

# 2011 IEI Capture Card Solutions

Kenny Jan

# IEI Capture Card Solutions

- The latest HDC solutions are capable of compressing and decompressing full HD video (1920x1080) in real-time using the H.264 codec. The products enable recording, playing, and transmitting HD video with high-definition quality on devices such as digital video cameras, home network devices, industrial broadcasting devices, and surveillance cameras.
- IEI IVC series provides standard-definition (SD) video resolution with standard or MP3 audio capture capability which provides better quality.



## High-Definition Solutions

## Standard-Definition Solutions

### H.264 Hardware Compression/Raw Video Solution



Supports high definition video resolution up to 1920 x 1080

HDMI Interface	DVI Interface	SDI Interface
HDC-304E	HDC-401	HDC-502E
HDC-302E	HDC-401E	HDC-501ER
HDC-301E	HDC-402E	
HDC-301	HDC-401ER	



### Software Compression Solution

Supports standard definition video resolution up to 720 x 480 NTSC/ 720 x 576 PAL

	PCI type	PCIe type
	IVC-C604	IVCE-T604
	IVCE-C608	IVCE-T608
	IVC-168G	IVCE-268G
	IVC-268G	

### Long Distance High Quality Extension Solution

SDI Interface  
HD-SDI-BOX



HDMI to SDI



SDI to HDMI  
\*SDI extender

### H.263/ MPEG4 Hardware Compression Solution

PCI type  
IVC-8371P  
PM-1059





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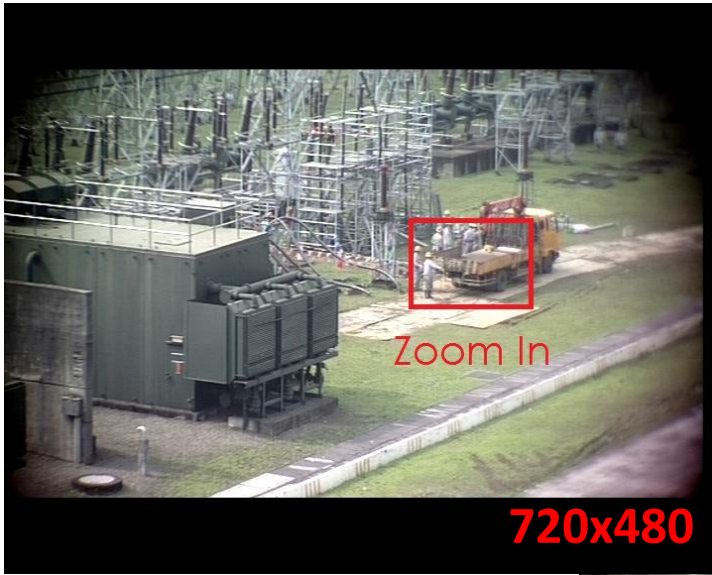
# HD Video Capture Solutions

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# Quick review on HD vs.SD



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# Quick review on HD vs.SD



SD

HD



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# High-Definition Compression Capture Card

► **Benefit**

Real time compressed files for better storage usage, cost savings and transmission rates. Best media quality HD video and audio can be provided with huge file storage capacity.

With IEI HDC hardware compression function, Uncompressed Full HD video will be 373 MB/sec

(1920 x 1080 x 3 (R.G.B.) x 60 frame/sec. = 373.248 MByte)

Compressed video encoding bit rate range from 30 Mbps = 3.75 MB to 2 Mbps = 0.25 MB

The compressed file size compared to the uncompressed one is up to **1492:1**

Encoding Bit Rate	Un-compressed	Compressed			
	373 MB	0.25 MB	1 MB	2 MB	3.75 MB
1 TB HDD capacity	0.75 hr	1108 hrs	277 hrs	139 hrs	74 hrs
30-minute Full HD Video Recording	671 GB	450 MB	1.8 GB	3.6 GB	6.75 GB

Take 30-minute Full HD video recording as an example. The uncompressed video is 671 GB, while the compressed video encoding with 0.25 MB (2Mbps) bit rate is only 450 MB.

120 minutes  
1080p movie



**3 TB HDD (cost \$300) space requirement**  
VS  
**30 GB (cost \$30) with compressed file**



Each 120 minutes  
1080p movie  
storage cost  
difference  
**\$300 VS \$30**

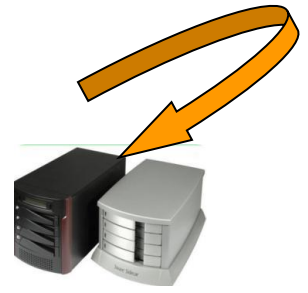
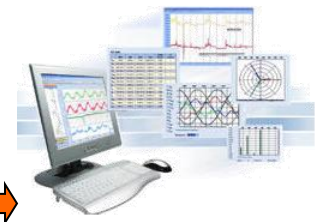
**Size does matter**



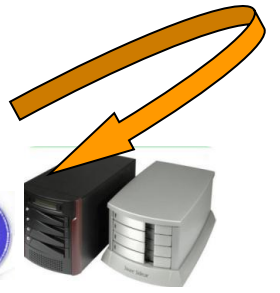
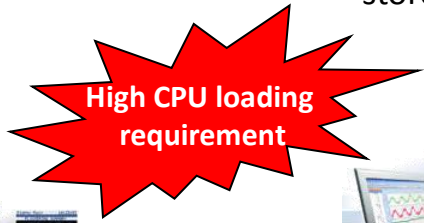
# High-Definition Compression Capture Card

Main difference between Hardware compression and Software compression Capture Card:

## Hardware compression



## Software compression



# High-Definition Compression Capture Card



## H.264 Hardware Compression Solution

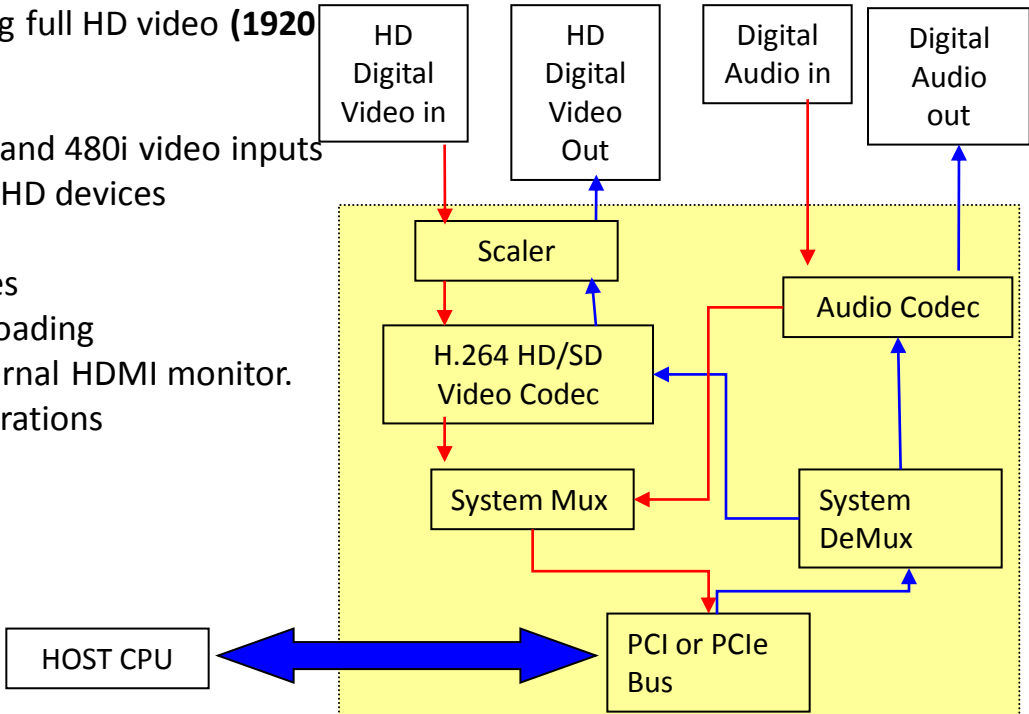
IEI HDC series products are designed with FUJITSU Codec IC MB86H46 solution which is capable of compressing and decompressing full HD video (1920x1080) in the H.264 format in real-time.

### Main Features

- Supports high-definition 1080p, 1080i, 720p, 480p and 480i video inputs
- Supports video and audio capture from all kinds of HD devices
- Edit and playback captured files on computer
- H.264 codec support with better storage advantages
- 8-channel hardware capture with under 10% CPU loading
- HDMI output port with hardware decoding for external HDMI monitor.
- PCI and PCIe interfaces for different system configurations



### FUJITSU H.264 Codec IC Block Diagram





# High-Definition Compression Capture Card

## Marketing Application

DVI, VGA, HDMI or SDI video source for Security, Video Editing, Gaming Industrial

Post Game Analysis, Contest Record  
HD Video Recording



HDMI



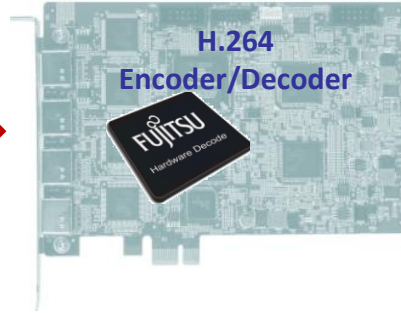
DVI/VGA



SDI Camera



HDMI Camera



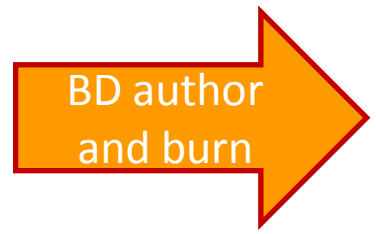
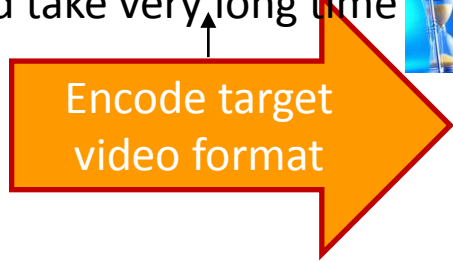
# High-Definition Compression Capture Card

Fast HD multimedia video/movie BD authoring

With powerful CPU and GPU,  
and take very long time



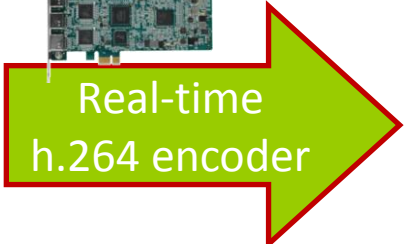
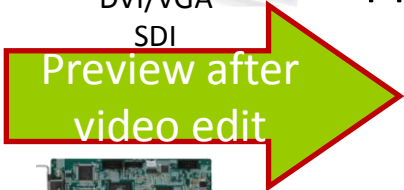
**Before**



HDMI  
DVI/VGA  
SDI

Real-time full HD preview function is supported by Apple Final Cut and Cyberlink PowerDirector

**Fast way**



HDMI  
DVI/VGA  
SDI

You save half of process time

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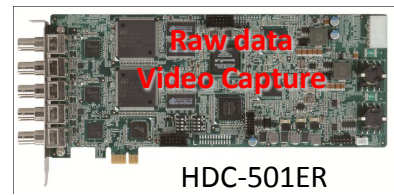
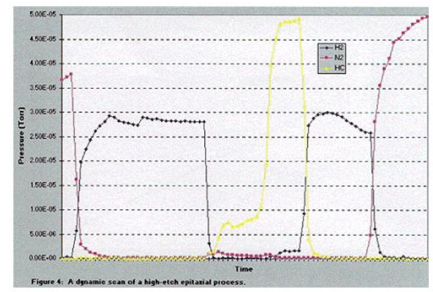
# High-Definition Raw Video Capture Card

Example: The Epitaxial System.

The high quality and more thin wafer improvement \$

SDI camera  
Low latency  
HD video

Real time feedback and adjust the process parameters



Process analytic for silicon growth

## Long Distance High-Definition Compression Solution

Nowadays, more and more equipment is equipped with SDI output for the television studios and other broadcasters application. SDI is a high capacity interface used as a way of exporting uncompressed digital video in real time. That makes ideal for live feed productions (such as a live TV show), as well as for editing and monitoring video at the highest possible quality. Since SDI is designed primarily for professional use, it is also compatible with a variety of video devices found in broadcast studios, including monitors, tape decks and switchers. SDI exports uncompressed SD and HD video over a single cable. While the data rate of HDV1080i footage recorded to tape, after undergoing compression, is 25mbps, the data rate for direct SD-SDI video output reaches 270Mbps. The standard data rate for HD-SDI is an astonishing 1.485Gbps.



HD-SDI Monitor



HD-SDI Camera

TV Live Show



# Long Distance High-Definition Compression Solution

## ▶ Long Distance and High Quality Capture Card

SDI (Serial Digital Interface) is a family of video interfaces used for broadcast-grade video. A related standard known as high-definition serial digital interface (HD-SDI) provides a nominal data rate of 1.485 Gbit/s. IEI SDI products HDC 502E is design with 2 channels SDI input, 2 channels SDI loop through and 1 channel SDI output for high quality and long distance signal transmission through a 100 m (HD-SDI)/ 300 m (SD-SDI) coaxial cable without compression with no data loss for professional studio, broadcast and transportation video applications.

### SDI in Studio Editing Field



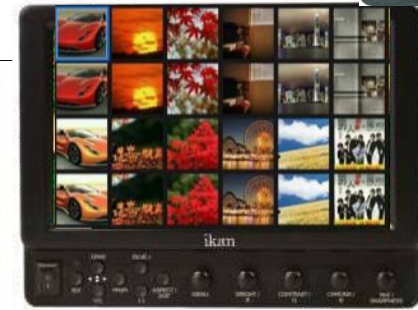
100 m or 300 m coaxial cable connection

Name	Bitrates	Video Formats
SD-SDI (300 meters)	270 Mbit/s, 360 Mbit/s, 143 Mbit/s, 177 Mbit/s	480i, 576i
HD-SDI (100 meters)	1.5 Gbit/s, 1.5/1 Gbit/s	720p, 1080i

How high is 300m?



SDI-In  
SDI-Loop  
SDI-In  
SDI-Loop  
SDI-Out



playback

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# Long Distance High-Definition Compression Solution

High-definition video recording has become a trend in industrial surveillance. The HD-CCTV camera with SDI interface is capable of longer distance transmission than analog and IP cameras. The most important benefit of the SDI interface is that it can transmit high-definition 1080p video directly through the coaxial cable without a network cable replacement. In other words, users can enjoy 1080p HD video using the existing analog system without any upgrades or additional equipment.

SDI in high quality surveillance field

HD-CCTV1 camera V.S. IP camera



Full HD  
1920x1080

HD  
cctv

Full HD  
1920x1080



HD-CCTV1

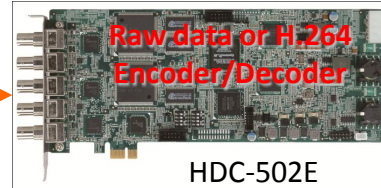
BNC

Traditional  
Coax Cable



HD-SDI

100 meters



1920x1080  
1280x720



Full HD  
1920x1080



HD-CCTV2

BNC

Using SDI for security allows transmission of 720P and 1080P resolution over coaxial cable.



Full HD  
1920x1080

**High-Definition DVR by  
HDCCTV without IP setup.  
Real-Time video without  
latency in raw data mode.**

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# Long Distance High-Definition Compression Solution

▶ **Long Distance and High Quality BOX**

The HD-SDI-BOX kit, combining the HD-SDI-BOX-M (Master) and the HD-SDI-BOX-S (Slave), provides a high-definition serial digital interface (SDI) for long distance signal transmission. With the HD-SDI-BOX kit, the HDMI or VGA video signal can be transmitted directly through a 100 m coaxial cable without compression. The HD-SDI-BOX kit also supports touch-screen remote control. The touch-screen remote control is linked through the RJ-45 Cat5 cable and RS-232 cable.

HD / SD media source input



Video In  
HDMI/VGA

HD-SDI-BOX kit



Master

Slave



300 m/100 m

Slave



300 m/100 m



HD display



300 m/100 m

Slave

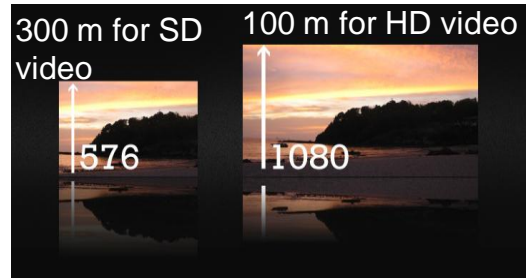


300 m/100 m

Slave

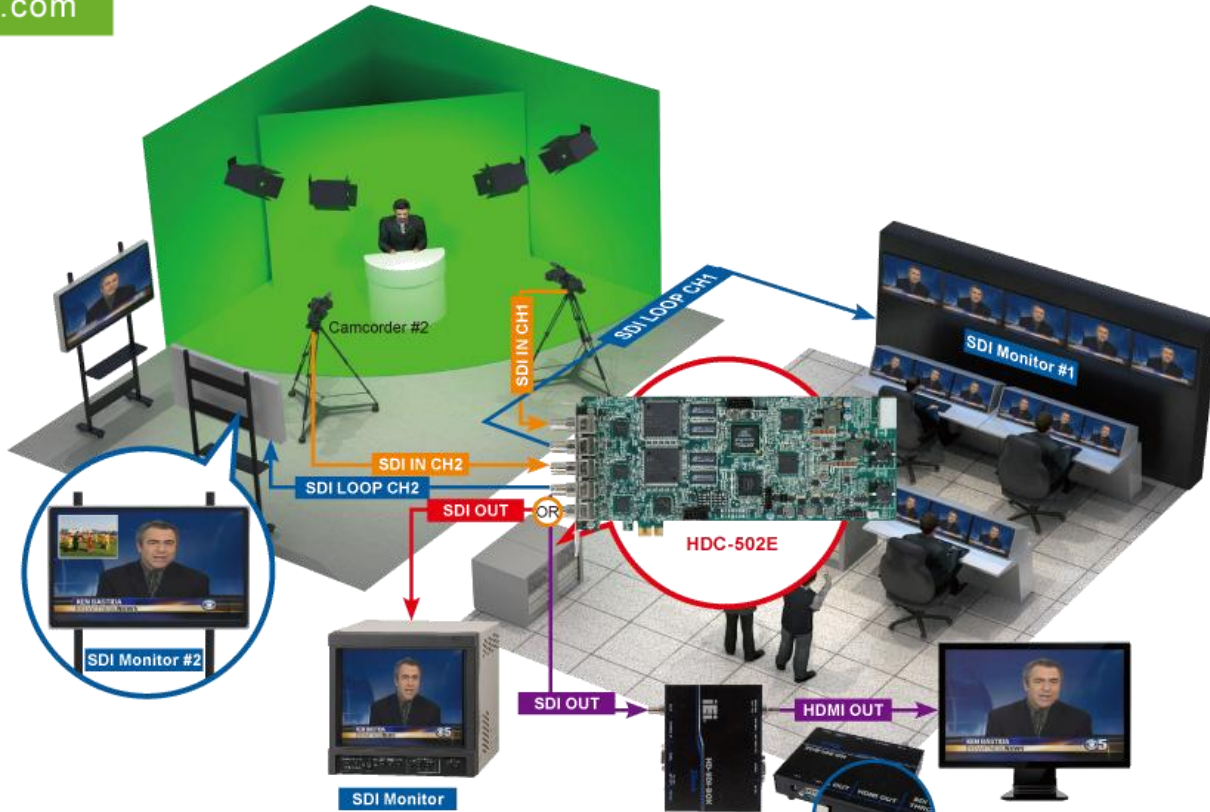


HD broadcast camera



# Long Distance High-Definition Compression Solution

Combining HDC capture and HD-SDI box for marketing application



**HD-SDI-BOX -S**

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# Long Distance High-Definition Compression Solution

## Marketing Application

Using one HD-SDI-BOX Master and two HD-SDI-BOX Slave systems to connect to PC and display device for up to 200 m long distance signal transmission. The user can extend the connection distance by adding more HD-SDI-BOX Slave systems. Adding one HD-SDI-BOX Slave system can extend 100 m ~ 300 m for HD or SD video quality.

## Applications

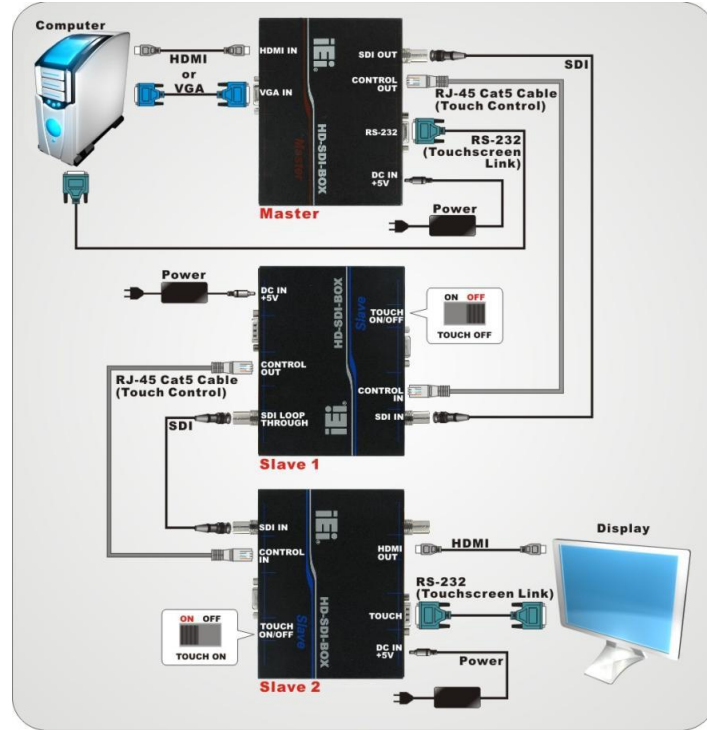
### Shopping mall digital signage



### Airport information



### Restaurant video



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# SD Video Capture Solutions

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# Market Coverage

## Intelligent Transportation Systems (ITS)

- Providing timely information on highway traffic conditions is a major function of intelligent transportation systems (ITS), and video surveillance

systems are critical tools for ITS to monitor and control any emergency evacuation event.

- The toll road payment stations process large numbers of micro transactions. The surveillance system minimizes fraud by recording all transactions including those carried out by potential gatecrashers.

## Automotive Video Surveillance

Automotive video surveillance is now widely used to monitor vehicle interiors on public transportation systems to ensure the safety of the onboard passengers. Automotive video surveillance systems can record the interior of train, cars and buses and can also be adopted in police vehicles to monitor patrol activity.

## Banking Security System

In a bank, the surveillance system easily monitors a teller line and automated teller machine transactions. Bank surveillance systems can also record robberies, unauthorized withdrawals, and other disputed transactions.

## Building, Airport, Road Surveillance system

Video surveillance has emerged as a vital technology in the war against terror. Video surveillance enables the easy identification of culprits behind terrorist bombings. As a result, since 911, governments around the world have started to leverage high-performance surveillance equipment in their efforts to protect their country and people from terrorist attacks.

## Industrial Automation

Latest Supervisory Control And Data Acquisition (SCADA) systems adopt video capturing technologies to collect factory data and thereby provide operators and supervisors access to real-time data and video feeds enabling them to make increasingly accurate assessments faster.



# Standard Definition Compression Capture Card

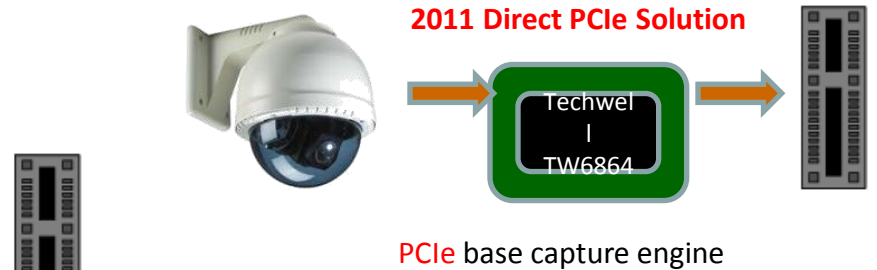
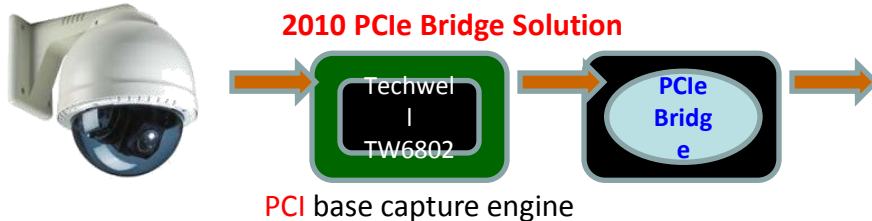
## Introduction

The world has seen increasing demand for security applications, and the video surveillance system has been a popular security tool for years. Security cameras are an everyday occurrence, and chances are, you're used to watching yourself walk into a store on a security monitor. Banks and retail stores have come to depend on the protection provided by video surveillance. Digital technology have made video surveillance more flexible and easy to use than ever, and allow you to create the security system that conforms exactly to your needs.

2011 New Solution	Capture Chip	4 Channels	8 Channels
PCI Slot	Techwell TW6816	IVC-T604	IVC-T608
	Techwell TW6864	IVCE-T604	IVCE-T608
	Conexant CX25850	IVCE-C604	
PCIe Slot	Conexant CX25853		IVCE-C608
2010 Solution	Capture Chip	4 Channels	
	Techwell TW6802/6805	IVC-168G	
		IVC-268G	
PCI Slot	Conexant BT878A	IVC-100G	
		IVC-200G	
	Multiplexer AT2041	IVC-8371P	
PCIe Slot	Techwell TW6802/6805	IVCE-268G	
	Conexant BT878A	IVCE-8784	
PCI-104	Conexant BT878A	PM-1056	
	Multiplexer AT2041	PM-1059	

## 2011 New feature

1. Single card with 8 channels capture up to 128 channels.
2. Direct PCIe bus with better bandwidth flow.
3. Better power consumption.
4. Real time video/audio output for real time monitoring.
5. MP3 quality audio capture



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# Multiple Card with Digit LED Card ID Support

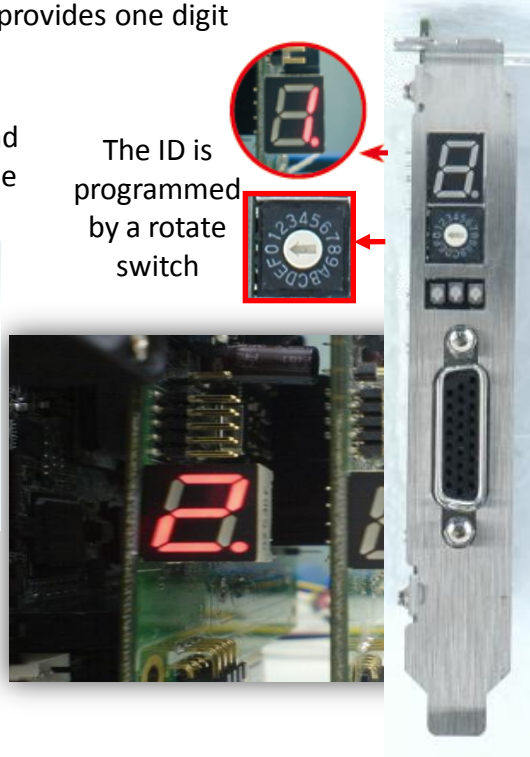
## One Digit LED for Card Identification (ID)

Because the IEI IVC series support multiple IVC cards, users need to know which card is related to which device name in the Device Manager of Windows 7. Each IVC card provides one digit

LED to show its ID (identification), and the ID is programmed by a rotate switch. The IEI IVC SDK also provides an application programming interface (API) to get device name and the demo application software shows how to display device names on screen. The advantages are for ease of maintenance and debugging. When a display channel malfunctions, the users can quickly find out which IVC card should be checked for error via the device name and LED ID.

### Multiple Card Support

The IEI IVC series are designed to support multiple IVC cards in a system, its driver can recognize and support multiple IVC cards plugged into a system. The limitation of how many IVC cards can be plugged into a system is dependent on system resources such as CPU performance, interface bandwidth, and number of available IRQs.



### Multiple Capture Cards



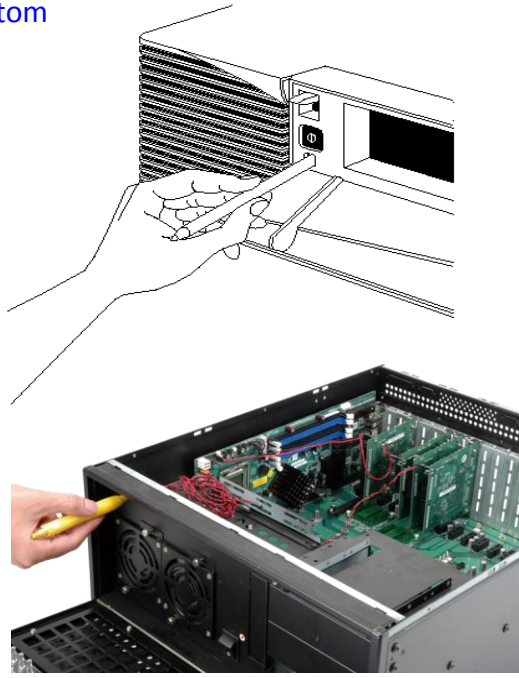
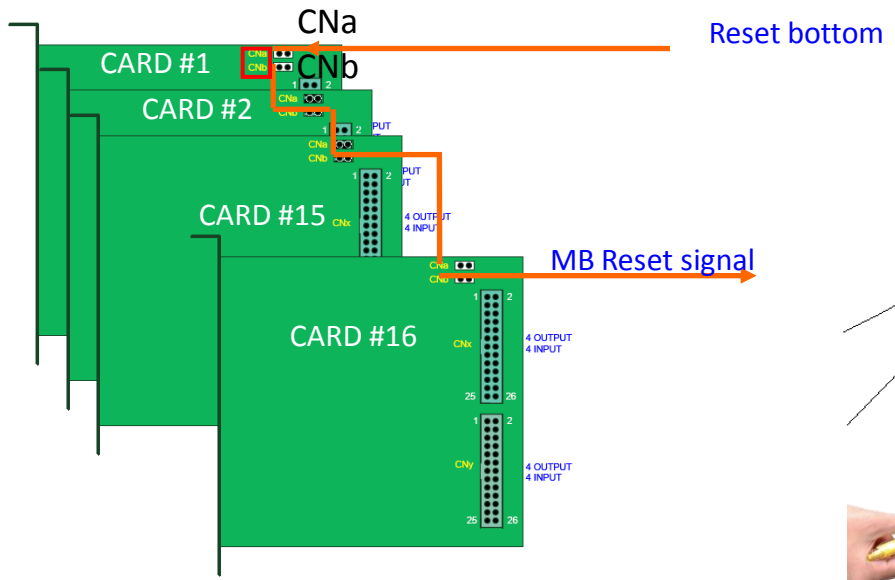
<b>Card Number</b>	Card 1	Card 2	Card 3	Card 4	Card 5	Card 6	Card 7	Card 8
<b>Card ID</b>	0	1	2	3	4	5	6	7
<b>Card Number</b>	Card 9	Card 10	Card 11	Card 12	Card 13	Card 14	Card 15	Card 16
<b>Card ID</b>	8	9	A	B	C	D	E	F



# Multiple Card Cascade Reset

## One Bottom Cascade Reset

IEI's latest software compressive capture (IVC series) provides a multiple card reset cascade function. In the event of system failure, the system can be restored through an external hardware reset button



IVC series Connector pin define

CARD Type	CNa	CNb
IVCE-C604	CN4	CN5
IVCE-C608	CN4	CN5
IVCE-T604	CN2	CN3
IVCE-T608	CN4	CN5
IVC-T604	CN2	CN3
IVC-T608	CN3	CN4



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# Multiple Zones Real Time Monitoring

## Central control room

System monitor and control with video/audio capture



## Local security site

Real time monitoring with video and audio



Source



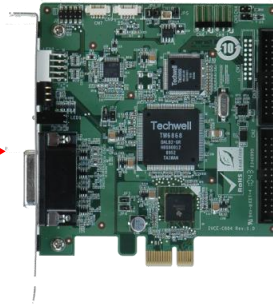
Video in

Audio in

Audio out  
Video out

4/8 channels  
video audio  
capture

Capture



Complete 4 or 8  
channels function  
control

2 channels  
video  
+  
1 channel  
audio  
Real-time  
information

IEI video capture card is capable of video and audio output for second location real time monitoring. Using this function, local on site monitoring can focus on capturing video and audio with no need to operate system control. Local channel switch can be assigned by the system administrator or switch by GPIO module.

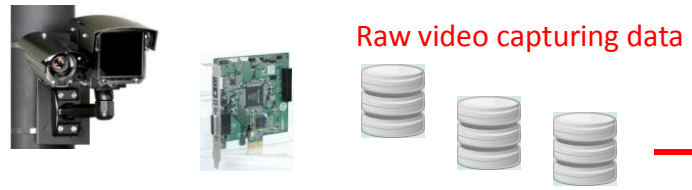
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# Standard Definition Compression Capture Card

## Benefits

The software compression card is used to transfer analog NTSC/PAL signal to digital raw data signal. Uncompressed raw data that can provides better video quality without distortion. It is useful for real-time video surveillance applications.

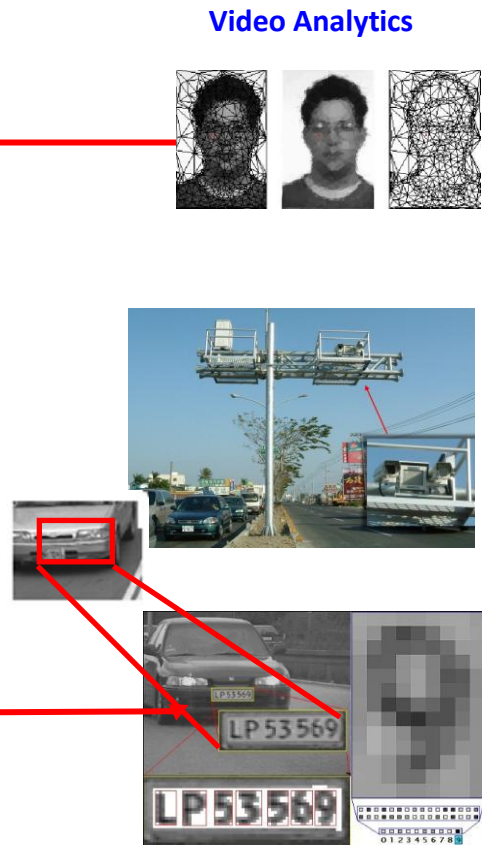
The software compression process is first transferring data into PC through PCI or PCIe interface then the CPU compresses the video and stores it in the HDD. Since compression and de-compression are handled by the CPU, the software compression card needs a more powerful hardware system.



Um-compressed raw data w/o distortion



Data decoding from CPU w/ distortion

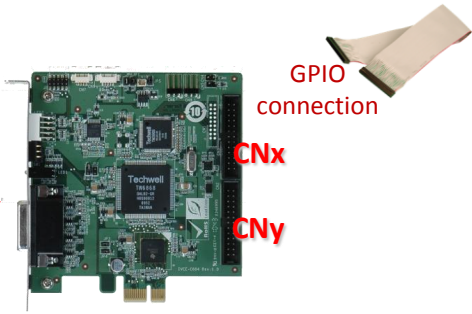
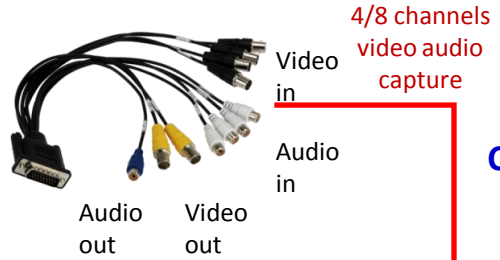
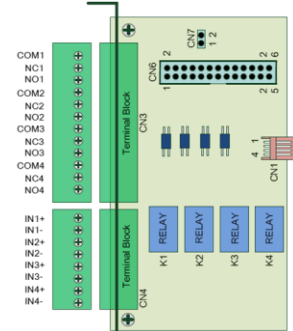
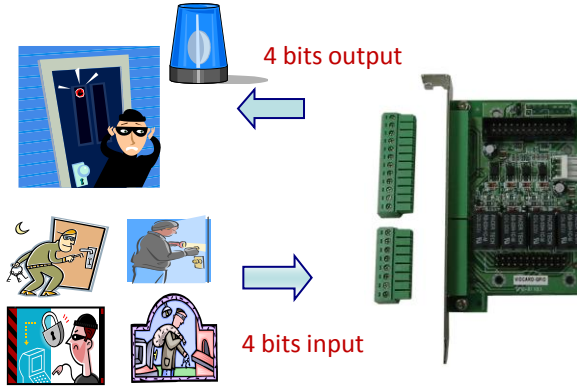




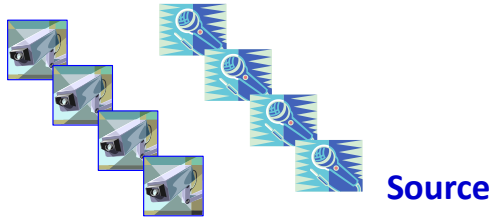
# GPIO Alarm

## 4-Bits GPIO port support

The IEI VIOCARD-GPIO is an optional card providing a 4-bits alarm input and 4-bits alarm output function with normal open relay. The card is compatible with IVC software compressive capture for connecting to external I/O detective devices

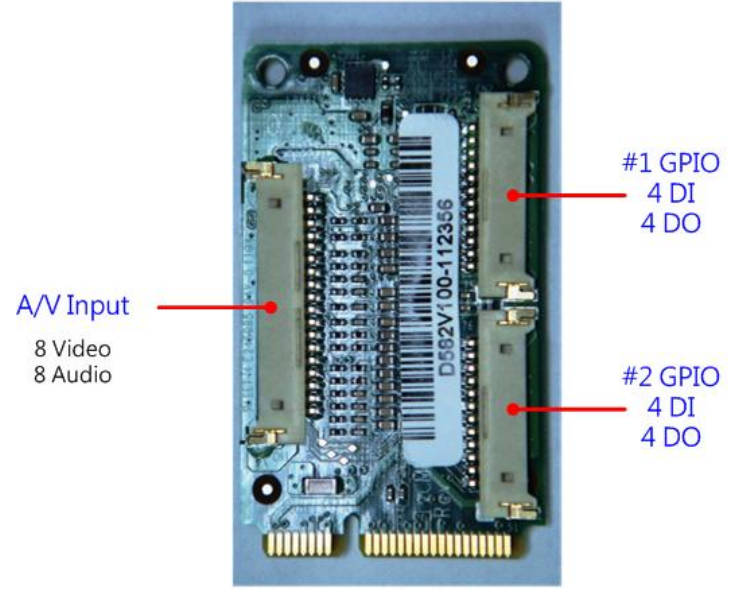


CARD Type	CNx	CNy
IVCE-C604	CN3	
IVCE-C608	CN3	CN2
IVCE-T604	CN1	
IVCE-T608	CN3	CN2
IVC-T604	CN1	
IVC-T608	CN1	CN2



# Mini PCIe Software Compress Card with Conexant Solution (8 D1)

IVCME-C608-R10



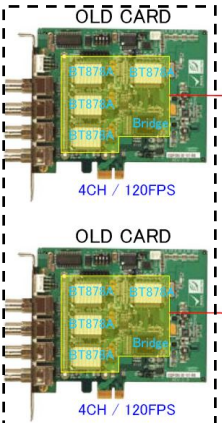
Top



Bottom

# Benefits of new generation capture cards

7.8W  
Conexant



Conexant 8 CHANNELS



5.3W

DirectShow: easy to develop the SW

old chip

7.8W

new chip

New Cards:

Much less the space requirement

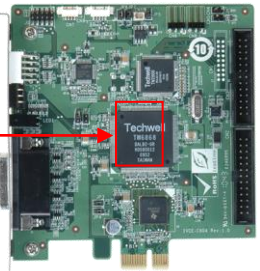
Much lower power consumption

Techwell

12W



Techwell 8 CHANNELS



2.97W

DirectDraw: lower CPU utilization

12W



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# Standard Definition Compression Capture Card

## ● How to choose Conexant and Techwell Solution

	TECHWELL	TECHWELL	CONEXANT	TECHWELL	CONEXANT	TECHWELL
	TW6816	TW6816	CX25850	TW6864	CX25853	TW6868
IEI Solutions	IVC-T604	IVC-T608	IVCE-C604	IVCE-T604	IVCE-C608	IVCE-T608
Bus	PCI		PCIe			
Video input	4 Channels	8 Channels	4 Channels	4 Channels	8 Channels	8 Channels
Frame rate	120/100 IPS	240/200 IPS	120/100 IPS	120/100 IPS	240/200 IPS	240/200 IPS
Video input format	NTSC/PAL/SECAM	NTSC/PAL/SECAM	NTSC/PAL	NTSC/PAL/SECAM	NTSC/PAL	NTSC/PAL/SECAM
	EIA/CCIR	EIA/CCIR	EIA/CCIR	EIA/CCIR	EIA/CCIR	EIA/CCIR
Video Format Auto Detection	YES	YES	NO	YES	NO	YES
Video output	NO	NO	2 CH	NO	2 CH	2 CH
Audio output	NO	NO	YES	NO	YES	YES
Audio Sampling rate	8/16/32/44.1/48KHz	8/16/32/44.1/48KHz	8~96KHz	8/16/32/44.1/48KHz	8~96KHz	8/16/32/44.1/48KHz
Static Power consumption (Hardware)	1.1W	2.2W	4.4W	3.3W	7.7W	4.4W
Dynamic Power consumption	8.8W	15.4W	14.3W	7.7W	24.2W	13.2W
CPU usage (Preview only)	3%	6%	7%	3%	13%	3%
Driver for Windows 32/64	Directdraw	Directdraw	Directshow	Directdraw	Directshow	Directdraw
Driver for LINUX 32/64	V4L2	V4L2	V4L2	V4L2	V4L2	V4L2

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# Video Capture Software

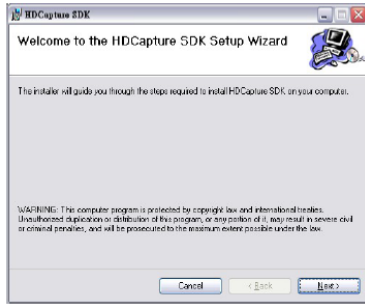
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## IEI SDK Software support

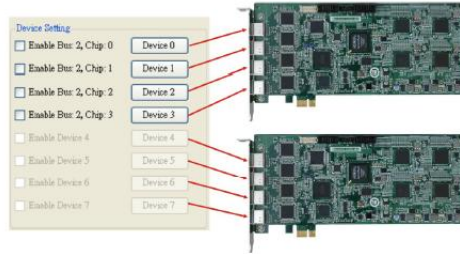
IEI provides complete software solutions such as device drivers and software development kit (SDK), the flexible open architecture allows easy integration of cameras, video signal processing, storage, and video management/security.

### HDC series demo AP

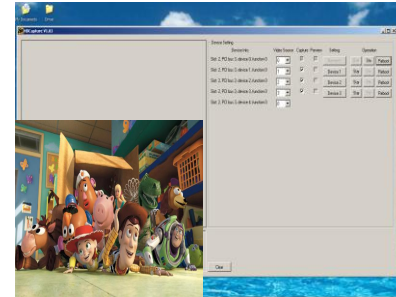
#### SDK Install



Support up to eight channels input

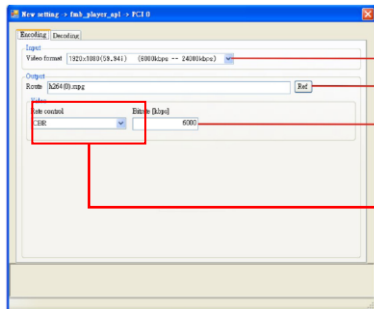


Video capture and preview video

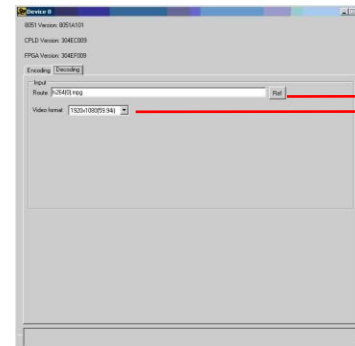


Decode setting

Encode setting



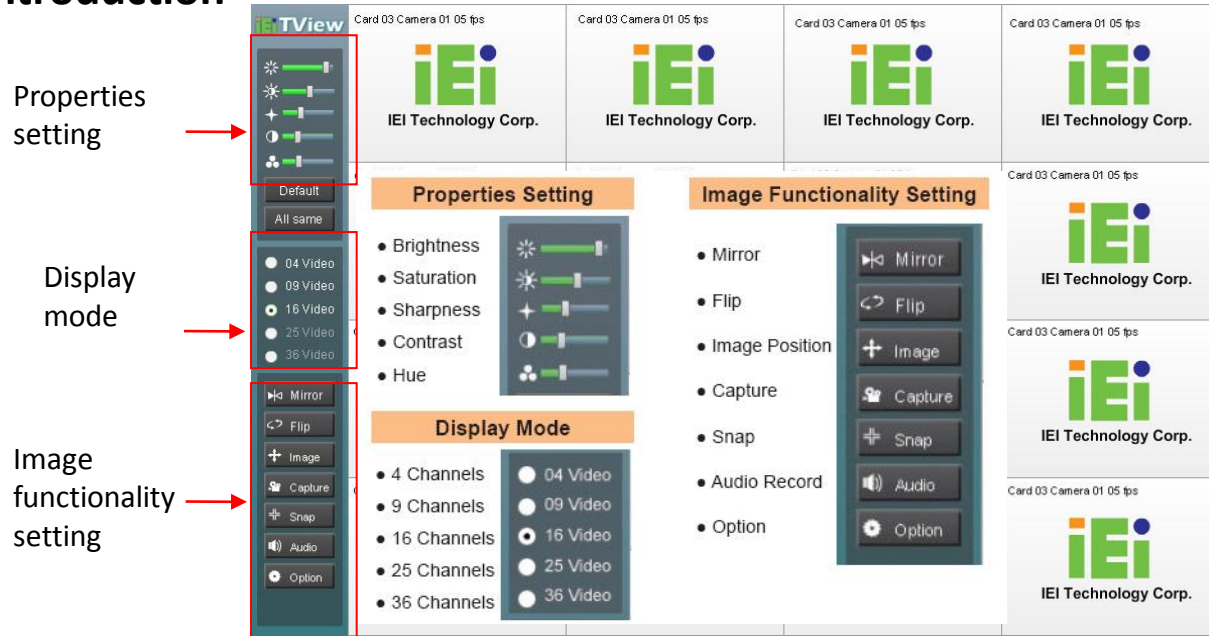
- Video input format
- Output file saving location
- Video output bitrate
- Rate control CBR/VBR/CVBR



- Input file name / path
- Video input format

- IEI provides two demonstration application programs for different solution, Cview AP is for Conexant solution and Tview AP is for Techwell solution, the program demonstrates the following functions:
- Video and audio capture. Video and audio data recording to AVI file. Testing of device I2C and GPIO ports. Channel parameters configuration

### TView Demo AP introduction



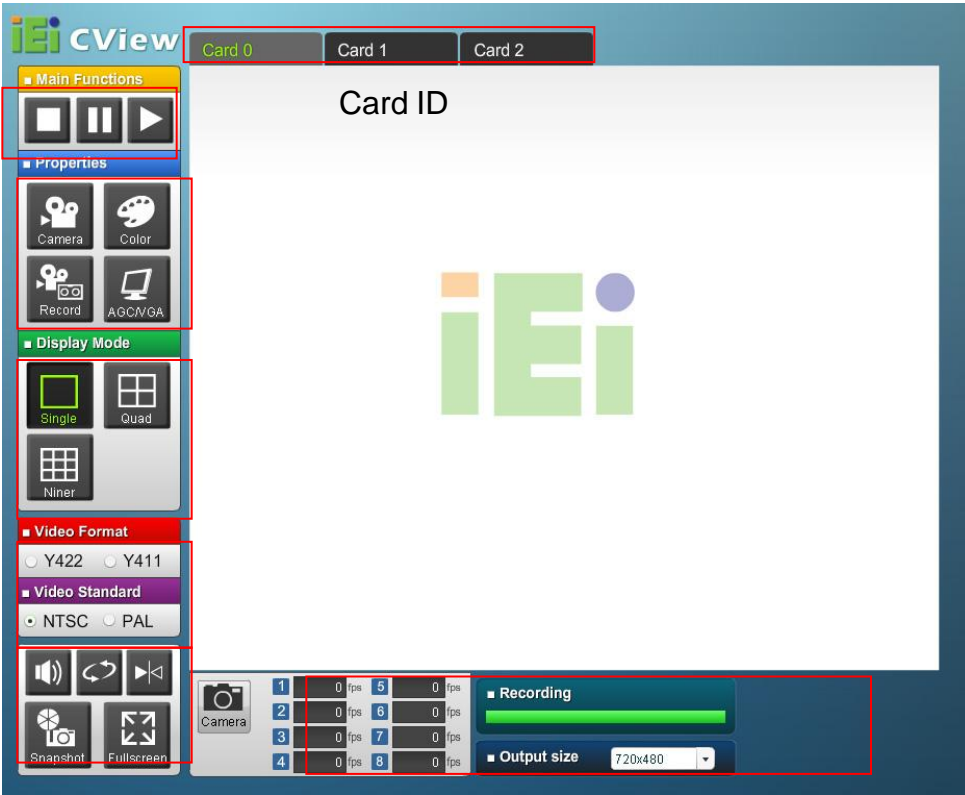
The screenshot displays the TView software interface. On the left, a vertical sidebar contains several settings panels, each highlighted with a red box and a red arrow pointing to it from a text label:

- Properties setting:** Points to the top panel with sliders for brightness, saturation, sharpness, contrast, and hue.
- Display mode:** Points to the middle panel with radio buttons for 04 Video, 09 Video, 16 Video, 25 Video, and 36 Video.
- Image functionality setting:** Points to the bottom panel with buttons for Mirror, Flip, Image, Capture, Snap, Audio, and Option.

The main area of the interface shows four camera feeds, each displaying the IEI logo and the text "Card 03 Camera 01 05 fps". Below the feeds, there are three main settings sections:

- Properties Setting:** Contains sliders for Brightness, Saturation, Sharpness, Contrast, and Hue.
- Image Functionality Setting:** Contains buttons for Mirror, Flip, Image Position, Capture, Snap, Audio Record, and Option.
- Display Mode:** Contains radio buttons for 4 Channels, 9 Channels, 16 Channels, 25 Channels, and 36 Channels, along with video resolution options (04 Video, 09 Video, 16 Video, 25 Video, 36 Video).

# CView Demo AP introduction



Recording setting →

Properties setting →

Display mode →

Video information →

Image functionality setting →

Camera	1	2	3	4
	0	0	0	0
	5	6	7	8
	0	0	0	0
	0	0	0	0
	0	0	0	0

Recording




Output size: 720x480

Other functionality setting







It is the function introduction for each bottom




### Main Functions

-  Stop
-  Pause
-  Start

### Properties

-  Camera setup
-  Record setup
-  Color control
-  AGC/VA setup

### Display Mode

-  Single channel
-  Four channels
-  Nine channels







### Video format

Y422  Y411

### Video Standard

NTSC  PAL

### Other functionality setting

-  Audio recording
-  Flip
-  Mirror
-  Snapshot
-  Full screen
-  Camera information  
1  fps
- Video output resolution setting  
Output size 720x480



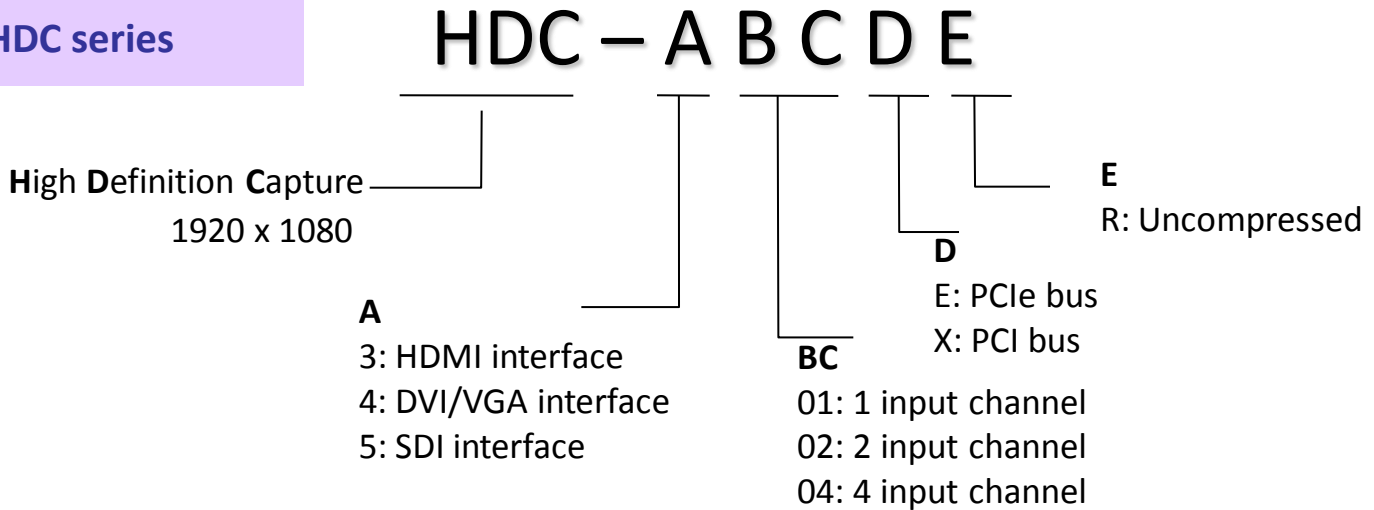
[www.ieiworld.com](http://www.ieiworld.com)

# Product Roadmap

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# High Definition Capture Card Naming Rule

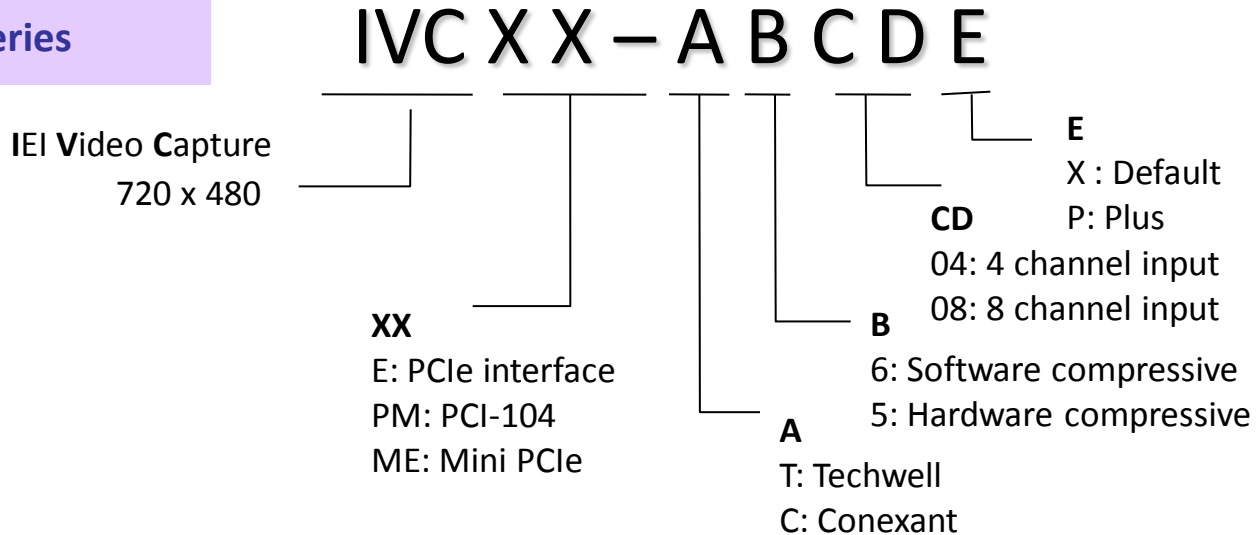
HDC series



# Standard Definition Capture Card Naming Rule

## Standard Definition Compressive Naming Rule

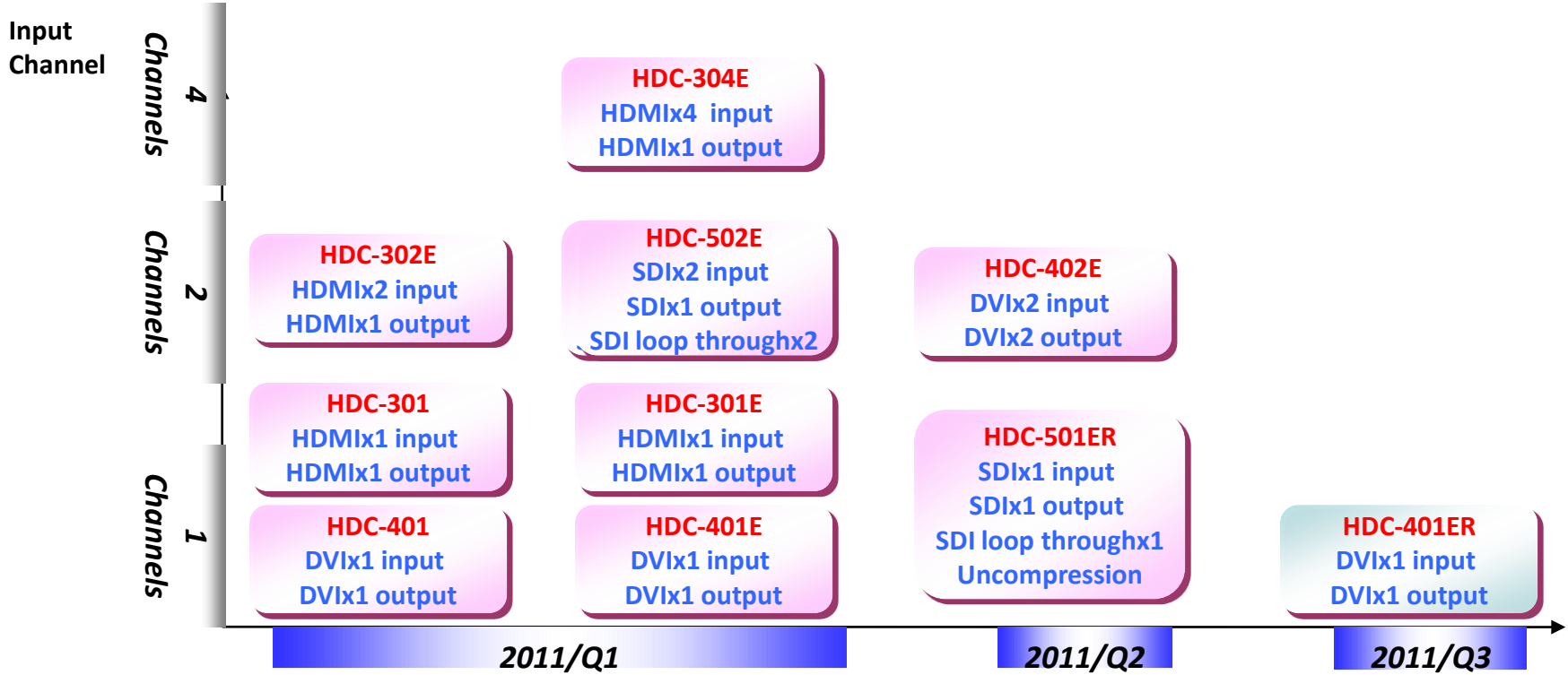
IVC series



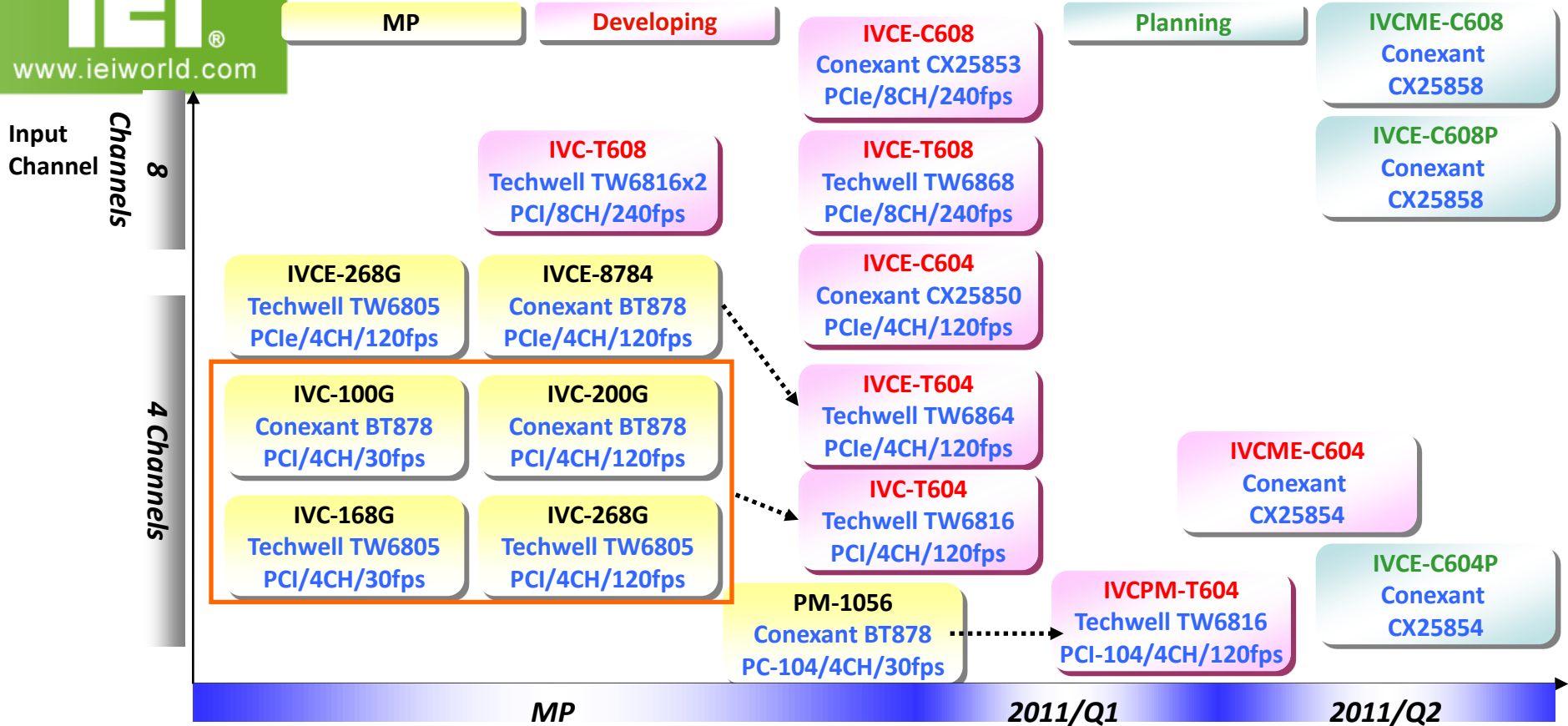
# High Definition Hardware Compressive Capture Card

**Developing**

**Planning**



# Software Compressive Capture Card





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# Standard Definition Hardware Compressive Capture Card

Input Channel

Channels

8

4 Channels

MP

Developing

Planning

IVCE-T508

Techwell

TW5864x2 + bridge

IVC-8371P

PentaMicro

AT2041 x1

IVC-T504

Techwell

TW5864x1

IVCME-T504

Techwell

TW5864 + bridge

IVCE-T504

Techwell

TW5864 + bridge

PM-1059

PentaMicro

AT2041 x1

IVCPM-T504

Techwell

TW5864x1

MP

2011/Q2

2011/Q3

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***Thanks for your attention!***

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