-0 setup with 2 additional drives.

8.1 Login information

The root password is veeone

Another user called ORCA is usually created, the password for ORCA is doremi.

8.2 Fiber Channel Connection

Newer ORCA Capture Stations are shipped with motherboards with at least one PCI-X slot. Clients can add their own Fiber Channel card and drivers. Doremi is not responsible for installing the FC card and making it work on the ORCA-CS.

8.3 Running the ORCA Control Panel software

The ORCA application should reside in a bin folder. The location of the bin folder is:

For user root: /root/bin

For user ORCA: /home/ORCA/bin

If you create a new user, you must copy the /bin from /root/bin to /home/username/bin where username is the new user name.

8.4 Network Configuration (IP addresses)

The Gigabit (eth0) is configured to get the IP from DHCP

The 100BT (eth1) is configured with a static IP address of 192.168.100.151

As mentioned previously the ORCA is configured with an IP address of 192.169.100.181