DM8168 DVR RDK Application and GUI Guide

DVR RDK Version: 02.00.00.xx

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Revision History

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1. Introduction

The document covers the details for DVR Application and GUI used in DM8168 DVRRDK. Please refer to DM8168_DVR_RDK_InstallGuide.pdf and DVR_RDK_McFW_UserGuide.pdf for DVR RDK installation steps.

2. Building the DVR Application and GUI

Assuming the application is already installed in <DVR_RDK_INSTALL_DIR>, the following sections provide details on how to build the DVR application.

Note: DVR GUI and Application has been validated to work on DVR RDK Hardware

2.1 Building Application

- Move to base directory of "dvr_rdk"

```
$ cd <DVR_RDK_INSTALL_DIR>/dvr_rdk
```

- Build application using option.

```
$ make dvrapp
```

- After the above step for building, the binaries are available at `<DVR_RDK_INSTALL_DIR>/dvr_rdk/bin/ti816x/bin`. The binaries are automatically copied to the following directory.
  - ✓ libdm816x.so to `<DVR_RDK_INSTALL_DIR>/target/rfs/opt/dvr_rdk/ti816x/firmware/`
  - ✓ dvrmain to `<DVR_RDK_INSTALL_DIR>/target/rfs/opt/dvr_rdk/ti816x/bin`
- To copy the binaries to the root file system, use the following commands

```
$ make fsupdate
```

2.2 Building GUI

- Refer to Qt_Installation_Guide.pdf for setting up Qt
- Edit `<DVR_RDK_INSTALL_DIR>/dvr_rdk/dvrapp/dvrgui/qmake.sh` with your own directory path
- Build GUI using following command inside `<DVR_RDK_INSTALL_DIR>/dvr_rdk` folder

```
$ make dvrgui
```

- To copy the binaries to the root file system, use the following commands

```
$ make fsupdate
```

3. Executing the GUI Application

- When booting is finished, user can login as "root" on the serial terminal. **Note that password is not required.**

```
dvr login: root
```

- Move to target directory and execute the shell script "start_app.sh" as below

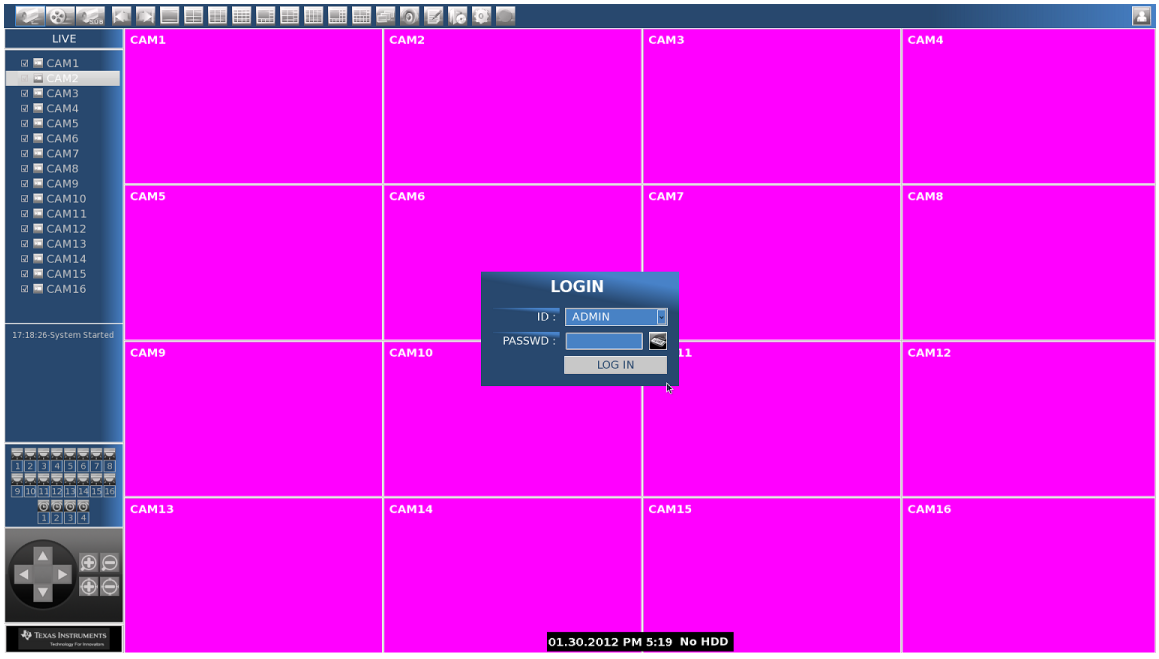
```
#!/bin/sh

# start application ----------------------------
echo -e "start application"
app_dir="dvr_rdk/ti816x"

if [ -x ./$app_dir/run_gui.sh ]; then
        cd ./$app_dir/
      ./run_gui.sh
fi
```

3.1 GUI Usage

3.1.1 Log in



- ✓ Login window is shown at start of DVR system,
- ✓ Other menus are disabled when login window is enabled
- ✓ Access level is divided 2 levels (ADMIN, USER).

- ✓ Maximum password character is 8
- ✓ Maximum user number is 10
- ✓ Default password is “blank” for both “ADMIN” and “USER”
- ✓ Password can be changed in *“Setup → System”* menu
- ✓ Access control for each mode (ADMIN, USER) can be selected in *“Setup → System”* menu

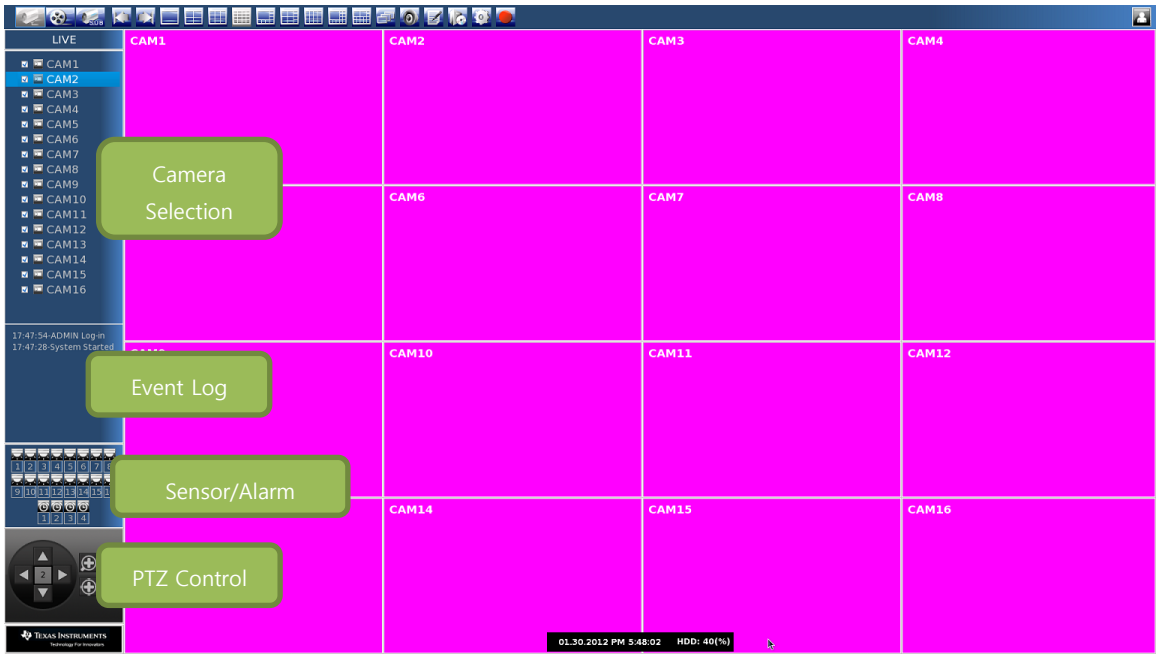
Note: Keyboard feature on the login box is not implemented in this release

3.1.2 Tool bar

The toolbar allows multiple functions based on the button press on the toolbar. Most of the buttons toggle the operation (enable or disable the feature).

- ✓  : Live mode
- ✓  : Playback mode
- ✓  : Sub-screen(secondary output) mode setting tool bar. This button pops up a reduced toolbar on the right bottom of the screen.
- ✓  : Previous / next page
- ✓  : screen mode setting
- ✓  : Sequence mode toggle (on/off). Sequence mode enables automatic display of next page after a programmable timeout interval. The timeout interval can be changed *“Setup → Display”* menu
- ✓  : Audio output enable/disable
- ✓  : Event log – this button show log pop-up dialog.
- ✓  : Back-up – This button results in popping up the backup configuration menu.
- ✓  : Setup – Clicking this button pops up the setup menu of the DVR
- ✓  : Emergency recording on/off – This button enables forced recording on all channels irrespective of the recording schedule. This is useful when the security administrator wants to override a recording in emergency situations.
- ✓  : log out button

3.1.3 Live



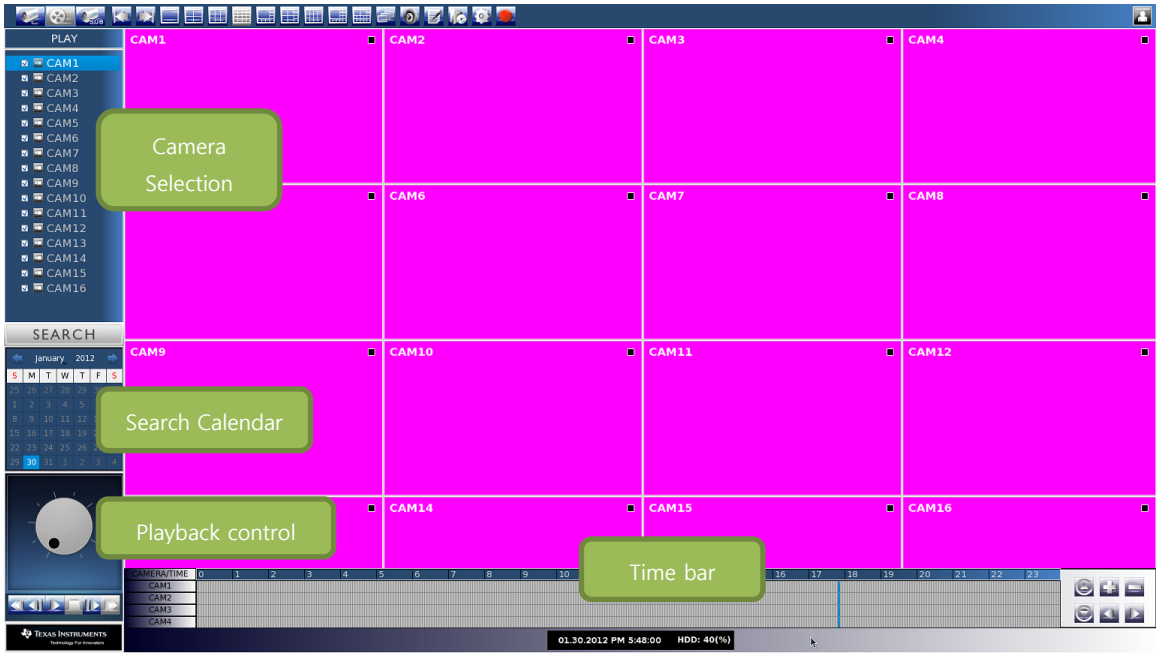
This is the default mode in which the DVR is started. The display shows a grid of multiple channels along with multiple control options. The control options are listed below:

- ✓ **Camera control window** – This window allows control the selection of input cameras on the display. A checkbox on the side of the camera enables or disables the preview of the camera on the Live Preview display.
  For example, If CAMERA1 is disabled on the camera control window, CAMERA2 moves to the position of CAMERA1 and all other cameras follow-on.
- ✓ **Event log window** – This window is used to show the logs of events or operations happening on the DVR
- ✓ **Sensor/Alarm window** – This window shows the status of sensors and alarms. The active sensors and alarms are shown with the enabled icon.
- ✓ **PTZ control window** – This window provides buttons to control camera pan, tilt and zoom.

The descriptions of PTZ buttons are as following:

- ✓  : move camera position (up/down/left/right)
- ✓  : zoom in/zoom out
- ✓  : focus in/focus out

3.1.4 Playback



This window is seen when the Playback mode is selected using the main toolbar. In the current release, the playback channels are displayed on the secondary output (sub-screen display). The secondary display shows a grid of multiple playback channels. The control options are listed below:

- ✓ **Camera control window** – This window allows control the selection of input cameras on the secondary display. A checkbox on the side of the camera enables or disables the display of the channel

  For example, If CAMERA1 is disabled on the camera control window, CAMERA2 moves to the position of CAMERA1 and all other cameras follow-on.

- ✓ **Calendar Search window** – This window shows a calendar. User can select the specific date to view the recording corresponding to that date. The days which have recorded data are shown in bold.
- ✓ **Time bar window** – This window shows all the recorded data for the selected date. The time bar allows the user to look at the recorded data for each channel at a particular time. It also shows the recording type (event, continuous, alarm…etc) using the color code. Color code for the different recording options is explained in "*Setup→Record"*
- ✓ **Playback control window** – This window allows the user to select the playback speed. The window has a virtual jog key that can be controlled using mouse interface.

On the right hand side of the time bar, there exists control buttons for the time bar. Descriptions of the buttons are listed below:

- ✓  : **channel up/down** – The time bar shows only 4 channels at a time. User can select the next set of 4 channels using these buttons.

- ✓  : **zoom in/out** – Time bar shows a range of 24 hours. User can use these zoom buttons to zoom in or out in the time interval. The time bar can zoom into a range of 6 hours to a range of 24 hours (default). For example, time bar shows 00:00 to 24:00 and if user zooms in, the time bar shows 00:00 to 06:00. This would allow user to select a better granularity for playback.
- ✓  : **move previous/next time band** – When time bar is selected to show 6 hours range, user can go left or right to select next time band. For example, if user has zoomed into 6 hours range and time bar shows 00:00 to 06:00, then user can move to 06:00 to 12:00 by clicking the right button.

3.1.5 Status bar

It shows the date/time depending on the live mode or playback mode selection.

- ✓ Live mode – In this mode, status bar shows current date/time
- ✓ Playback mode – In this mode, status bar shows the selected playback date/time

It also shows hard disk usage information.

3.1.6 Status Icon

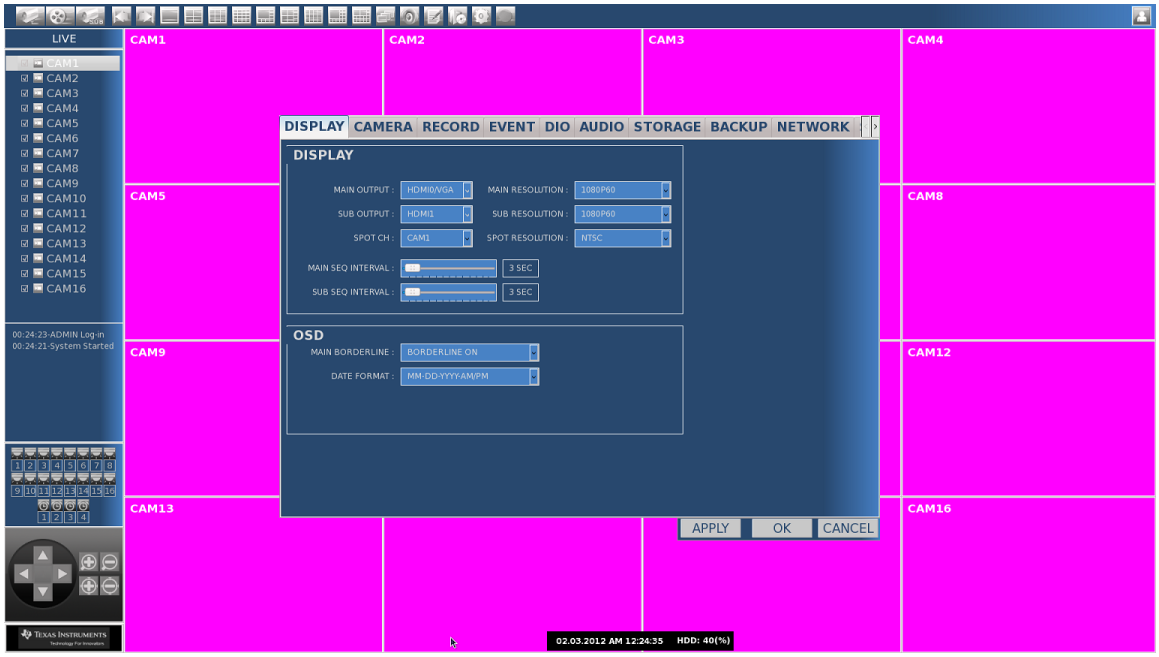
It shows the status of system with following symbols on OSD

- ✓  : shows the status of video loss detection. Whenever a camera input source is removed, the display goes blank for that camera and this icon shows up on that specific blank display.
- ✓  : shows motion detection. Whenever motion detection is enabled and there is motion detected in the selected region, this icon shows up on the display for that camera.
- ✓  : shows the status of audio recording. Whenever audio recording is enabled for that camera source, this icon shows up on the display for that camera.
- ✓  : shows the status of video recording. This icon shows up when recording for a

particular camera is on.

- ✓  : indicates playback status in playback mode

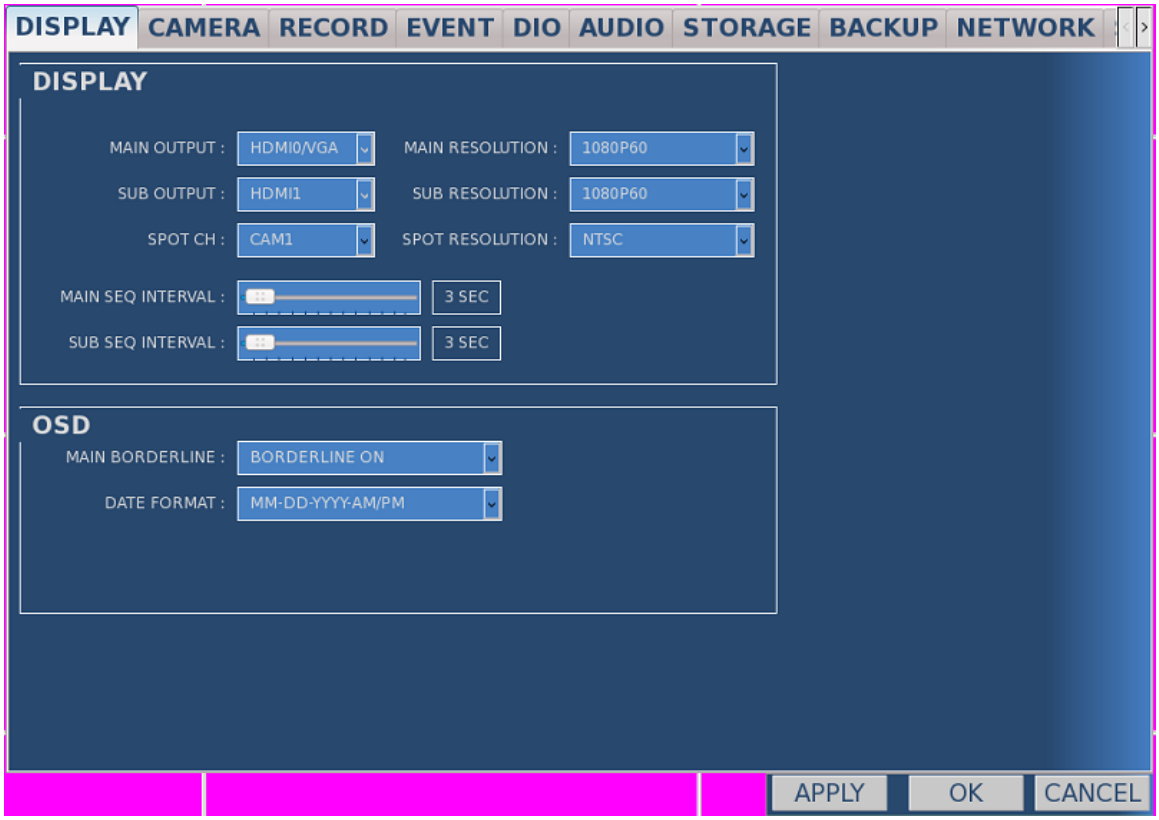
3.1.7 Setup menu



Setup Menu has multiple tabs for the different sub menus. The sub-menus and their key features are listed below:

- ✓ **Display setup** – Controls for output selection, resolution configuration, OSD controls
- ✓ **Camera setup** – Provides control for the individual input sources. Controls enable/disable, camera naming, motion detection, image filter, color, PTZ setting
- ✓ **Record setup** – video/audio recording setup, event record duration, record schedule
- ✓ **Event setup** – event to record, event to alarm setting
- ✓ **DIO setup** – sensor, alarm setting
- ✓ **Audio setup** – audio input/output
- ✓ **Storage setup** – HDD format/recycle, disk information
- ✓ **Backup** – provide backup functions
- ✓ **Network setup** – network type, IP, subnet mask, gateway for eth0 and eth1
- ✓ **System setup** – system version, date/time, user, system initialize and reboot

3.1.8 Display setup



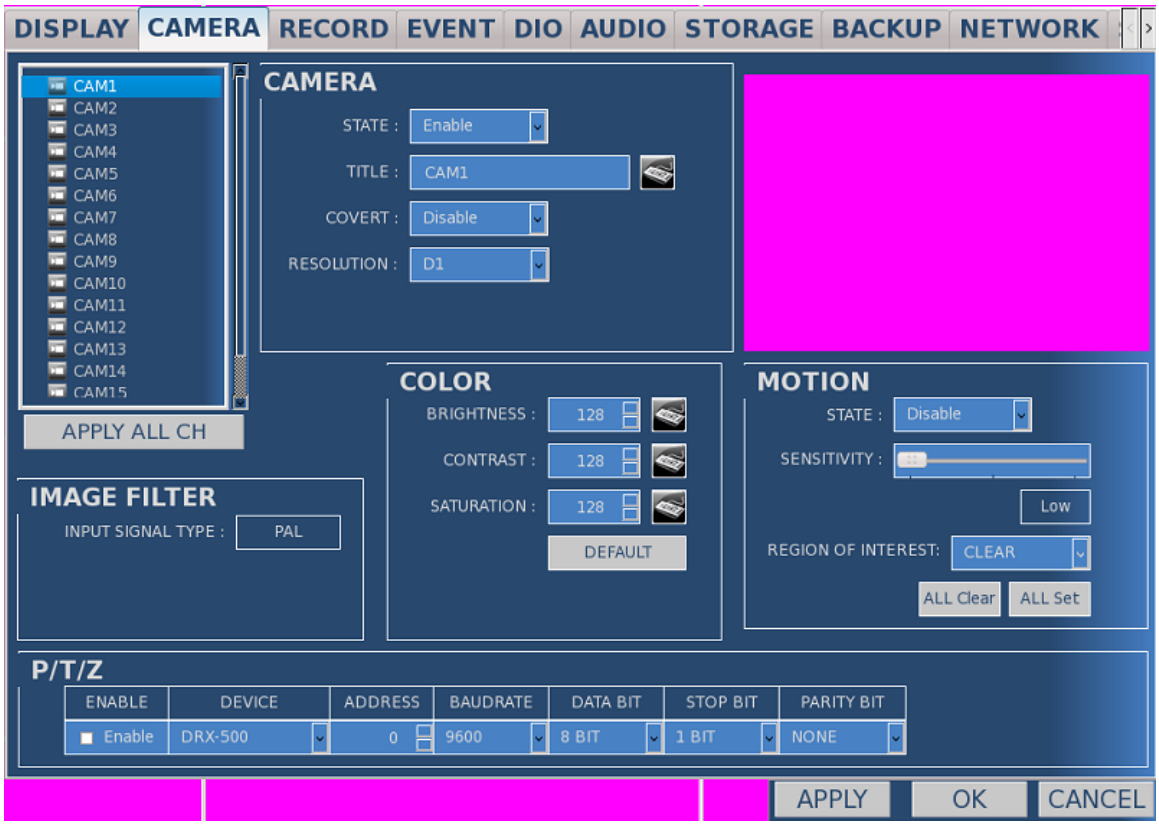
3.1.8.1 Display

- ✓ **Main output** – HDMI0/VGA /HDMI1 – show current Main-output port.
- ✓ **Sub output** – HDMI0/VGA /HDMI1 – show current Sub-output port.
- ✓ **Spot ch** – Only one channel can be displayed on spot output. This is displayed selected channel on the CVBS composite output.
- ✓ **Main sequence interval** – selectable from 1 second to 60 seconds. Once sequencing is enabled using the main toolbar, the automatic page up/down happens after this interval of time.
- ✓ **Sub sequence interval** – selectable from 1 second to 60 seconds. Once sequencing is enabled using the main toolbar, the automatic page up/down happens after this interval of time.
- ✓ **Main/Sub Resolution** – XGA/SXGA/720P/1080P – select output resolution.
- ✓ **Spot resolution** – NTSC/PAL

3.1.8.2 OSD

- ✓ **Main border line** – border line on/off for main output – These border lines are drawn on the display grid.
- ✓ **Date format** – MM-DD-YYYY-AM/PM / DD-MM-YYYY-AM/PM / YYYY-DD-MM-AM/PM / YYYY-MM-DD-AM/PM / MM-DD-YYYY / DD-MM-YYYY / YYYY-DD-MM / YYYY-MM-DD – User can select the date format that is to be displayed on status bar.

3.1.9 Camera setup



User can select the camera on the left tab and change the properties of the camera with the following menus.

APPLY ALL CH button – apply current camera setting except title to all camera.

3.1.9.1 Camera

- ✓ **Enable** – camera enable/disable setting, it can also be done using the “Camera Tree Menu” on the left. When a camera is enabled, it is displayed on the live preview.
- ✓ **Title** – camera title setting. User can set the camera title that is displayed on the live preview.
- ✓ **Covert** – When this option is enabled, only encoding & recording happens for the camera without it being displayed on the live preview. This is a feature needed for secret recording.
- ✓ **Resolution** – D1/CIF/Half D1 – User can select the resolution in which they want to encode and store the stream on the local storage.

3.1.9.2 Motion

- ✓ **Detect** – motion detection enable/disable setting – User can enable motion detection for a particular camera.
- ✓ **Sensitivity** – select from level 1(Low) to level 3(High) – Sensitivity of 1 is lowest and 3 is highest. This means if user sets sensitivity as 3(High), there is higher likelihood of detecting motion but can result in higher percentage of false detection as well.

- ✓ **Area mode** – selectable between clear/set – The region for motion detection can be selected on the right side. If the area mode is selected as “clear”, the motion detection area would be cleared. If the area mode is selected as “set”, the motion detection area would be selected on mouse click. “All Set” or “All Clear” buttons do the respective operation on the complete area of the camera input.

3.1.9.3 Image filter

- ✓ **Input signal type** – NTSC/PAL – This is an input signal status display. If the input channels are NTSC, then this field shows NTSC, else PAL.

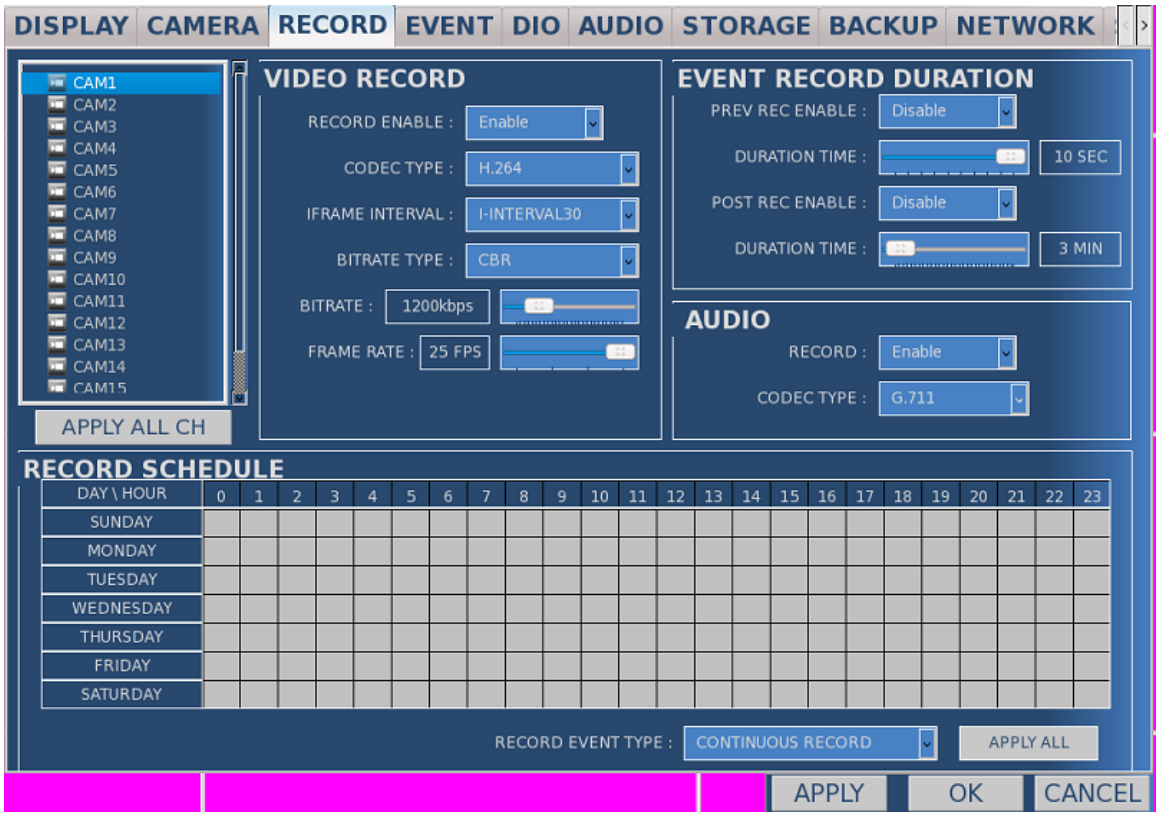
3.1.9.4 Color

- ✓ **Brightness** – range 0 to 255 – Controls the brightness of a specific input channel.
- ✓ **Contrast** – range 0 to 255,
- ✓ **Saturation** – range 0 to 255,

3.1.9.5 PTZ

This menu is to set the protocol for pan, tilt, and zoom. Once the protocol is selected for the camera, the actual pan, tilt and zoom can be controlled with the live preview PTZ control window.

3.1.10 Record setup



User can select the camera on the left tab and change the options of the recording with the

following menus.

APPLY ALL CH button – apply current record setting to all camera.

3.1.10.1 Video record

- ✓ **Record enable** – recording enable/disable – If this menu option is enabled, the recording for the channel is started based on the recording type and schedule.
- ✓ **Codec type** – H264/MPEG4/MJPEG **(currently only H264 is supported)**
- ✓ **Iframe interval** – 1/5/10/15/30 – Possible selection of the IFrame Interval for each channel.
- ✓ **Bitrate type** – CBR/VBR – This controls the rate control algorithm for the compression. CBR would mean that the compression would maintain the bitrate and can possibly drop frames. VBR means that the bitrate can be variable but the quality remains constant.
- ✓ **Bitrate** – 500Kbps to 4000Kbps (increase value by the 100Kbps). User can control the bitrate of each stream.
- ✓ **Frame rate** – 4/8/15/30 for NTSC camera, 3/6/13/25 for PAL camera.

3.1.10.2 Event record duration

- ✓ **Prev Rec Enable** - When enabled, system would record the video prior to the event.
  - ■ **Duration time** – User can set the duration of the recording prior to the event.
- ✓ **Post Rec Enable** - When enabled, system would record after the event is detected.
  - ■ **Duration time** – User can set the duration of the recording post the event.

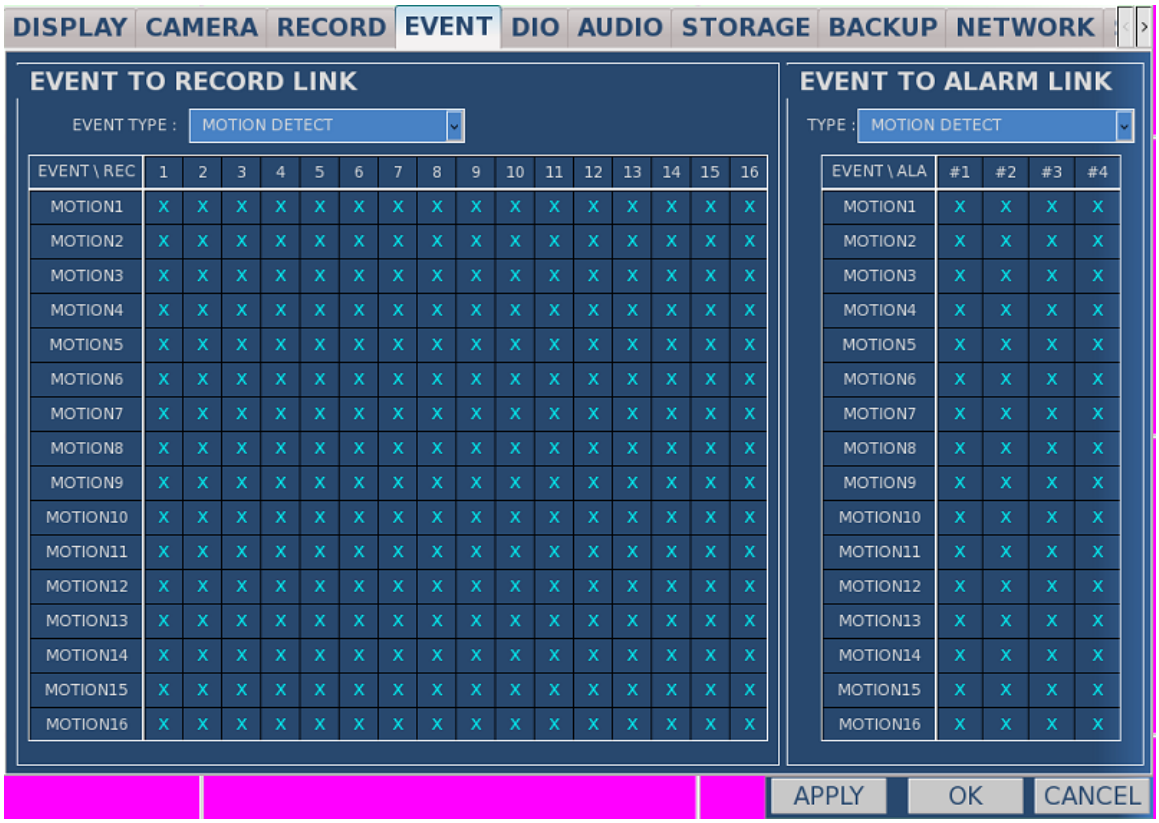
3.1.10.3 Audio

- ✓ **Record enable** – audio recording enable/disable,
- ✓ **Codec type** – G711/AAC, **(currently only G711 is supported)**

3.1.10.4 Record schedule

- ✓ **Record event type** – continuous record / record by motion / record by sensor / record by video loss / no record – User can plan a recording schedule using this menu. User can first select the event to be used for triggering the recording and then set up the schedule by clicking on the grid. The schedule can be selected for the whole week. User has an option of clicking “Apply All” button which results in the complete schedule set for the selected recording event. Option of “no record” is available in case user does not want any recording and would enable recording using emergency record mode (forcible recording).

3.1.11 Event setup



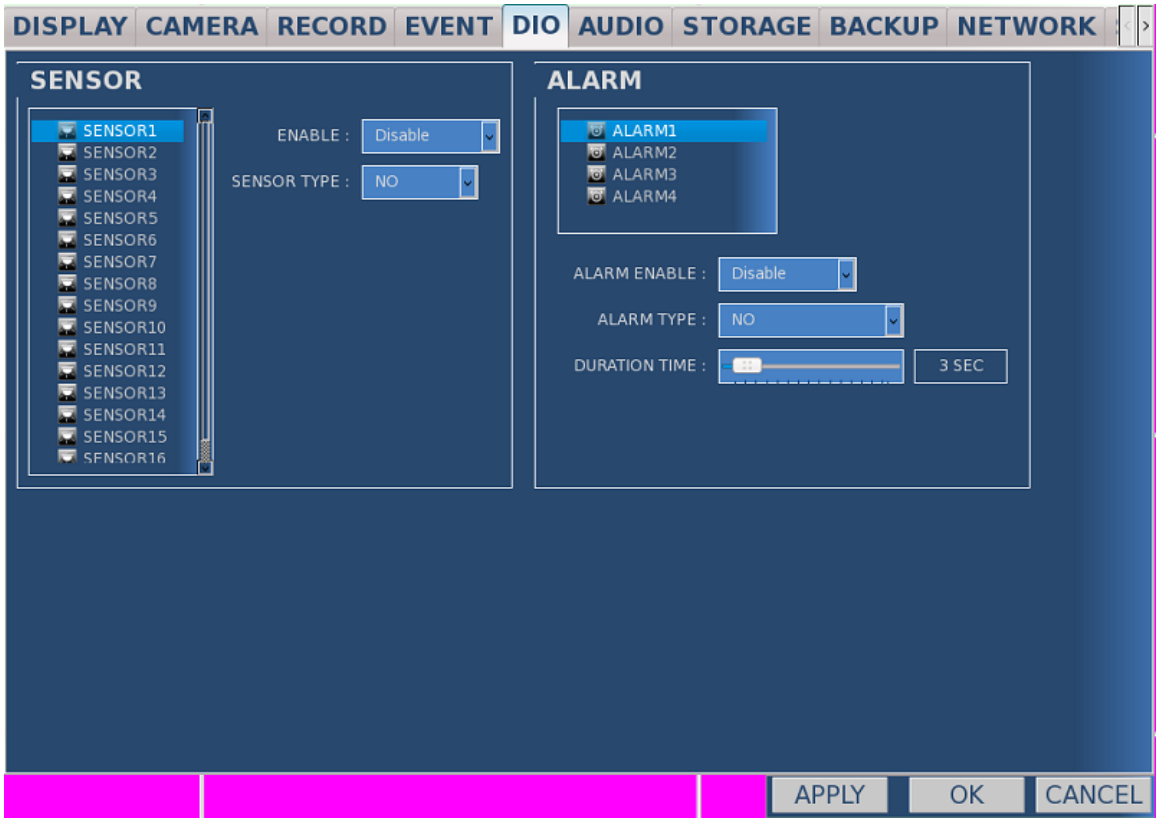
3.1.11.1 Event to record link

- ✓ Event type – motion/sensor/video loss/, not implemented about motion and video loss in this release

3.1.11.2 Event to alarm link

- ✓ Type – motion/sensor/video loss/, not implemented about motion and video loss in this release

3.1.12 DIO setup



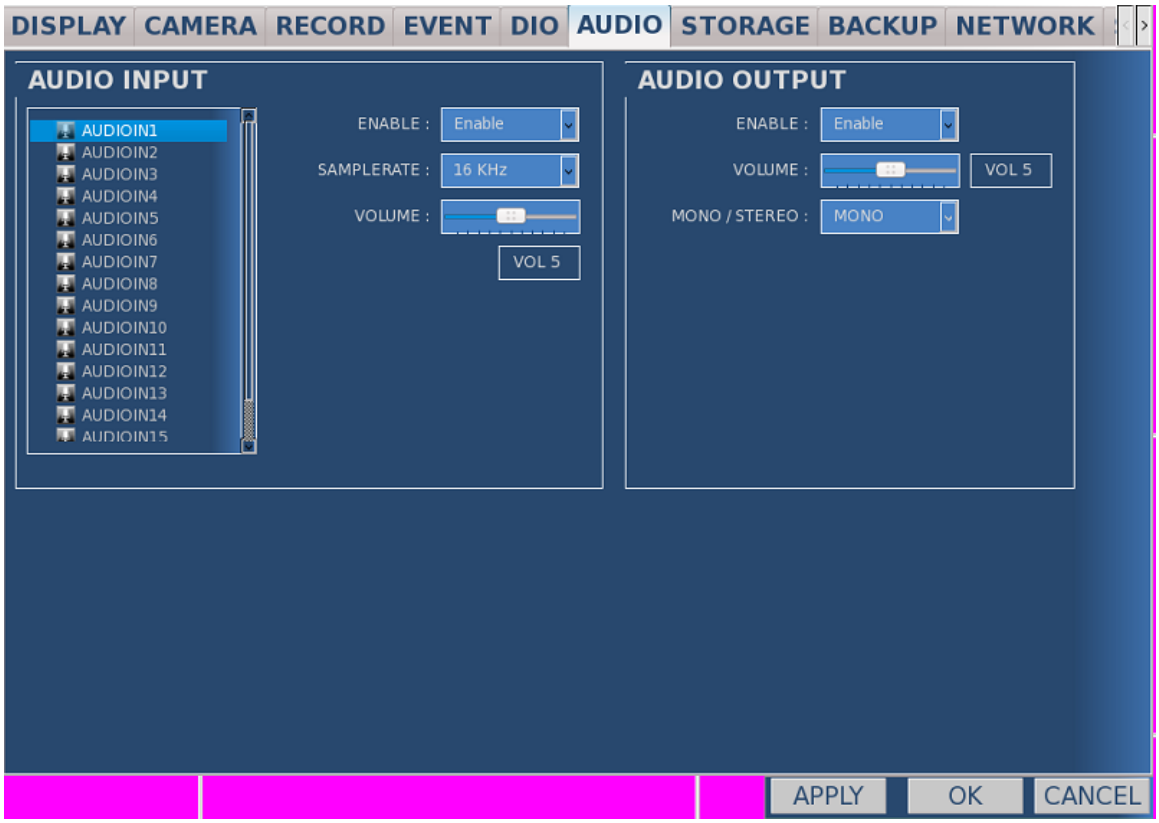
3.1.12.3 Sensor

- ✓ Enable – enable/disable for each sensor
- ✓ Sensor type – NO/NC(Normal Open / Normal Close)

3.1.12.4 Alarm

- ✓ Alarm enable – enable/disable for each alarm
- ✓ Alarm type – NO/NC,
- ✓ Duration time – can change the duration of alarm from 1 second to 30 seconds

3.1.13 Audio setup



User can select one of the 16 audio input channels on the left tab and do the configuration for that channel using following menus.

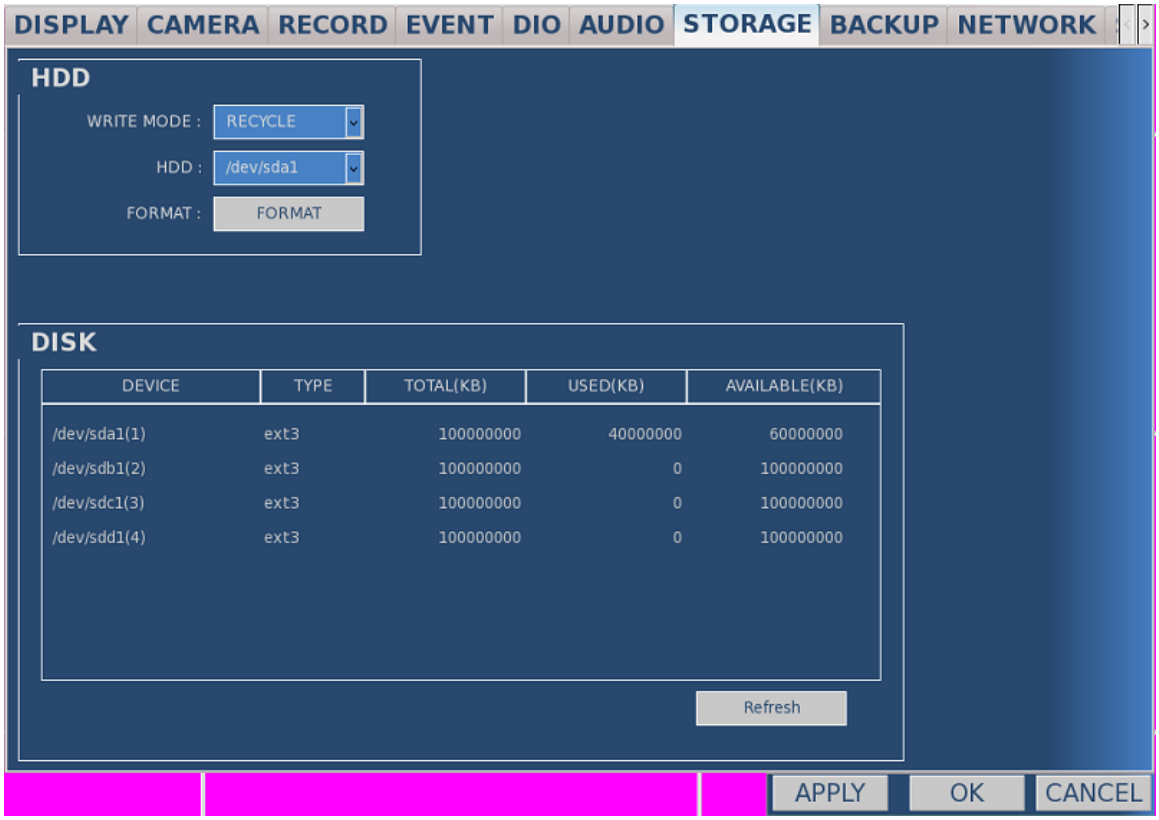
3.1.13.1 Audio input

- ✓ **Enable** – enable/disable for each audio input
- ✓ **Sample rate** – 8KHz/16KHz,
- ✓ **Volume** – mute to 10 – volume of 1 is lowest and 10 is highest **(not implemented in this release)**

3.1.13.2 Audio output

- ✓ **Enable –** enable/disable for audio output,
- ✓ **Volume –** mute to 10 – volume of 1 is lowest and 10 is highest **(not implemented in this release)**

3.1.14 Storage setup



3.1.14.3 HDD

- ✓ **Write mode** – recycle/once. It is setting for HDD operation, when HDD is full.
  Once – After the HDD is full, no further recording allowed on the hard disk
  Recycle –After HDD is full, the oldest files start getting deleted automatically
- ✓ **HDD** – shows device path for the active hard disk and select device for format disk
- ✓ **Format** – format the selected HDD and created Basket File System.
  If have not created a partition on HDD, it will run Fdisk automatically and then format proceeds

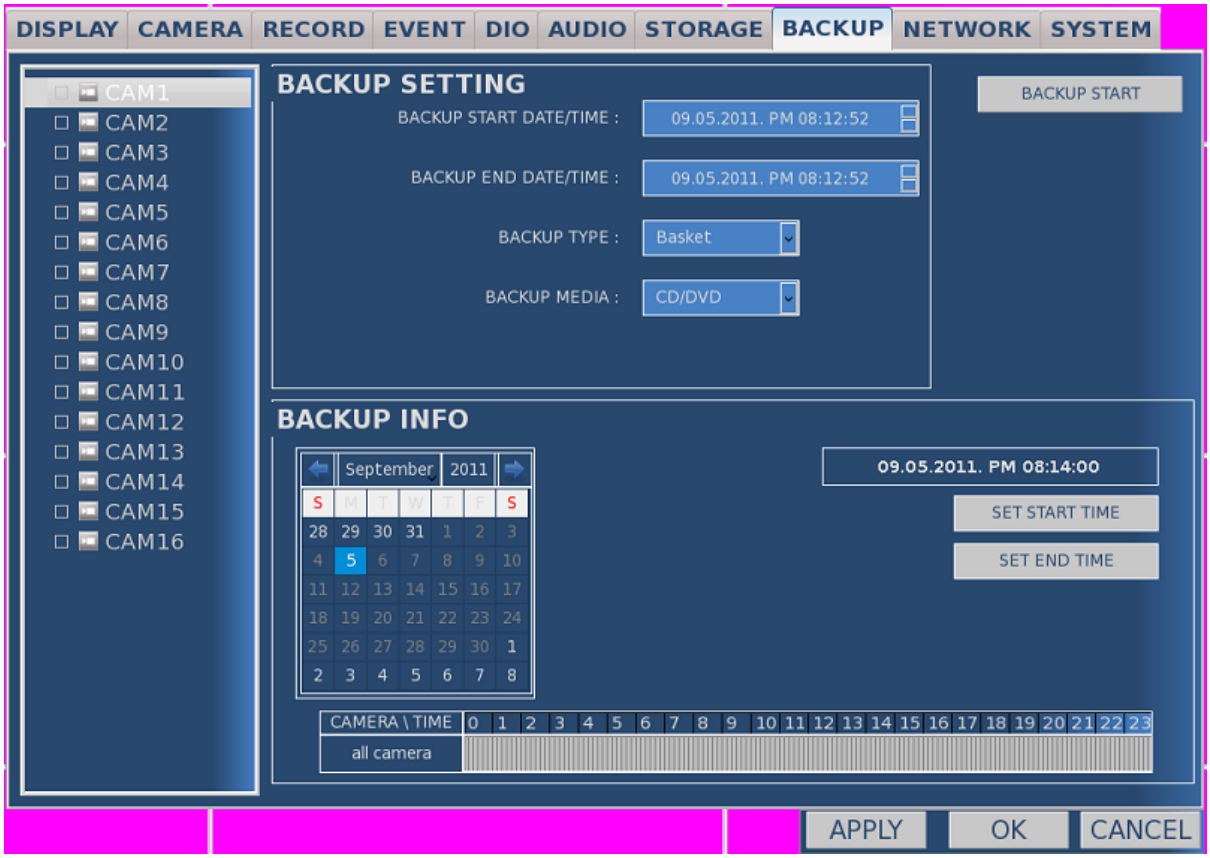
Note : Format command of the RDK include formatting HDD and creating a Basket File System for recording, so it is available only for recording of the video data in the RDK. It supports up to four HDD for recording. After the format of the DEVICE, number (1) to (4) is appended next to the disks. This means the HDDs are recordable. Note: (0) means that disk is not recordable.

3.1.14.4 Disk

This table shows the entire mounted disk's information.

Note :**TOTAL**, **USED**, **AVAILABLE** sizes in the Disk information matches the disk information after running '**df**' command on Linux shell

3.1.15 Backup setup



3.1.15.1 Camera selection

Camera selection is enabled when backup type is AVI. User can select specific camera for backup

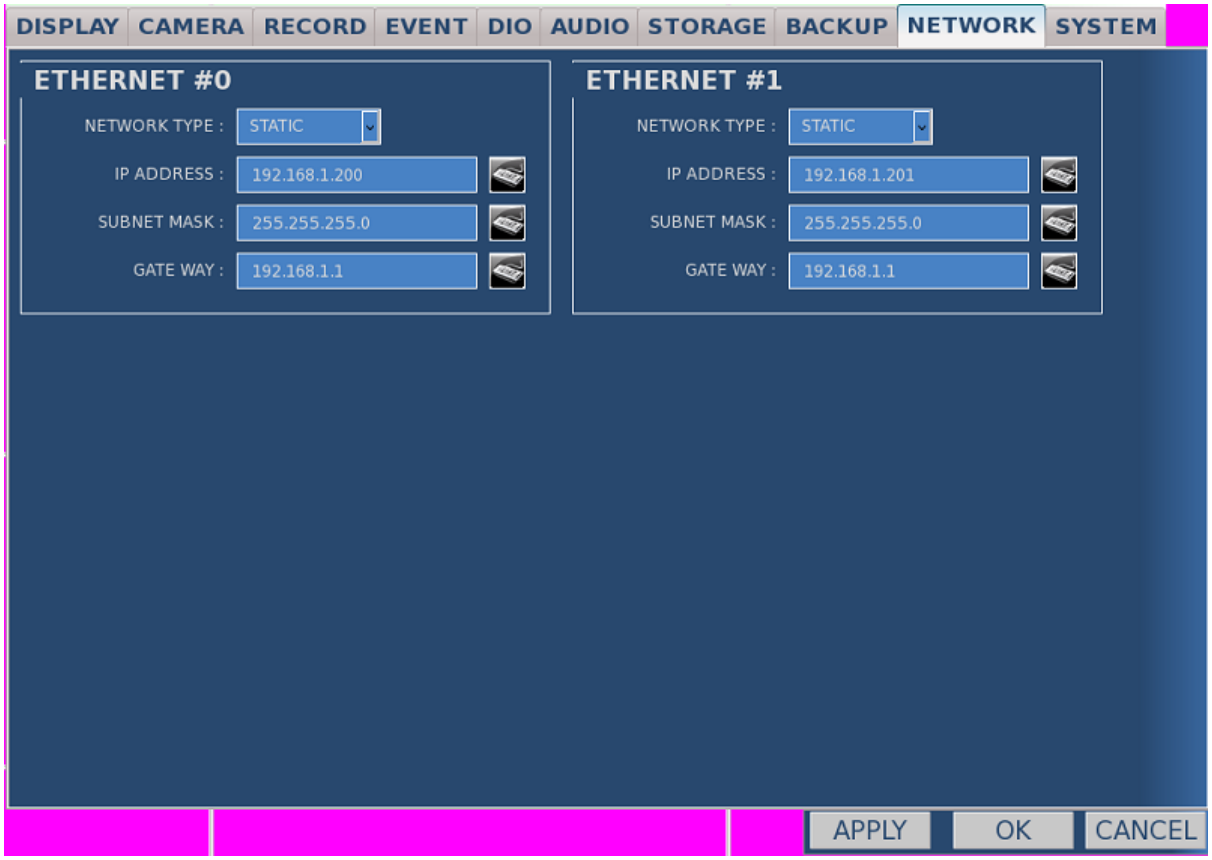
3.1.15.2 Backup setting

- ✓ Backup start date/time – can select start date/time
- ✓ Backup end date/time – can select end date/time
- ✓ Backup type – can select basket/AVI
- ✓ Backup media – can select CD/DVD or USB
- ✓ Select device – when backup media is USB, user should select device path

3.1.15.3 Backup info

This show recording status of selected camera and provide start/end time setting

3.1.16 Network setup



- ✓ **Network type** – STATIC/DHCP
- ✓ IP address
- ✓ Subnet mask
- ✓ Gateway

User can set each of the values for IP address, subnet mask and gateway address for the two Ethernet interfaces on the DVR RDK. If the DHCP mode is selected, the other addresses are not valid.

3.1.17 System Setup

3.1.17.1 System information

This menu displays the status of the system for the following items:

- ✓ Firmware version
- ✓ Hardware version
- ✓ MAC address#1
- ✓ MAC address#2
- ✓ Build date/time

3.1.17.2 Date/time

- ✓ Current – shows current system time
- ✓ Config – update system time – User can input a new date/time for the system and that gets reflected in current time.

3.1.17.3 System Config

- ✓ Config initialize – initializes system to default factory configurations. All the items in setup menus go to default values. This option can be used to recover from some unknown condition.
- ✓ System reboot – reboot DVR system – User can click this button to auto reboot the DVR and start up fresh.

3.1.17.4 User

Select the user name from the left tab and configure the user properties using the following options:

- ✓ User enable – enable/disable access for the selected user
- ✓ Access content – give access right for live/playback/main menu/setup
- ✓ Change passwd – User has to enter the new password
- ✓ Confirm passwd – User has to enter the new password again for confirmation