codex™

ONBOARD **M** RECORDER

ARRI®
CERTIFIED FOR
ARRIRAW
RECORDING
ALEXA

GETTING STARTED GUIDE

SAFETY PRECAUTIONS

> Please observe any warnings and follow all instructions.
> Do not use this equipment near water.
> Clean only with dry cloth.
> Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
> Do not install near any heat sources such as radiators, heat registers, stoves, or other equipment (including amplifiers) that produce heat.
> Do not expose to excessive vibration, or drop this product.
> Do not defeat the safety purpose of the polarised or grounding-type plug. A polarised plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
> Protect the power cord from being walked on or pinched, particularly at plug ends, convenience receptacles, and the point where they exit from the equipment.
> Only use attachments/accessories specified by the manufacturer.
> Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the equipment.
> Unplug this equipment during lightning storms or when not in operation for long periods of time.
> Refer all servicing to qualified service personnel. Servicing is required when the equipment has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the equipment, has been exposed to rain or moisture, does not operate normally, or has been dropped.
> To reduce the risk of fire or electric shock, do not expose equipment to rain or moisture.
> To avoid electrical shock, do not attempt to open this equipment. Refer servicing to qualified personnel only.

DISCLAIMER

Codex products are constantly being developed to remain at the forefront of the industry, and as such the information in this guide is subject to change without notice.
Whilst Codex endeavours to ensure that all printed documentation provided is correct at the time of publication, this guide is not guaranteed to be error-free or up-to-date.

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Please report any errors found in this document to support@codexdigital.com

codex ONBOARD **M** RECORDER

SETTING THE STANDARD FOR FILE-BASED WORKFLOWS, THE CODEX ONBOARD M RECORDER CAN CAPTURE THE BEST QUALITY DIGITAL CAMERA ORIGINALS. IT CAN BE MOUNTED DIRECTLY ON A WIDE RANGE OF CAMERA SYSTEMS INCLUDING THE SONY F23, F35, ARRI D-21 AND ARRI ALEXA.

THE CODEX ONBOARD M RECORDS UNCOMPRESSED OR WAVELET CINEMA QUALITY MATERIAL – PLUS AUDIO AND METADATA – ONTO A SINGLE, REMOVABLE DATAPACK. WHEN SHOOTING IS DONE, A CODEX TRANSFER STATION CAN BE USED TO OFFLOAD MATERIAL MUCH FASTER THAN REAL-TIME.

GETTING STARTED

This guide provides an overview of the Onboard **M** recorder. For configuration guides for recording common formats, and further documentation visit www.codexdigital.com/support
The operating temperature range of the Onboard M is 5-40 Degrees C.

Licensing
Recorders are available with different licensed features. The licences on your recorder can be confirmed on the Setup->Licence screen. Licenses that can be installed are:

HD - allows recording of HD formats using the first input channel (Inputs 1/2).
ARRIRAW - allows recording of ARRIRAW formats up to 30fps using the first input channel (Inputs 1/2).
Multi-Chan - allows recording of licensed formats using both input channels (facilitating stereo capture and ARRIRAW up to 60fps)
Dual-Cam - allows independent control of recording channels using remote Codex UI.

Power Up and Shutdown
The power input for the Onboard auto-switches between two voltage ranges. See the VOLTAGE RANGES section for details. Once all necessary cabling is correctly connected, press the **Power Button** on the top surface of the Onboard M. When it has started and a Datapack with a Roll is loaded it will switch into live mode and the LED ring will become orange.

The battery meter on the display shows minutes remaining and a capacity remaining percentage for smart batteries, or else just a voltage reading. If the Shutdown volts setting in the System menu has been set too high for your battery, then you may not be able to start up normally. In this case, boot the Onboard M in safe mode by pressing a thin implement, such as a paperclip, through the small hole next to the power button, whilst pressing the power button. This will reset the Shutdown volts setting to default (10V), and you will be able to boot normally after this.

To power down press the **Power Button** on the top of the Onboard M and then press the Shutdown button which appears on the Control Panel. The shutdown process is complete when all lights on the Onboard M have switched off.

Loading and unloading a Datapack
The Datapack should find a natural position when rested on the Onboard M due to the interlocking design of the loading mechanism. Take care that the Datapack is mated flat with the Onboard M before closing the locking mechanism. Turn the locking lever 180 degrees clockwise to lock the Datapack to the Onboard M. When unloading the Datapack, unlock the lever by approximately 20 degrees to the first position. Wait until the LED on the Datapack becomes solid red and then fully unlock the lever.
(WARNING - damage may occur to the Datapack drives if they are disconnected without waiting)

Roll and shot concepts
There must be a Roll on a Datapack in order to make a recording. See section on the Storage screen for information on how to create a Roll. A shot is created after each record-stop cycle of operations. Multiple shots can be recorded onto a Roll, and once shots have been recorded they can be transferred and will maintain the original Roll name in their metadata.

For dual camera recording the Onboard M can record shots with two video channels, identified by default Channel IDs of V1 and V2 (which are user definable). When processed out by a Codex Media Station or Vault the shots from each camera are then output as separate files with metadata allowing them to be organized correctly for post production. For independent dual camera recording refer to the Remote User Interface section of this guide.

THE ONBOARD CONTROL PANEL AND MENU SYSTEM

There are a few global rules about how the Control Panel operates, which will be dealt with before menu specifics:
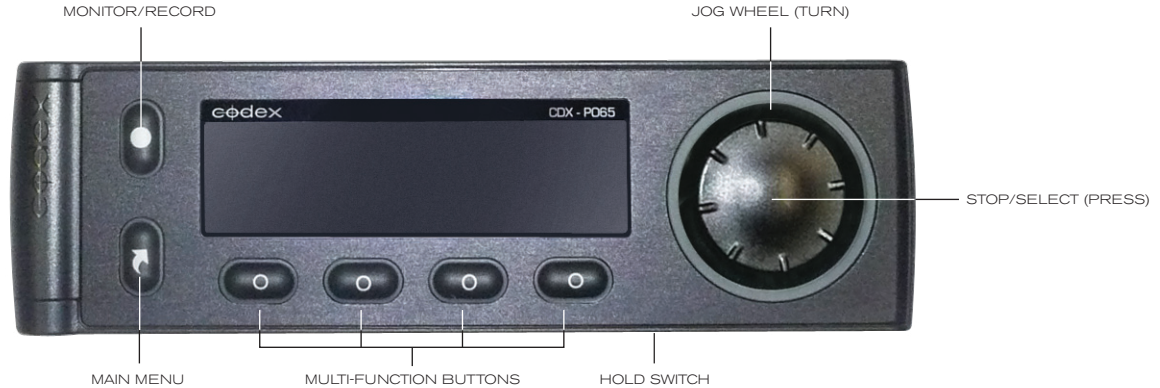

1) You are only ever two button presses from recording: if you are anywhere in the menu system then one press of the Monitor/Rec button will engage Monitor mode, and a second press will begin a recording. If you are already in Monitor mode then a single press will begin a recording. During recording the only responsive button is STOP/SELECT, which finishes the recording and returns the system to Monitor mode.

2) The colour of the LED ring on the Control Panel shows the current mode of the recorder. The different modes are: Monitor = **Orange**; Recording = **Red**; Playing = **Green**; Pause/Setup = **Blue**.

3) When the **Hold Switch** is on there will be a padlock symbol at the top of the screen, and none of the other buttons will respond until the **Hold Switch** is set to be off. The image below shows the screen with the padlock symbol:

4) This image also shows another global function – from any screen the Main Menu button can be pressed which brings up the │ **Play** │ **Setup** │ **Storage** │ options on the **Multi-Function** buttons. This can be used at any time to navigate to these screens.

5) From within the menus the left **Multi-Function** button can be used to go **Back** a level or to **Monitor** mode.

6) The **Jog Wheel** can be turned to navigate through lists in the menu.

7) The **Select** button is used to select from a list, whether it be a settings list or a shot list.

8) If there are less than 3 possible settings for a menu option these will be available on the **Multi-Function** buttons below the screen. If there are more than 3 options the **Select** button can be used to open a list of all possible settings.

9) Some menu fields, such as the **Shot Naming Rule**, contain presets which are indicated by < and > symbols. On the **Multi-Function** buttons press the **Next** button to move through presets, **Accept** to use a preset, or **Cancel** to leave the settings as they are.

10) Pressing **Select** on a text field (e.g. a metadata field in the shot Filecard) will open the text editor screen. Initially the Jog Wheel controls the position of the cursor. **Backspace** deletes characters from where the cursor is located. Press **Insert** to bring up the row of characters that can be navigated using the Jog Wheel, and press **Select** to enter a character. The **Shift** button can be pressed to cycle the character row through Shift, Caps, and Normal case modes. Exit Insert mode by pressing the **Cursor** button.

11) The battery level is always shown in the top left corner of the display.

12) The record time remaining is always shown in the top right corner of the display. If this symbol is flashing then it indicates either that there is less than 5 minutes of record time remaining, or that there is an issue with the Roll on the Datapack which should be checked from the **Storage** screen.

The most important screens of the Control Panel display are:

Monitor/Rec
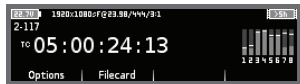
The video format is shown at the top of the screen as follows: <Video format> <Frame rate> <Storage format> <Wavelet compression quality> Below the battery symbol is the shot name. In Monitor mode this is the name of the next shot to be recorded, and in recording mode it is the name of the shot currently being recorded. Below this is the main timecode display, and to the right of this are the audio meters. Any warning or error messages appear below the timecode display. Warnings are cleared from the display if the cause for the warning is corrected. Errors remain on the display until you move to a different part of the menu system. The Next Scene button increments the scene number by 1 and resets the take number to 1. The Review button plays back the last 10 seconds of the previous recording for a quick and easy gate check.

Options

These options can be used to change the playback behaviour as well as the type of timecode display. Uncompressed material can be played back at any frame rate. Wavelet compressed material can be played back at frame rates within whichever of these two ranges it was recorded: 23.98-30fps or 47.95-60fps. A 1D LUT can be selected from here to be applied to the video outputs. See the LUTs section of this guide for further details.
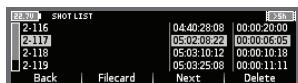
Filecard
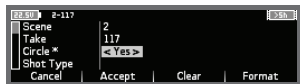
The Filecard is where shot metadata can be viewed and edited. This can be accessed in Monitor mode in order to prepare the metadata (e.g. Scene and Take values) for the next shot, or from the Shots list for any previous recordings. When a change has been made it is not automatically stored. Press **Accept** to save any changes, or press **Cancel** to lose them. Use the **Clear** button to wipe the contents of a field without having to use the text editor.

Play
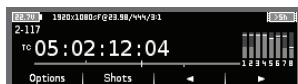
Going to the Play screen will load the last recorded shot. Use the > button to play the shot forwards, and the < button to play the shot backwards. The Jog Wheel can be used to jog through the shot. To load another shot press the Shots button, which will bring up the Shot List.

Shot List

Use this screen to **Select** a different shot for playback, open the Filecard of a recorded shot to view/edit metadata, view Format information, or delete recorded shots. Deleting shots is a non-reversible operation. From left to right, the columns on this page show:
< Shot Name> <Start Timecode> <Shot Duration>

Storage

Storage shows information about the Datapack and Roll. Before a Roll is created the drives should have a status of Free. Now turn the Jog Wheel left for **RAID-0** (striped drive set) and right for **RAID-1** (mirrored drive set). To create a Roll on a blank Datapack press the **Create** button and use the text editor to enter a Roll name (max. 8 characters). When the Roll has been created the drives should all be listed as **'Good'** and the Status as **'Ready'**. If this is not the case then contact Codex Support. **Delete** can be used to delete a Roll and all the shots on it.

Deleting a Roll is a non-reversible operation.

Setup

Menus in the Setup screen are as follows:

Project – enter metadata for the project such as Project Name, Director, DoP, Unit, etc. This information is stored as metadata with all shots.

Source – set unique information for sources, such as a Source ID value. This can be added to the start of Roll metadata to differentiate between multiple cameras.

Slate – set the **Shot Naming Rule** and **Roll Naming Rule**. These use metadata to automatically generate the shot names and roll names for recorded shots. There are several useful default options that can be cycled through with the **Next** button. These rules can also be customised if required.

Video – Select the appropriate Format, Storage, and Fps settings for the camera output being received by the Onboard.

Quality – sets the wavelet compression level for recording. It can be set to 1:1 for uncompressed recording, or any other compression ratio between 3:1 and 8:1 in order to use wavelet compression.

Channels – set this to 1 for single camera recording or 2 for dual camera recording. (Multi-channel licence required)

Aspect – choose the correct setting for your lens. Square for standard spherical lenses, or Anamorphic x1.3 or x2.

Variframe – should be Off for standard frame rates. For non-standard frame-rates variflags from the Alexa are supported and Variframe mode should be On. If Variframe is enabled on the recorder but not on the camera then recording is not possible.

Input has two options:

○ Default – use for 1.5GHz digital video signal   ○ 3G – use for 3GHz digital video signal

Output option has four settings:

○ Default – no conversion is done for output   ○ 4:2:2 – all material is output as 4:2:2 digital video signal   ○ 3G – dual link material is output as 3GHz digital video signal

○ Duplicated – provides duplicated 4:2:2 outputs of a single camera input

Audio – Depending on the Input setting, the Onboard M can record between 2 and 8 channels of audio. Select the appropriate input type and bit-depth. If using AES audio and the signal is not frequency locked to the video then set **AES SRC** option to On. No audio is recorded in Variframe mode.

Timecode – Select the appropriate timecode setting. **HD VANC** takes timecode embedded from the video stream – in this case **Fix TC Breaks** should be set to No - this is especially critical for correct timecode handling when shooting in Variframe mode from the Alexa. **LTC** takes timecode from the external connector. **TCG** uses the internal clock.
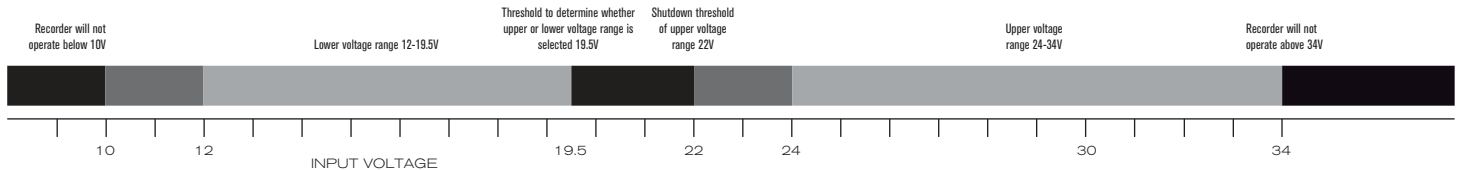
LUTS

The Onboard can apply 1D LUTs in ASSIMILATE SCRATCH format to the video outputs for monitoring and playback. To load a LUT refer to the 'Getting Logs and Loading LUTs Guide'.

From the Control Panel select Options when in live or play mode and from this sub-menu select LUT. You can enable/disable any LUT on the system from here.

REMOTE USER INTERFACE

It is possible to control the Onboard M from a remote User Interface (UI), running on a networked computer. The remote UI software is available for both Windows and Mac, and can be downloaded from www.codexdigital.com/software. Once it is installed, ensure the IP address of the Onboard and the remote computer are in the same range, i.e. if the Onboard IP is 192.168.1.110 and the subnet is 255.255.255.0 then the remote computer should have an IP which begins 192.168.1. and the last number of it's IP should be any number between 1 and 254, except for 110. The remote computer should also have a subnet of 255.255.255.0. Use the **SYSTEM** menu within SETUP on the Onboard to check/change network settings. With correct network settings and an ethernet cable attaching the Onboard to the remote computer, run the Codex software package and enter the Onboard IP address in the Connect to Server box. Initially you will not be **'IN CONTROL'**, which means you can edit shot metadata but not control the functions of the Onboard S. Go to the SETUP tab, then the **CONTROL** screen, and you can press **'TAKE CONTROL'** in order to control all settings and functions of the Onboard.

VOLTAGE RANGES

ERROR/WARNING MESSAGES

Warning/Error Message	Meaning	Course of action
No video input signal detected	No video/valid input signal detected by the video card. The video signal could be absent, too weak, or could be in a format which the Onboard does not accept.	Check cabling between the video source and the Onboard. Check the video output format of the source. If this happens during monitoring it is recommended to switch to playback mode and then back to monitoring to 're-time' the Onboard to the incoming video signal.
Video CRC error	One or more errors have been detected on the incoming video signal. This will be evidenced by visible errors appearing as 'sparkles' on the recorded data.	Check cabling – it could be damaged, too long, or suffering interference from lighting etc.
Video frame dropped	There has been a momentary loss in video signal, or data has failed to be written to disk.	This can occur if signals are dropping in and out during monitoring, so it is advised to restart monitoring after a signal drop to re-time the Onboard to the incoming signal. If this happens during recording on one channel it is likely the result of cabling problems. If it happens during recording on both channels then it could be a symptom of a Datapack write-speed problem, in which case you should contact Codex Support.
Input video signal wrong type	Video Format is set to a different format from the one being supplied.	Check the Video Format settings and make the appropriate changes.
No AES audio input detected	Audio Source is set to AES but there is no AES audio signal being received at the AES inputs on the back panel.	Check that the audio being supplied is an AES/EBU signal at 16-bit, 48KHz.
No embedded audio input detected	Audio Source is set to HD A/V, but there is no embedded audio being received by the HD IN connectors on the back panel.	Check that the source is set to output embedded audio.
No video input signal B detected	Storage is set to 4:4:4 so the Onboard expects a dual link signal, but there is no video signal being received at the second input connector.	Check that the source is outputting Dual Link video.
Not all embedded audio inputs detected	Audio Channels is set to expect more HD A/V audio channels than are being supplied.	Check the source is outputting the correct number of audio channels.
Not all AES audio inputs detected	Audio Channels is set to expect more AES audio channels than are being supplied.	Check the source is outputting the correct number of audio channels.
Timecode break	This will most likely be caused by a discontinuity in the timecode, which in turn is caused by the timecode and video not being locked together.	Check video and timecode source genlock.
Video cables misconnected	Cables are connected to video inputs in the wrong order.	Check and correct the input cables.
Roll is full	There is no more space on the Datapack Roll.	Switch to a different Datapack which has storage space remaining.
Input signal is black	ARRIRAW only - the Alexa is generating a black signal on REC OUT.	Reboot the Alexa.
No valid frames - check variframe settings	Variframe is enabled but no Variflag frames are received after a few seconds.	If intending to shoot variframe, confirm Recording -> REC OUT -> Variflag setting on Alexa.
Cannot play shot	The Datapack is not good or degraded in some way. If this is the case the record time remaining symbol will flash to indicate an issue.	Contact Codex Support to determine the best course of action.
Invalid video format for Datapack	The format settings are not compatible with the loaded Datapack.	Either change format settings to be compatible, or change Datapack. The most common cause is a lack of disk bandwidth, so either select a format with lower bandwidth or use a Datapack with more drives.

CONNECTOR PIN OUTS

LTC - 5 pin 0B Lemo socket

1 Ground
2 LTC IN +
3 LTC IN —
4 LTC OUT —
5 LTC OUT +

For unbalanced input, use 'LTC IN +' and connect 'LTC IN -' to ground (Pin 1).

RS422 - 6 pin 0B Lemo socket CURRENTLY FOR WIRED UI CONNECTION ONLY

GPIO - 7 pin 0B Lemo socket

1 Reserved for RS232 RX - DO NOT CONNECT
2 Reserved for RS232 TX - DO NOT CONNECT
3 Ground
4 GPI IN
5 GPI OUT
6 Reserved - DO NOT CONNECT
7 Reserved - DO NOT CONNECT

DC IN - 5 pin 1B Lemo socket

1 Battery V— (0V)
2 IDX SCL (IDX digital clock)
3 IDX SDA (IDX digital data)
4 AB DATA (Anton/Bauer coms)
5 Battery V+ (12-28V DC)

DC OUT - 2 pin 0B Lemo socket RESERVED FOR FUTURE USE - DO NOT CONNECT

AUDIO 1/2 - 3 pin Mini XLR Switchable between balanced Line or AES

1 Ground
2 Audio In +
3 Audio In —

HEADPHONE OUT - 3.5mm Jack

Tip   Left channel audio
Ring   Right channel audio
Sleeve Ground

NOTES

NOTES

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