

iP Series of Intelligent Projectors

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Abstract

The iP Series of intelligent projectors (hereinafter abbreviated as “iP series projector”) is a unique projector released by Nippon Avionics Co., Ltd. incorporating a high-resolution document camera function and iP Viewer presentation software (hereinafter abbreviated as “iP Viewer”). The document camera function allows the projectors to project the images of paper documents and samples as they are viewed.

The iP Viewer is designed for use in capturing and processing of projected data. This paper introduces these projects by focusing on their biggest features, which are the document camera function and the iP Viewer function.

Keywords

projector, document camera function, presentation software

1. Introduction

When talking about the operating environment of projectors, people may usually think about a scene in which a PC or video device is connected to project its image onto a screen. In addition to this function, the iP Series projectors incorporate a document camera to achieve an OHP function. Even when PC or video data cannot be prepared in advance, an iP Series projector makes it possible to hold a presentation or meeting using only a projector and projection materials such as paper sheets, without using a PC.

In addition, we also released the iP Viewer as an effective presentation tool in the market. The iP Viewer is launched automatically when a PC is connected to the iP Series projector through USB, making it possible to transfer the data temporarily saved in the projector into the PC and process the data for archiving of meeting data or for preparation of presentation materials in advance (Fig. 1).

2. Outline of iP Series Projectors

The iP Series projectors adopt the LCD system and are available in three models according to the brightness. **Photo** below shows the external view of the iP-55E model.

Each model incorporates the document camera function and iP Viewer, which are the biggest features of our projectors, as well as the projector’s basic function that is the projection of PC and video data (Table).

2.1 Document Camera Function

The document camera incorporated in the iP Series projectors consists of an ultrawide-angle camera and lighting system. When a material is placed upside down on the glass table, it is illuminated by uniform internal lighting so its image can be captured without being affected by external light. Unlike ordinary document cameras, there is no need to adjust the camera focus/iris or illumination of the subject.

(1) Image Capturing Lens

An ultrawide image-capturing lens is used so that an A4 image can be captured without distortion using a projector with a height of only 125mm (smallest model iP-25E).

(2) Image Capturing Camera

Five functions in a single body

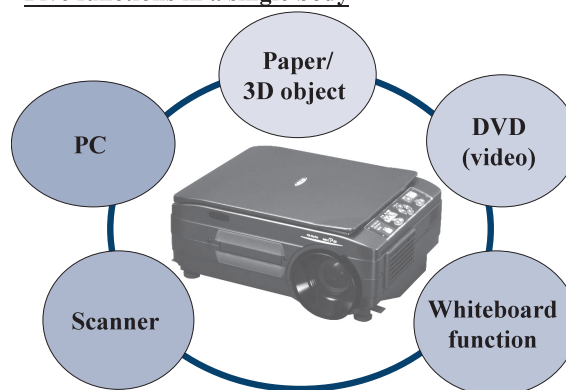


Fig. 1 Versatile functions of iP Viewer.

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Photo External view of iP-55E.

Table Lineup of iP Series projectors.

Model	iP-25E	iP-55E	iP-750E
System	Liquid crystal display		
LCD panel size	0.7-inch	1.0-inch	1.3-inch
Brightness	2000 lm	3000 lm	4500 lm
Weight	Approx. 5.6kg	Approx. 7.3kg	Approx. 8.5kg
Object projection	Available		
Image pickup device	2.11-million pixel color CCD	2.11-million pixel color CCD	2.11-million pixel color CCD
Zooming	Approx. 6.25X	Approx. 6.25X	Approx. 6.25X
Image memory	Max. 32 images		
PC resolution	SXGA	UXGA	
PC inputs	1 set	2 sets	
RGB outputs	None	1 set	
Audio outputs	1 W monaural	1 W + 1 W stereo	2 W + 2 W stereo
Scanner	Available		
Whiteboard	Available		
Keystone correction	Vertical $\pm 15^\circ$	Horizontal $\pm 10^\circ$, Vertical $\pm 15^\circ$	
iP Viewer	Ver. 1.1		

The camera uses a 2.11-million pixel color CCD that captures about 2 million effective pixels.

As a result, data material such as word-processed documents or graphs, printed materials including books, newspapers or magazines and handwritten memos or reports as well as 3D objects such as product samples or models can be projected in vivid color on the screen by simply placing it on the glass surface just like when using a photocopier.

(3) Luminance Distribution Correction System

The lighting of the glass surface is ensured by installing two fluorescent lamps below the glass surface and additionally installing a reflector each below the fluorescent lamps to utilize their light more effectively and secure the uniformity of luminance distribution.

Since these optical means may still leave a slight deviation in the luminance distribution, shading correction is applied as an electric means to increase the uniformity of the luminance distribution.

(4) Data Processing Functions

The captured image data is subjected to contour correction for improved clearness of the image.

Functions for improving the ease of use are provided as well, including the digital zooming with maximum magnification area of 6.25 times, image scrolling and image freezing.

An image orientation conversion function is also incorporated to enable projection of either the whole or partially magnified material without having to move an oblong A4-sized paper sheet material.

These functions will make dynamic presentations possible by projecting even very small letters clearly.

(5) Data Save Function

Up to 32 projected images can be saved in the projector with a simple operation.

This means that a material used immediately before can be re-projected by simply selecting it from a list, without the need of it being re-placed on the glass table.

This function can also be used to hold a meeting or presentation without using a PC.

Considering the shared use of the projector by an unspecified number of users, the data saved in the projector is cleared automatically when the projector is switched off.

2.2 iP Viewer

The iP Viewer is application software that runs on Windows. The software is stored in the USB memory built into the iP Series projectors.

The USB memory is composed virtually of the CD-ROM area and removable disk area. The auto-run function of the CD-ROM area activates a program automatically to launch the iP Viewer (Fig. 2).

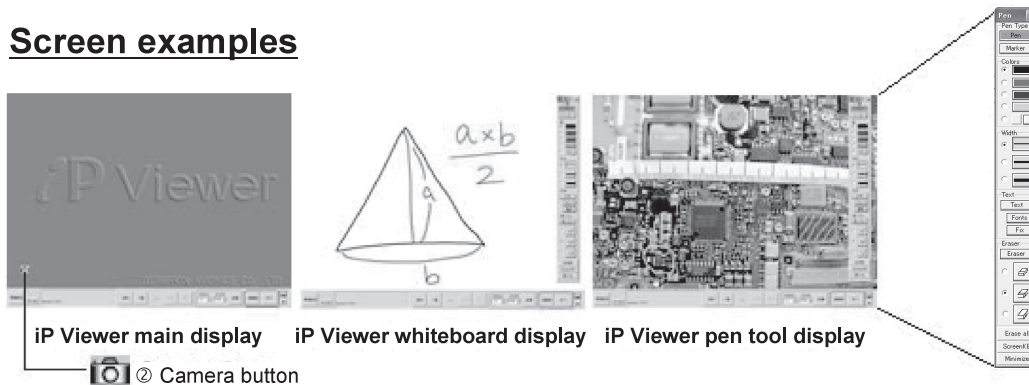
(1) Installation and Launching

Only when a PC is connected to the projector for the first time, the driver that lets the PC recognize the iP Series projector as a large-capacity removable disk is installed automatically in the PC. However, the iP Viewer itself is not installed in the PC and is launched automatically every time a PC is connected through a USB cable.

As the iP Viewer does not need to be installed in the PC, the software license management per PC is not necessary and the iP Viewer can be used easily with any PC.

When upgrading of the software version is required, it can be

Screen examples



iP Viewer main display iP Viewer whiteboard display iP Viewer pen tool display

Camera button

Menu bar

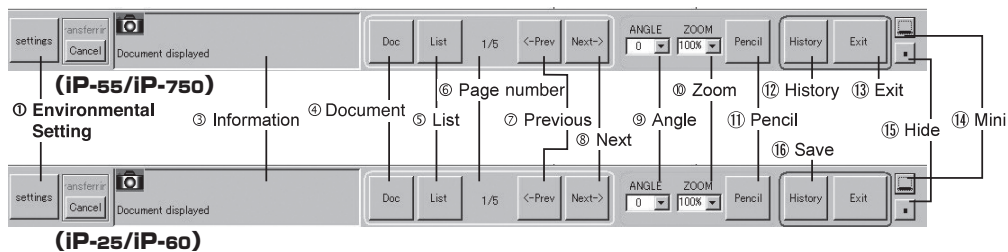


Fig. 2 iP Viewer screen.

performed by replacing the application software in the projector without the version upgrading management of the PC.

(2) Scanning

The iP Viewer recognizes the projector as a USB mass-storage device so that the data temporarily saved in the projector can be transferred to and saved as jpeg format data in the PC.

After transfer to the PC, the data remaining in the projector is cleared automatically.

(3) Transfer of Materials Created on PC

The iP Viewer allows the jpeg, png and wmf data created on a PC to be transferred in jpeg format to the projector.

Also, every page of a PowerPoint file can be converted automatically into a single item of jpeg data and transferred to the projector.

In addition, the desktop capturing function also makes it possible to convert the display of application software other than PowerPoint into jpeg data and transferred to the projector.

(4) Editing of Captured Materials

The captured data materials are displayed in a list, from which the user can sort or delete them and save them in their edited state.

(5) Rotation, Zooming and Scrolling of Materials

The captured materials can be displayed with rotation, zooming or scrolling. The data can be saved in the rotated, zoomed or scrolled state, making these functions effective tools for supporting the user in preparation of presentation materials in advance as well as during presentation.

(6) Whiteboard

A whiteboard can be inserted as a material. The information written on the inserted whiteboard can be used in arranging the items to be recorded in the minutes, etc.

(7) Writing

Using the pen tool, information can be written onto the captured data in opaque style or translucent style like a highlight marker.

The information written using the pen tool is managed on another plane until it is saved, so the written information can be erased using the eraser function.

(8) Keyboard Input

When the tablet environment is not available, information can also be written using the keyboard. The keyboard input information is also managed on another plane until it is saved, so that it can be erased using the Eraser function.

(9) Thumbnail Display

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Jumping across the captured materials is possible by specifying the destination page. The jump destination page can also be specified from the thumbnail display.

(10) Data Save

The data processed on the iP Viewer can be saved in jpeg format for later use in minutes or presentation data.

Fig. 3 shows the image of operation of an iP Series projector and the iP Viewer.

3. Application Examples

3.1 Schools

The scanner function makes it possible to capture the artwork of students, notes or teaching materials and transfer them into a PC for handling as digital content. The transferred materials can be corrected or otherwise processed for use in teaching.

In addition, the whiteboard function can be used to arrange the presentations or opinions expressed by the students during the class.

3.2 Training Facilities

In training facilities where a large number of data and reference materials are brought in from outside, they can be projected by simply placing them on the glass surface without using a PC.

In addition, the iP Viewer can be used to save the projected data as well as the content of lectures using the whiteboard function for later distribution among the trainees easily.

3.3 Manufacturing Industries

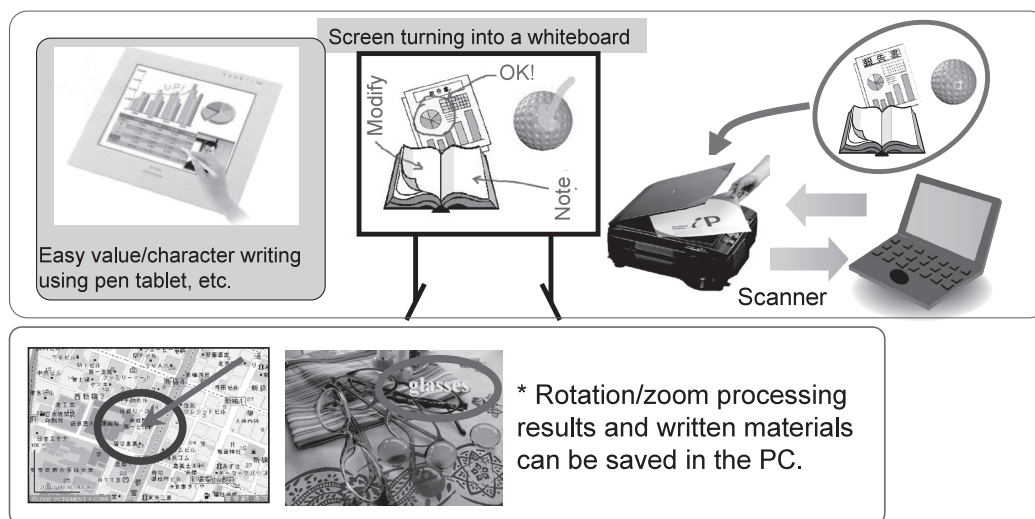
A prototyped sample or actual product experiencing problems in the field can be projected as a large image by simply placing it on the glass surface. Developing active discussions among the meeting participants while observing the actual item will increase the speed of decision-making.

In addition, the iP Viewer can be used to transfer the images to the PC and the results of discussions can be saved or shared using the whiteboard function.

4. Conclusion

This paper introduced the unique features, which are not found among the competitors' projectors, of the iP Series projectors that are the core of our presentation solutions. After being able to release our new model incorporating a document camera with about 3 million effective pixels in January 2006, we are determined to continue providing easy-to-use projectors for the users.

* The corporate names and product names above are trademarks or registered trademarks of their respective owners.



• An iP Series projector and PC can be connected through a USB cable and the iP Viewer can be run to save the lines and characters written on the screen as well as other materials as electronic data.

Fig. 3 Image of using an iP Series Projector and iP Viewer.

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