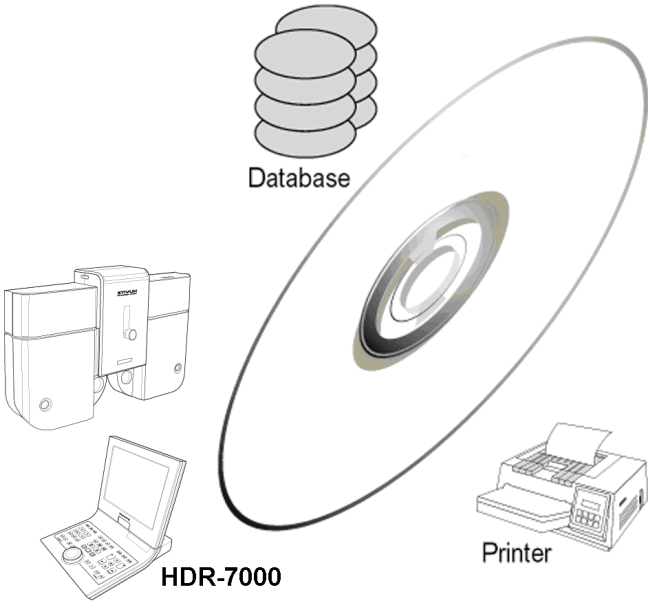
Operator's Manual

HDR Mate



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689-3, Geumjeong-dong, Gunpo-si, Gyeonggi-do,
435-862, Republic of Korea

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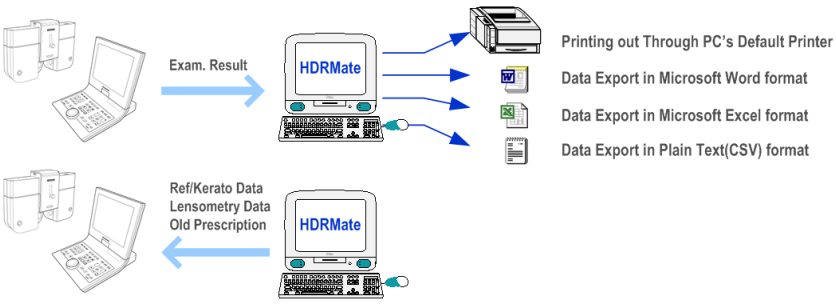
1. Getting Started

1.1. What is HDR Mate?

HDR Mate is an application program running on a PC that performs and controls data communication between Digital Refractor, HDR-7000 (or CDR-3100) and PC.

It receives examination results from Digital Refractor and, on the other hand, it transfers ref/keratometry and/or lensometry data to Digital Refractor. Additionally it supports data export for received examination results in various formats such as Microsoft Word, Microsoft Excel, and plain text. Data export in plain text format is to aid 3rd party database applications, such as Practice Management Software, that integrates patient record from Digital Refractor into its database. And instead of supporting direct interface with external printer, Digital Refractor supports indirect printing interface via HDR Mate. This eliminates the dependency of Digital Refractor on proprietary external printers and allows more advanced features supported such as data export and import, graphical representation of patient record. So it is not required for users to upgrade their Digital Refractor for printer replacement.



2. Safety Information

2.1. Introduction

Safety is everyone's responsibility. The safe use of this equipment is largely dependent upon the installer, user, operator, and maintainer. It is imperative that personnel study and become familiar with this entire manual before attempting to install, use, clean, service or adjust this equipment and any associated accessories. It is paramount that the instructions contained in this manual are fully under stood and followed to enhance safety to the patient and the user/operator. It is for this reason that the following safety notices have been placed appropriately within the text of this manual to highlight safety related information or information requiring special emphasis. All user, operators, and maintainers must be familiar with and pay particular attention to all warning and cautions incorporated herein.

⚠ WARNING

"Warning" indicates the presence of a hazard that could result in severe personal injury, death or substantial property damage if ignored.

NOTE

"Note" describes information for the installation, operation, or maintenance of which is important but hazard related if ignored.

⚠ CAUTION

"Caution" indicates the presence of a hazard that could result in minor injury, or property damaged if ignored.

2.2. Safety Symbols

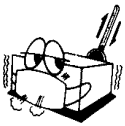
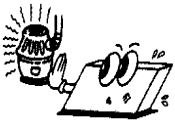
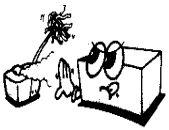
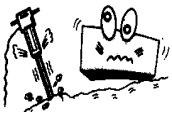
The International Electro technical Commission (IEC) has established a set of symbols for medical electronic equipment, which classify a connection or warn of any potential hazard. The classifications and symbol s are shown below.

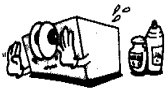
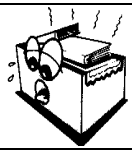
Save this instruction

	This symbol identifies a safety note. Ensure you understand the function of this control before using it. Control function is described in the appropriate User's or Service Manual.

2.3. Environment Factors

Avoid the following environments for operation or storage:

	Where the equipment is exposed to water vapor. Don't operate equipment with a wet hand.
	Where the equipment is exposed to direct sunlight.
	Where the temperature changes extremely. Normal operating temperature range is from 10℃ to 40℃, Humidity is from 30% to 75%.
	Where it is near the heat equipment.
	Where the humidity is extremely high or there is a ventilation problem.
	Where the equipment is subject to excessive shocks or vibrations.

	Where equipment is exposed to chemical material or explosive gas.
	Be careful not to be inserted dust, especially, metal.
	Don't disassemble the product or open. We aren't responsible for it for nothing.
	Be careful not to close the fan located on the lateral or rear side of the equipment.
	Don't plug the AC power cord into the outlet before the connection between devices of the equipment is completed. This can generate the defect.
	Pull out the power cord with holding the plug, not the cord.

Avoid places where the ambient temperature falls below 10℃ or exceeds 40℃ for normal operation, or below –10℃ or exceeds 40℃(14°F-104°F) for transportation and storage. Humidity should be maintained between 30 and 75% for normal operation, transportation and storage. Avoid environments where the equipment is exposed to excessive shocks or vibrations.

2.4. Safety Precaution

This equipment has been developed and tested according to safety standards as well as national and international standards. This guarantees a very high degree of safety for this device. The legislator expects us inform the user expressively about the safety aspects in dealing with the device. The correct handling of this equipment is imperative for its safe operation. Therefore, please read carefully all instructions before switching on this device. For more detailed information, please contact our Customer Service Department or one of our authorized representatives.

1. This equipment must not be used (a) in an area that is in danger of explosions and (b) in the presence of flammable, explosive, or volatile solvent such as alcohol, benzene or similar chemicals.

2. Do not put or use this device in humid rooms. Humidity should be maintained between 30 and 75% for normal operation. Do not expose the device to water splashes, dripping water, or sprayed water. Do not place containers containing fluids, liquids, or gases on top of any electrical equipment or devices.

3. The equipment must be operated only by, or under direct supervision of a properly trained and qualified person.

4. Installation and modifications of this equipment may only be carried out by Huvitz's service technicians or other authorized persons.

5. Customer maintenance of this equipment may only be performed as stated in the Operator's Manual. Any additional maintenance may only be performed by Huvitz's service technicians or other authorized persons.

6. The manufacturer is only responsible for effects on safety, reliability, and performance of this equipment when the following requirements are fulfilled: (1) The electrical installation in the respective room corresponds to the specifications stated in this manual and (2) This equipment is used, operated, and maintained according to this manual.

7. The manufacturer is not liable for damage caused by unauthorized tampering

with the device(s). Such tampering will forfeit any right to claim under warranty.

8. This equipment may only be used together with accessories supplied by Huvitz. If the customer makes use of other accessories, use them only if their safe usability under technical aspect has been proved and confirmed by Huvitz or the manufacturer of the accessory.

9. Only the person who has undergone proper training and instructions is authorized to install, use, operate, and maintain this equipment.

10. Keep the Operator's Manual in a place easily accessible at all times for persons operating and maintaining the equipment.

11. Do not force cable connections. If a cable does not connect easily, be sure that the connector (plug) is appropriate for the receptacle (socket). If you cause any damage to a cable connector(s) or receptacle(s), let the damage(s) be repaired by an authorized service technician.

12. Please do not pull on any cable. Always hold on to the plug when disconnecting cables.

13. This equipment may be used for interfacing the Digital Refractor, CDR-3100 , HDR-7000 with a customer's PC.

14. Before every operation, visually check the equipment for exterior mechanical damage(s) and for proper function.

15. Do not cover any ventilation grids or slits.

16. Immediately turn off and unplug any equipment that gives off smoke, sparks, strange noises, or odors.

17. For the power adaptor with 115 or 230 voltage input selection switch, be sure to set the input-voltage switch to the voltage of the area where the power adaptor is being used. Otherwise, it may result in fire or electric shock.

18. Be sure to disconnect power cord before connecting or disconnecting the cables. Otherwise, the cable may be damaged, which may result in fire or electric shock.

19. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
    - Reorient or relocate the receiving device
    - Increase the separation between the equipment
    - Connect the equipment into an outlet on a circuit different from that to which the other device(s) are connected
    - Consult the manufacturer or field service technician for help

20. "External equipment intended for connection to signal input, signal output or other connectors, shall comply with relevant IEC standard (e.g., IEC 60950 for IT equipment and IEC 60601 series for medical electrical equipment). In addition, all such combinations - systems - shall comply with the standard IEC 60601-1-1, Safety requirements for medical electrical systems. Any person who connects external equipment to signal input, signal output or other connectors has formed at system and is therefore responsible for the system to comply with the requirements of IEC60601-1-1. If, in doubt, contact qualified technician or your local representative." (Or some cases, for example LCD Monitor, "This device is intended to connect to the medical device only, which complies with standards of IEC 60601 series.")

21. Do NOT touch signal input/signal output and patient simultaneously (example, Ref. Body and OP connectors of DIGITAL REFRACTOR CDR-3100 or HDR-7000, RS-232C of DIGITAL REFRACTOR CDR-3100(OP) or HDR-7000(OP) and connectors of Converter Box).

3. Features

1. Performs complete data communication with multiple HDR-7000 (or CDR-3100), Digital Refractor, simultaneously that uses non-RS232 serial protocol but uses CAN, an industrial standard protocol.

2. Supports data-link with 3rd party software in the PC where HDR Mate is running, such as Practice Management Software, by exporting or importing examination results automatically. By deploying this function, 3rd party software doesn't need to concern the CAN protocol and N-to-N communication.

3. Supports various export formats.

    - Microsoft Word format
    - Microsoft Excel format
    - CSV (plain text, Comma Separated Value) format for exporting data to support the data-link with 3rd party software

4. Prints out the whole examination results transmitted from Digital Refractor, HDR-7000 (or CDR-3100) through PC's Windows default printer. Thus HDR Mate is fully compatible with all Windows-compatible printers from all manufacturers.

5. Supports graphical representation of examination results for both Microsoft Word/Excel format export and printer printout.

    - For lensometry data
    - For refractometry data
    - For subjective refraction data
    - For final prescription data
    - For keratometry data

6. Supports various options for printer printout.

   - Customizable printing items list
   - Customizable printing order
   - Different font size (6/9/12)
   - Alignment on one of the four corner of paper
   - Full and half page mode

7. Supports data import from 3rd party software and transmission of imported data to Digital Refractor.

   - Lensometry data (old prescription data)
   - Ref/Keratometry data

8. Supports full options for automatic execution of its all functions.

   - Automatic printout
   - Automatic data export
   - Automatic data import & transmission
   - Etc

9. Supports automatic startup.

   - Automatic execution on Windows startup
   - Automatic port connection on execution
   - Iconizing it in the Windows system tray after automatic startup

10. Supports the Zernike's Map of examination results for refractometry data.

4. Notes for Using the Package

1. Do not hit or drop the hardware device. The hardware device may be damaged if it receives a strong impact. The impact can damage the function of the device. So handle with care.

2. Install the hardware device on a level, stabilized table with no vibration to keep it normal state.

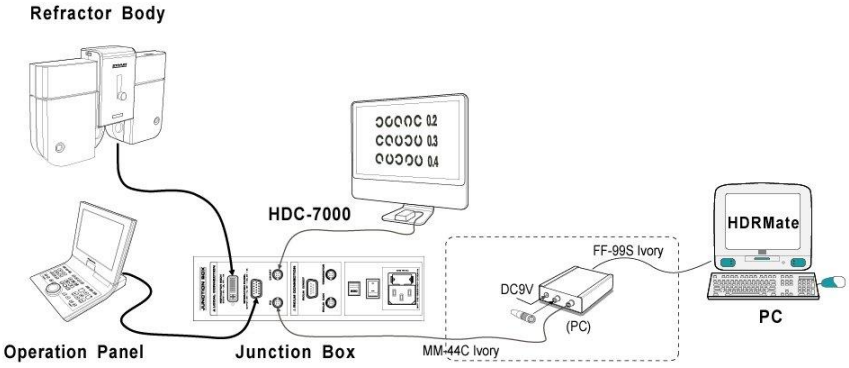
3. Don't use organic solution such as thinner, benzene, etc. to clean the surface of the hardware device. It may damage the device.

4. Use only with correct type of power adaptor for the hardware device, or the hardware device may get damaged or not work properly.

5. Disconnect the power supply and consult the dealer in case of smoke, strange odors, or noise during operation.

5. Configurations

HDR Mate Package consists of a Converter Box, interface cables, power adaptor, and HDR Mate software. The figure below shows an example of deploying HDR Mate Package parts.



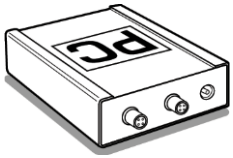
5.1. PC-Type Converter Box

The PC-Type Converter Box is a protocol converter that mediates the data communication between Digital Refractor and PC. It has three communication ports and one power connector.

① Power connector: Used to connect external power adaptor to the Converter Box.

② Serial interface connector: Used to connect the Converter Box to PC with a RS232 serial interface cable.

③ Two CAN interface connectors: Used to connect the Converter Box to Digital Refraction System with a CAN interface cable and a Terminator.



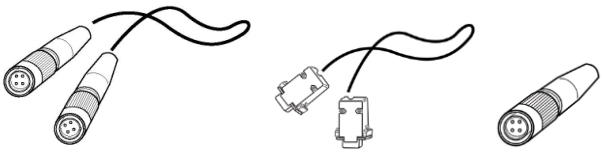
[PC-Type Converter Box]

5.2. Interface Cables and Terminator

① 4-pin CAN interface cable.

② 9-pin DSUB serial interface cable

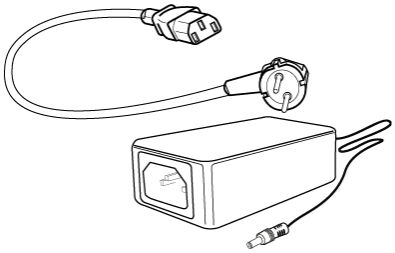
③ Terminator: Used to terminate a CAN network extension



[CAN interface cable] [Serial interface cable] [Terminator]

5.3. Power Adaptor

HDR Mate Package includes a power adaptor*) for supplying power to the Converter Box.



Power Adaptor

i) DC 9V 0.1A

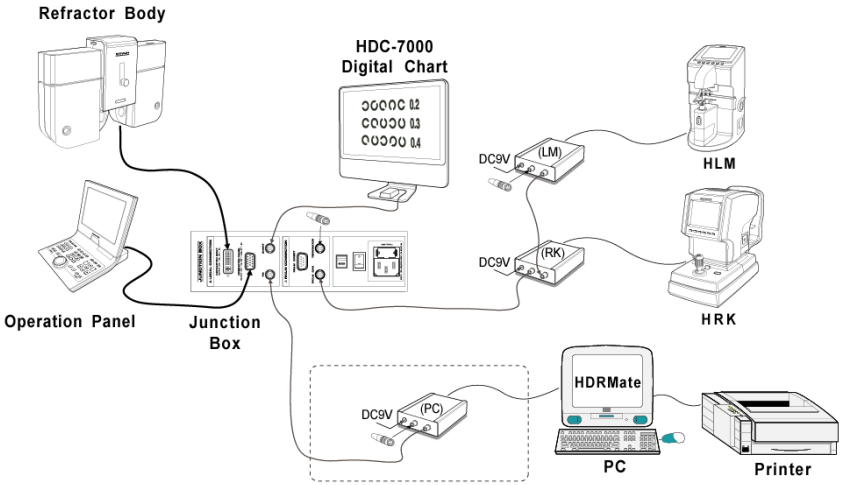
ii) ⚠ When the PC-Type Converter Box is interfaced with cULus-compliant version of Digital Refractor, use only with Ault Inc, model SW171 (*, +) series power supply.

6. Installation Procedure

Before proceeding to install a HDR Mate Package, check the package components listed in chapter 10 and the hardware & software requirements in chapter 9 first. The package installation is comprised of three parts, hardware device installation, software installation, and setting up options.

6.1. Hardware Device Installation

The figure below shows an example installation of HDR Mate hardware device installation with an extended type of Digital Refraction System.



About detailed information about the hardware installation, refer to the "HDR-7000 (or CDR-3100) Operator's Manual".

NOTE

After installing the hardware device, make it sure to turn on the 'Print To Serial' option in the Operation Panel of Digital Refractor. Refer to the HDR-7000 (or CDR-3100) Operator's Manual for detailed information about setting-up the options in the Operation Panel.

6.2. Software Installation

Before installing the HDR Mate software, it is highly recommended to remove old versions if exist. About removing the software, refer to section 6.2.2. After installation, to make HDR Mate working, it is required to configure HDR Mate with its options to meet the user's environment. Setting up options is covered in section 6.3.

6.2.1. Installation Procedure

Log on to Windows system first to install the software. In case of using Windows NT, 2000, or XP, 'Administrative Privileges' are required for the logon account. Then check the installation files in the CD. Installation CD should includes:

- ☐ HDR-Mate.exe
- ☐ autorun.inf

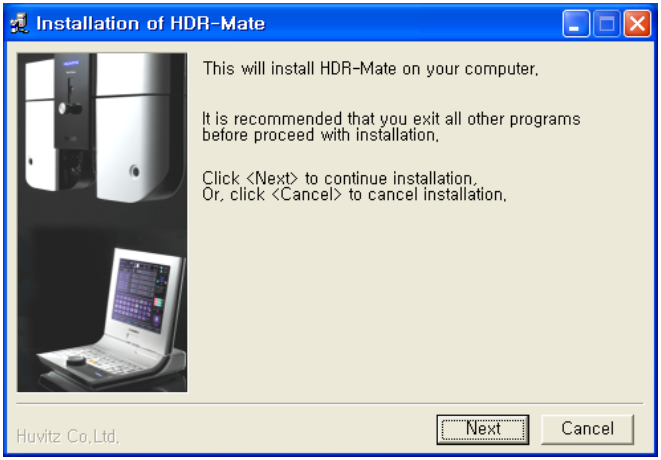
HDR Mate setup program will automatically start by auto-run when you insert the installation CD into CD-ROM on PC. If it doesn't work or is installing from local or network drive, open the installation folder and manually run HDR-Mate.exe. And then the wizard program would lead the installer to complete the installation.

NOTE

During the installation of HDR Mate, there could be some unexpected errors or problems due to the regional language setting of Windows Operating System in certain version of Windows OS. In that case, kindly contact and report the problem to your local dealer or to Huvitz directly by using the service information in chapter 11.

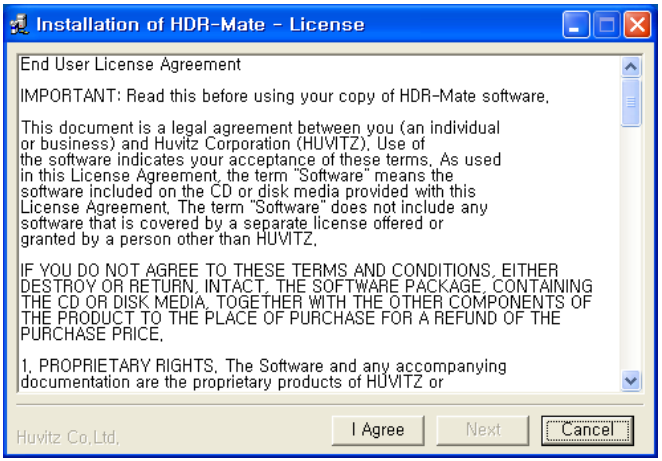
Installation procedure lead by Install Wizard is shown below.

① Step 1: Welcoming message



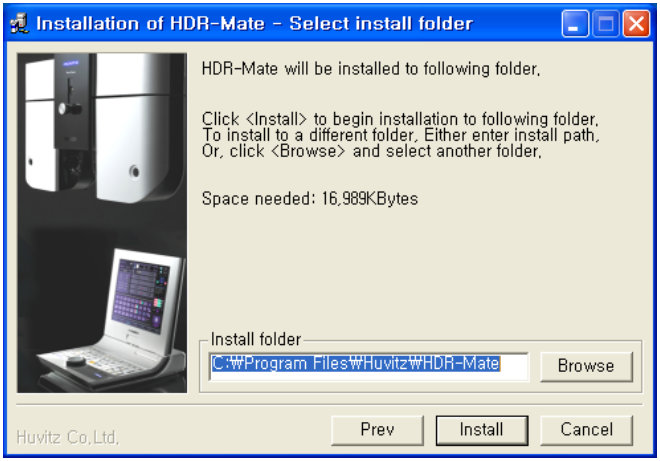
Just click the 'Next' button to continue installation. Otherwise click the Cancel button to stop and exit.

② Step 2: End-User License Agreement



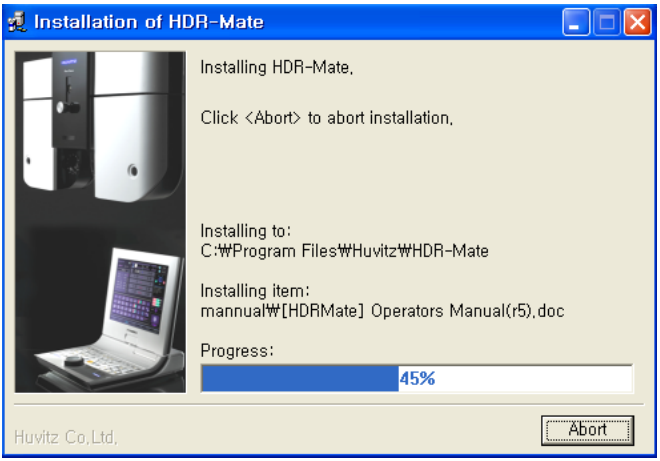
If you do not accept with the License Agreement, do not enable the button Next. Without agreeing the License Agreement, it is not allowed to install the software. Click the 'I Agree' button and then click the 'Next' button to continue installation.

③ Step 3: Choosing installing folder



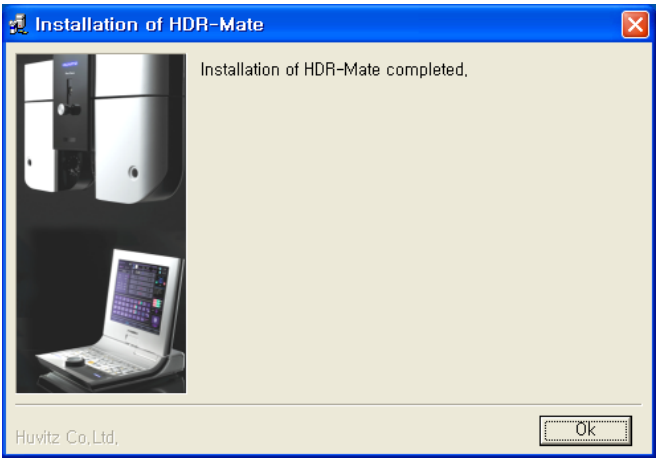
Select a folder to install HDR Mate. It will be 'C:\Program Files\Huvitz\ HDR-Mate' as default. If you want change it, Click the button 'Browse'. click the 'Install' button to continue installation.

④ Step 4: Copying HDR Mate components to installing destination



⑤ Step 5: Completion message

After finishing copying HDR Mate component files, the Install Wizard displays completion message to inform user of the end of installation. Just click the 'Ok; button to close the Install Wizard and finish the installation.



NOTE

After finishing the Install Wizard, create the HDR Mate shortcut icon. To execute the HDR Mate, click the HDR Mate icon in Windows Start menu or double-click the HDR Mate icon on Windows desktop.

6.2.2. Removing HDR Mate

To remove existing version of HDR Mate from Windows System, you can exploit as following process.

① Step 1: Click the Start menu of Windows System

② Step 2: Execute the Control Panel menu

③ Step 3: Double click the 'Program Add/Delete' icon

④ Step 4: Select the HDR Mate to remove from 'Installed Program List'

⑤ Step 5: Click Change/Remove button

Executing Change/Remove button starts the unInstall Messagebox.

⑥ Step 6: Click Yes button

Click Yes button to continue removing HDR Mate. Otherwise click No button.

⑦ Step 7: Confirming Delete job

Click OK button to confirm removing HDR Mate.

6.3. Setting up Options

HDR Mate options are comprised of three categories, Connection, Data Receiving & Transfer, and Print options. Each category of options include:

- **Connect**

  ① Connection Target
  - Connection Target
  - Protocol Version
  - System ID

  ② Port Connection
  - Port number
  - Baud Rate
  - Computer Id

  ③ Startup & Connect
  - Start HDR Mate on Widows startup
  - Connect to port when HDR Mate starts up

- **Data Receiving & Transfer**

  ① Data Receiving Option
  - Automatic Print
  - Automatic Export
  - Export Directory
  - Advanced …
  - Deleting Record
  - List Size

  ② Data Transfer Option
  - Import Directory
  - Automatic Transfer

- Deleting Record
- List Size

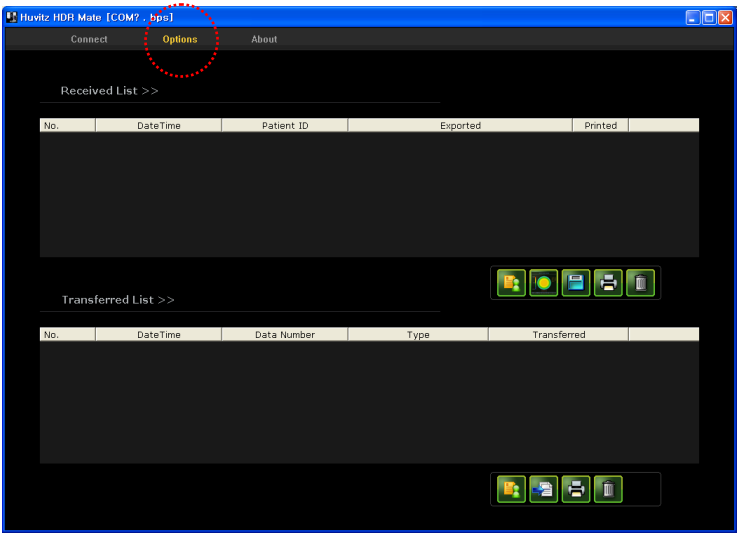
■ **Print**

① Paper
- Size
- Direction

② Settings
- Font Size
- Mode
- Alignment
- Option for Empty Data Value

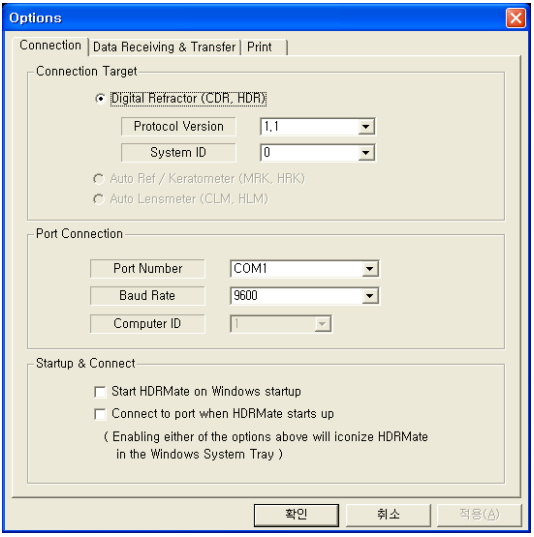
③ Print List & Order

Click the 'Options' menu to start options menu.



6.3.1. Connection Options

Connection options are for setting communication environment such as protocol version, system id, serial port, and HDR Mate startup.



1) Connection Target

① Connection Target

- Digital Refractor (HDR-7000 or CDR-3100)
  This is the default selection for Connection Target. To have HDR Mate communicate with Digital Refractor, select this.

- Auto Ref/Keratometer (MRK, HRK)
  This is reserved for future use.

- Auto Lensmeter (CLM, HRK)
  This is reserved for future use.

② Protocol Version

Protocol version affects the number of data fields that transmitted by Digital Refractor and the number of data fields that are exported in CSV (Comma Separated Value) format by HDR Mate.

- Version 1.0

  Setting Protocol Version to 1.0 makes Digital Refractor transmit 191 fields of data and has HDR Mate export 191 fields of data. Refer to Appendix C for detailed information about exporting data fields with protocol version 1.0.

- Version 1.1

  Setting Protocol Version to 1.1 makes Digital Refractor transmit 178 fields of data and has HDR Mate export 178 fields of data. Protocol version 1.1 is not supported by any other previous version of HDR Mate. Refer to Appendix D for detailed information about exporting data fields with protocol version 1.1.

- Version 1.2

  Setting Protocol Version to 1.2 makes Digital Refractor transmit 188 fields of data and has HDR Mate export 188 fields of data. Protocol Version 1.2 is not supported by any other previous version of HDR Mate. Refer to Appendix E for detailed information about exporting data fields with protocol version 1.2.

NOTE

If the protocol version of HDR-7000 Operation Panel is lower than that of HDR Mate, it's not possible to communicate each other unless you upgrade the Operation Panel to at least V1.12 or change the selection of protocol version to 1.1 in the options menu of HDRMate.

On the contrary, using higher version of the Operation Panel doesn't make any problem as it automatically recognizes the protocol version set in HDRMate.

③ **System Id**

This is an obsolete option for having HDRMate compatible with CDR-3100 that requires its peer application, HDRMate or CDRMate, set with an identical system id with it. Leave the System Id set to 0 to connect it to HDR-7000.

2) Port Connection

① Port Number

- Selects the serial port number that is used to interface PC with Digital Refractor.

NOTE

You can check the available port numbers on your PC by executing the Device Manager of Windows System. It is useful when using USB to Serial connector for laptop computer that has no serial port. Some USB to Serial device doesn't assign the port number sequentially, for example COM7.

② Baud Rate

- Selects the communication speed of serial interface. It should be set to 9600.

③ Computer Id

- This is reserved for future use.

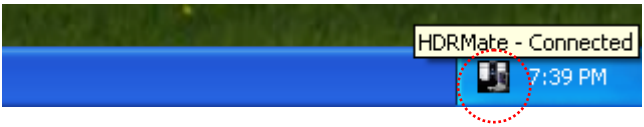
3) Startup & Connection

① 'Start HDR Mate on Windows startup'

Enables automatic startup of HDR Mate on Windows startup. If this option is checked, HDR Mate starts up automatically whenever Windows system is booted up. After being started up, HDR Mate iconize itself in

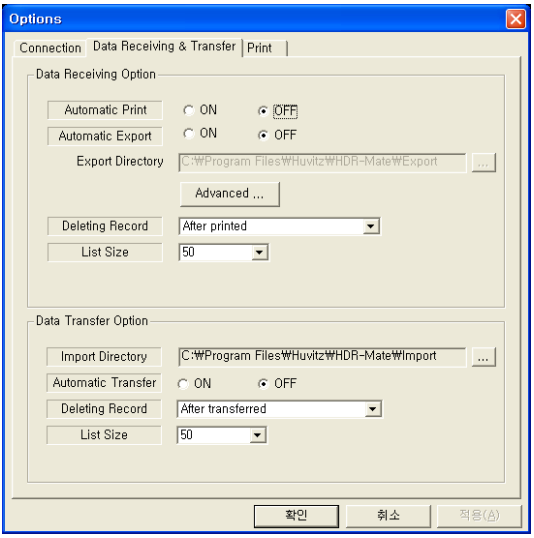
the Windows System Tray.

② 'Connect to port when HDR Mate starts up'
Enables automatic port connection. If this option is checked, HDR Mate establishes a connection to serial port automatically after its startup. After the connection, HDR Mate iconize itself in the Windows System Tray.



6.3.2. Data Receiving & Transfer Options

Data-receiving options affect the behavior of HDR Mate after it receives data from Digital Refractor. And data transfer options affect the behavior of importing and transferring data from 3rd party software to Digital Refractor.



1) Data Receiving Option

① Automatic Print

- ON

  Enables HDR Mate to print examination results out through Windows default printer immediately after it completes receiving a patient record from Digital Refractor.

- OFF

  Disables automatic printing.

② Automatic Export

- ON

  Enables HDR Mate to export examination results immediately after it completes receiving a patient record from Digital Refractor. Export format is set in the 'Advanced…' data receiving option.

- OFF

Disables automatic data export.

③ Export Directory
It is enabled and editable when the 'Automatic Export' option is turned on. Exporting files are saved in the folder specified here.

④ Deleting Record
Defines the behavior of deleting patient record from the received data list.

- After printed
  Deletes patient record automatically after printing one.

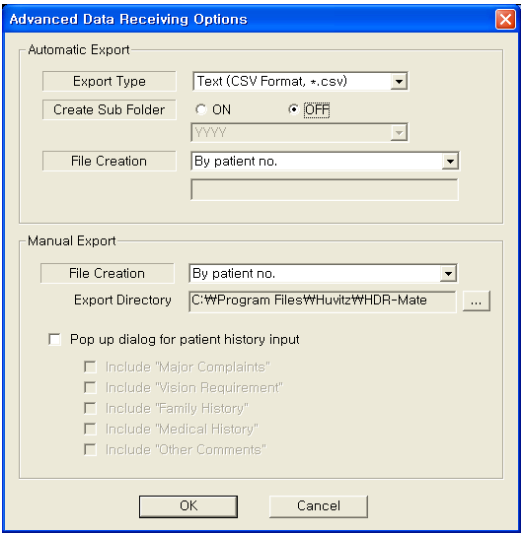
- After exported
  Deletes patient record automatically after exporting one.

- After printed and exported
  Deletes patient record automatically after printing and exporting one.

- Manually
  Do not delete patient record automatically. Patient records are not deleted until the user deletes manually. But the whole received data list cannot exceed the limit specified in the 'List Size' option.

⑤ List Size
Sets the limit size of received data list. It can be set from 10 to 100. If the size of received data list exceeds this limit, it deletes patient record first-in-first-out order.

2) Advanced Data Receiving Option



① Automatic Export

This options group is enabled and editable only when the 'Automatic Export' option is turned on.

a. Export Type

- Text (CSV Format, *.csv)
  Exports patient record in CSV, which is a plain text, format. This format is to aid 3rd party software to get Digital Refractor's examination result integrated into its database storage.

- MS Word (*.doc)
  Exports patient record in Microsoft Word format.

- MS Excel (*.xls)
  Exports patient record in Microsoft Excel format.

NOTE

HDR Mate exports all the fields of patient data as a whole. The 'Print List' option in the Print option tab doesn't affect the contents of exporting data fields.

b. Create Sub Folder

- ON

  Creates a sub folder under the export directory when it exports patient records. Sub folder name is chosen from one of the below:

  - YYYY: year
  - YYYYMM: year with month
  - YYYYMMDD: year with month and day
  - YYYY/MM: month under the year
  - YYYY/MM/DD: day under the month under the year

- OFF

  Creates no sub folder when it exports. So it just creates a file directly under the export directory when it exports a patient record.

c. File Creation

- By patient no.

  Creates filename with patient number that is generated and transmitted from Digital Refractor when it exports automatically.

- By user defined name

  Creates filename with user-defined name when it exports. It overwrites if the same name exists. If File Creation option is selected to this, the input field in the next line is enabled for a user-defined name.

- By user defined name (with refractor id)

  Behaves the same way as the above but it adds the refractor id as an extension at the end of filename.

NOTE

> For the data export intended to integrate patient record into 3rd party application such as Practice Management Software, it is highly recommended to set the export type to 'CSV' and the file creation method to 'By user defined name' and give a static name that is recognized by the 3rd party software.

② Manual Export

This option is always enabled and editable.

a. File Creation

- By patient no.
  Recommends patient number as a filename when it exports manually. But user can change the filename before confirming the preset filename.

- By patient name
  Recommends filename with patient name and age combined when it exports manually. But user can change the filename before confirming the preset filename. Patient name and age are input by user on Patient History input dialog.

- Not predefined
  Recommends nothing as filename when it exports manually. So user has to input filename manually each time.

b. Export Directory

Sets the default location for saving patient records when it exports manually.

c. Pop up dialog for patient history input

Below options are enabled and editable when this option is checked. This allows user to add some comments on patient and save the information with examination results.

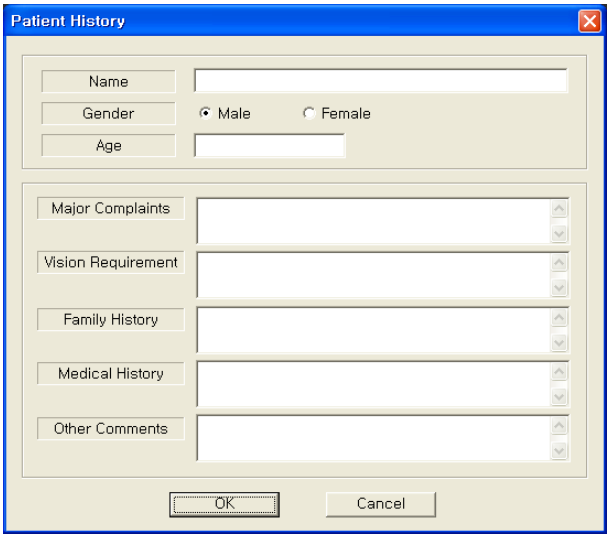
- Include "Major Complaints"
  Enables input field for the major complaints of patient.

- Include "Vision Requirement"
  Enables input field for the vision requirements of patient.

- Include "Family History"
  Enables input field for the family history of patient.

- Include "Medical History"
  Enables input field for the medical history of patient.

- Include "Other Comments"
  Enables input field for other comments on patient.



3) Data Transfer Option

① Import Directory

Sets the source folder to import external data exported by 3rd party software. HDR Mate keeps checking the import folder for new data and imports the data automatically. HDR Mate expects two types of data, previous glasses data as a lensometry data and ref/keratometry data. And those data files should be compliant with HDR Mate import format.

② Automatic Transfer

- ON
  Enables HDR Mate to transfer imported data to Digital Refractor automatically.

- OFF
  Disables automatic data transfer.

③ Deleting Record

Defines the behavior of deleting patient record from the transferred data list.

- After transferred
  Deletes patient record automatically after transferring one.

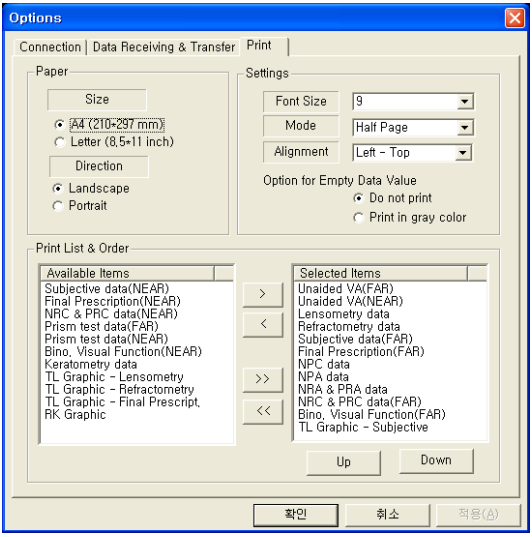
- Manually
  Do not delete imported data automatically. Imported data are not deleted until the user deletes manually. But the whole transferred data list cannot exceed the limit specified in the 'List Size' option.

④ List Size

Sets the limit size of transferred data list. It can be set from 10 to 100. If the size of transferred data list exceeds this limit, it deletes imported data first-in-first-out order

6.3.3. Print Options

Print options affect the paper printout and the preview on the display.



1) Paper Option

① Size

Sets the paper size to print.

- A4 (210*297 mm)
- Letter (8.5*11 inch)

② Direction

Sets the printing direction of paper.

- Landscape

  Prints out in horizontal direction.

- Portrait
  Prints out in vertical direction.

2) Settings Option

① Font Size
Sets the printing font size.

- 6
  Prints data in font size 6.
- 9
  Prints data in font size 9.
- 12
  Prints data in font size 12.

② Mode
Sets the printing mode.

- Half Page
  Prints data on the half side of paper. But half page mode doesn't work perfectly when the font size is 12 or when the font size is 9 with paper direction portrait. The other half side is emptied for user annotations or comments.
- Full Page
  Prints data on full page.

③ Alignment
Sets the formatting position on paper.

- Left-Top
- Left-Bottom

- Right-Top
- Right -Bottom

④ Option for Empty Data Value
Sets the behavior of processing empty data value.

- Do not print
  Data fields with empty value are not printed.
- Print in gray color
  Data fields with empty value are printed in gray color. It only prints the name of data field.

3) Print List & Order Option

① Print List
Sets the list of data items to be printed.

- >
  Adds the item selected in Available Items list to Selected Items list.
- <
  Move the item selected in Selected Items list back to Available Items list.
- >>
  Adds all the items in Available Items list to the Selected Items list.
- <<
  Move all the selected items back to Available Items list.

② Print Order
Sets the order of the items to be printed.

- UP
  Moves selected item to the front one step.

- DOWN
  Moves selected item to the back one step.

③ Printable Items

- Unaided VA (FAR)
  Unaided Visual Acuity at distance.

- Unaided VA (NEAR)
  Unaided Visual Acuity at near.

- Lensometry data
  Previous glasses data.

- Refractometry data

- Subjective data (FAR)
  Subjective refraction data at distance.

- Subjective data (NEAR)
  Subjective refraction data at near.

- Final data (FAR)
  Final prescription data at distance.

- Final data (NEAR)
  Final prescription data at near.

- NPC
  Near Point of Convergence data.

- NPA
  Near Point of Accommodation data.

- NRA & PRA data
  Negative/Positive Relative Accommodation data.

- NRC & PRC data (FAR)
  Negative/Positive Relative Convergence data at distance.

- NRC & PRC data (NEAR)
  Negative/Positive Relative Convergence data at near.

- Prism test data (FAR)
  Individual prism tests data at distance. This item includes the test results of Schober, Von Graefe, Polarized Cross, Polarized Cross with Fixation, Coincidence, and Maddox test for both horizontal and vertical.

- Prism test data (NEAR)
  This item includes the test results of Von Graefe, and Maddox test for both horizontal and vertical.

- Bino. Visual Function (FAR)
  Binocular visual function tests data at distance. This item includes the test result of Fusion, Stereo, Minute Stereo, and Aniseikonia test.

- Bino. Visual Function (NEAR)
  Binocular visual function test data at near. This item includes the test result of Fusion test.

- Keratometry data

- Retinoscopy data

- TL Graphic - Lensometry
  Graphical lensometry data in a shape like trial frame.

- TL Graphic - Refractometry
  Graphical refractometry data in a shape like trial frame.

- TL Graphic - Subjective
  Graphical subjective refraction data in a shape like trial frame.

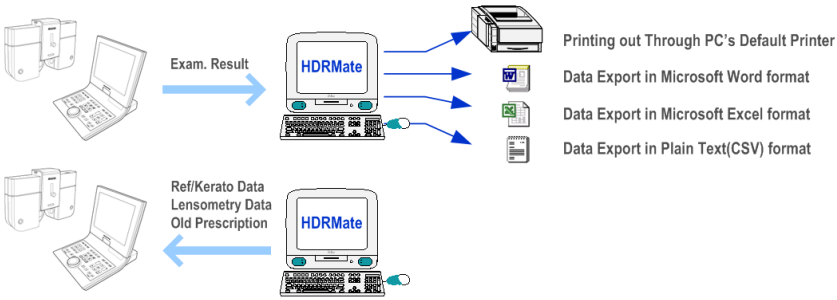
- TL Graphic – Final Prescript.
  Graphical final prescription data in a shape like trial frame.

- RK graphic
  Graphical keratometry data.

7. Using HDR Mate

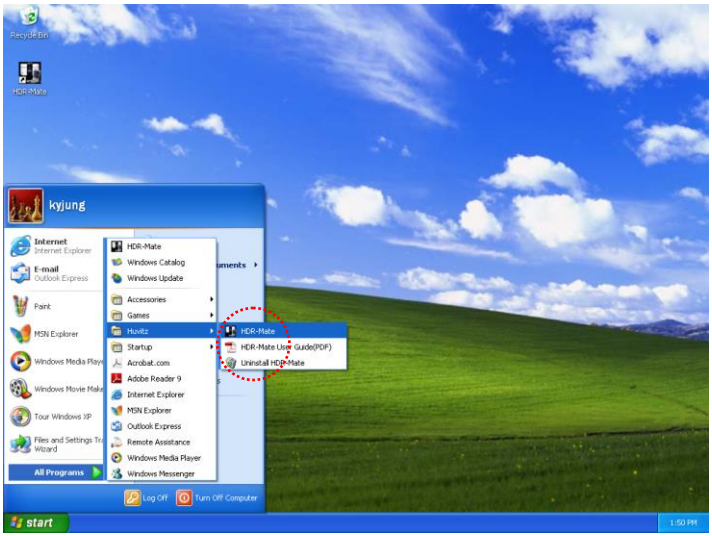
In the perspective of user, HDR Mate is an application that prints out or exports the examination results that are transmitted from Digital Refractor, HDR-7000 (or CDR-3100) by performing data communication with Digital Refractor. And also it supports importing and transferring ref/keratometry data and lensometry data (old prescription data) to Digital Refractor. HDR Mate can automatically detect newly exported data from 3rd party software that supports HDR Mate-compliant format.

Moreover HDR Mate provides full options to configure it being operated automatically. So users even don't need to remember that they are using HDR Mate on their PC.



7.1. Starting up HDR Mate

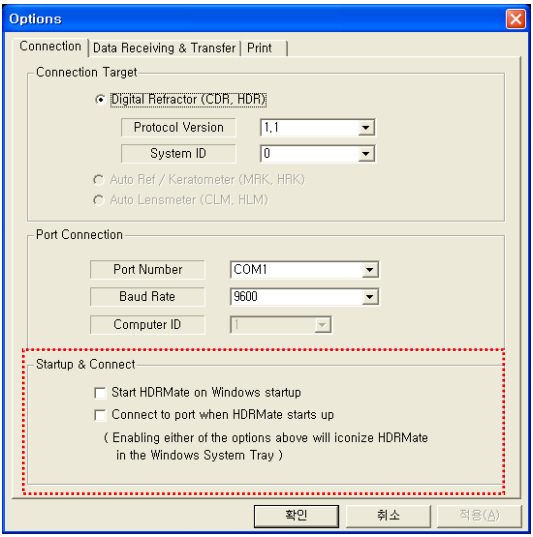
There are two ways to start up HDR Mate, manually and automatically. To start up HDR Mate manually, simply click the HDR Mate icon in Windows Start menu or double-click the HDR Mate icon on Windows desktop.



[Startup in the Windows Start menu]

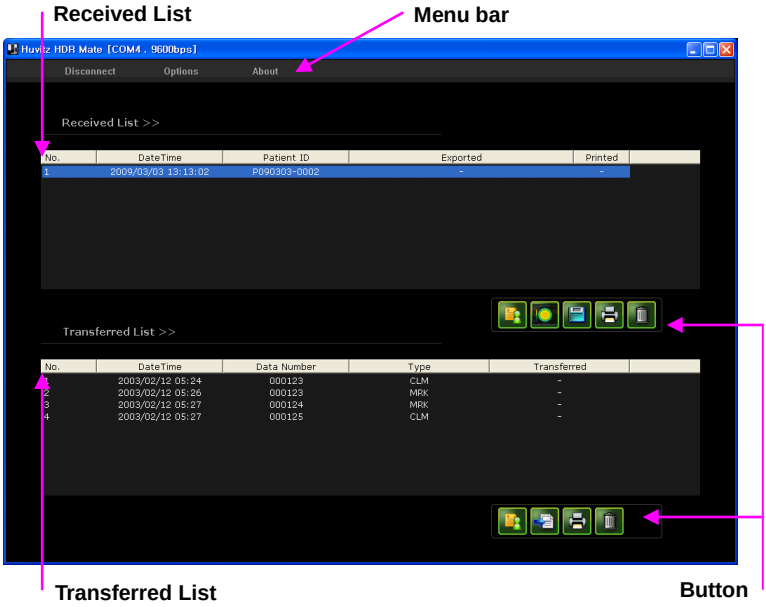
[Startup on the Windows Desktop]

To make HDR Mate being started automatically after Windows-startup, set some Connection options, 'Start HDR Mate on Windows startup' and 'Connect to port when HDR Mate start up' options. By turning these two options, HDR Mate comes to be available always until being terminated by user. Once HDR Mate is automatically started, it is iconized in the Windows System Tray automatically.



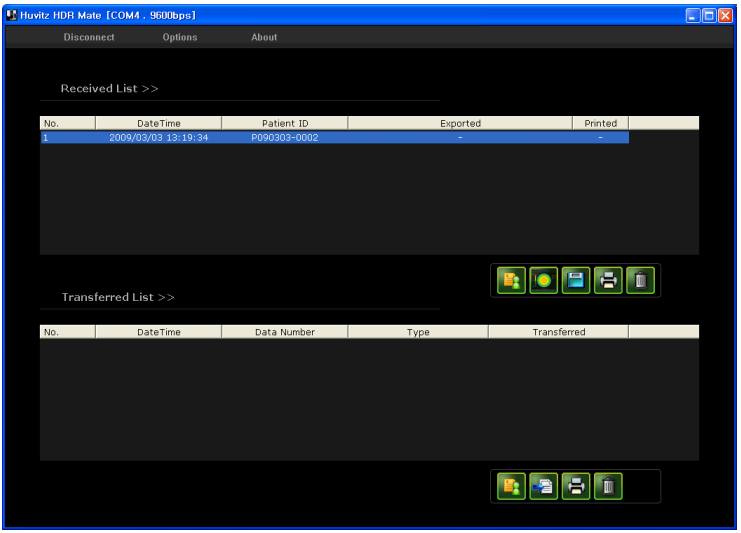
7.2. Composing the Main Window

The layout of the HDR Mate is very simple and intuitive. So it is easy to operate. The HDR Mate is composed of Menu bar, Received List, Transferred List, and Button.



7.3. Managing Received Data

Executing the PRINT button on the Operation Panel of Digital Refractor transmits examination results to HDR Mate if the 'Print To Serial' option in the Operation Panel is turned on. HDR Mate receives and queues patient records in its received data list. Then it prints out and/or exports the data automatically as far as the corresponding options are turned on. Otherwise patients' records are just queued in the list. HDR Mate allows four additional functions performed on the records in the received data list.



-  [View Detail Button]

Shows the detailed information about selected patient record in the list. Displayed contents are selected according to the selected items for printout on the Print options tab. Refer to 6.3.3. Print Options for detailed information about print options.

-  [Zernike Map Button]

Shows the measure result with Zernike map from RK data. The Zernike maps display the following items.

- Acuity Aberrations (Defocus&Astigmatism)
- Defocus Aberration(SPH)
- Astigmatism Aberrations(CYL)
- High Order Aberrations(Coma&Trefoil…)

-  [Export Button]

  Exports selected patient record. If the 'Pop up dialog for patient history input' option is selected, it pops up a dialog window for patient history input. It is possible to save patient record in three ways, MS Word, MS Excel, and CSV (plain text). Refer to 6.3.2. Data Receiving & Transfer Options for detailed information about export options.

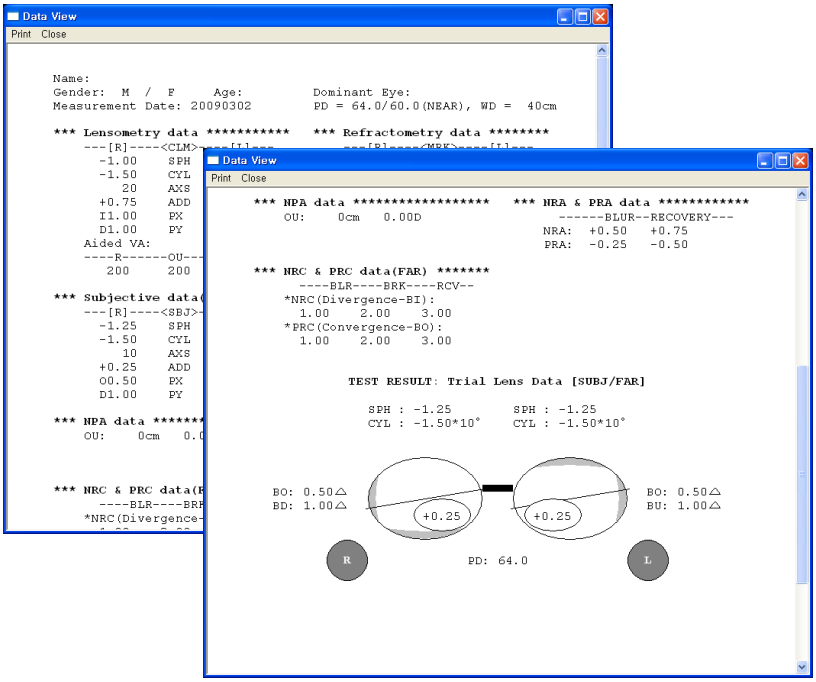
-  [Print Button]

  Prints out selected patient record thru Windows default printer. Printout includes only the selected items on the Print options tab. Refer to 6.3.3. Print Options for detailed information about print options.

-  [Delete Button]

  Deletes selected patient record. But it is also possible to have patient records deleted automatically after being printed and/or being exported. Refer to 6.3.2. Data Receiving & Transfer Options for detailed information about delete options.

Below shows the result screens, Data View windows, of executing View Detail button or Double Click the items on the Received List. Displayed items and the order of items are based on the settings of Print options.

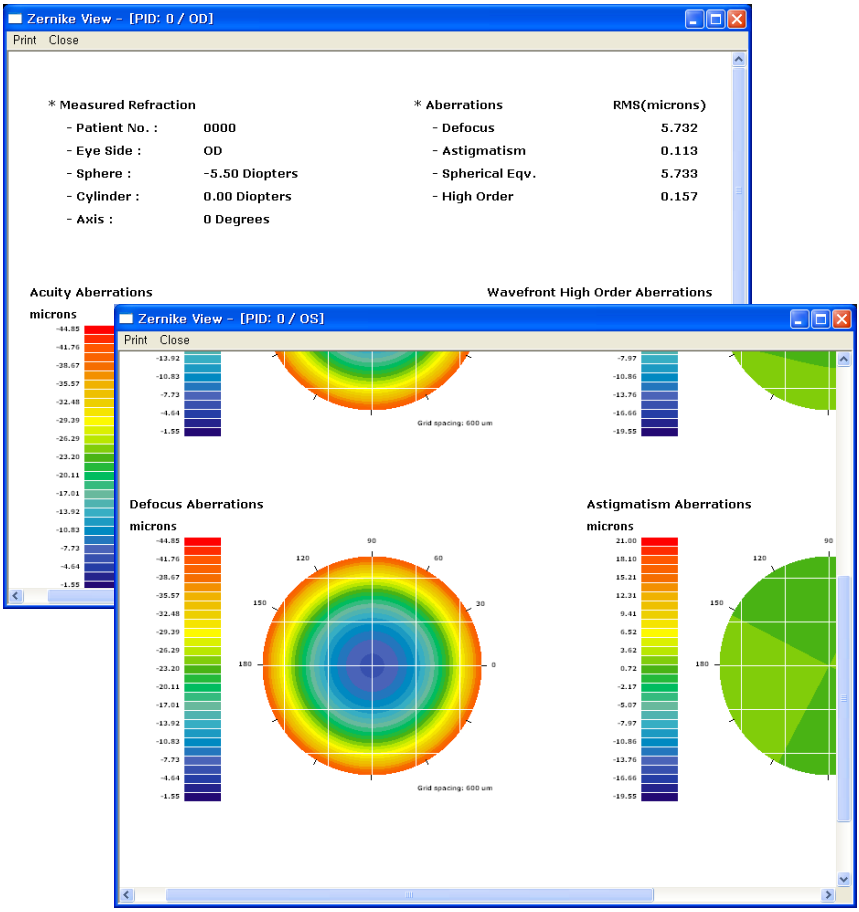


To show the Zernike Map, there is one condition. It must be include the Zernike data In the received data list, Otherwise, although click the Zernike Map button, it is not show the Zernike Map. Below show the Zernike View to click the Zernike Map button.

NOTE

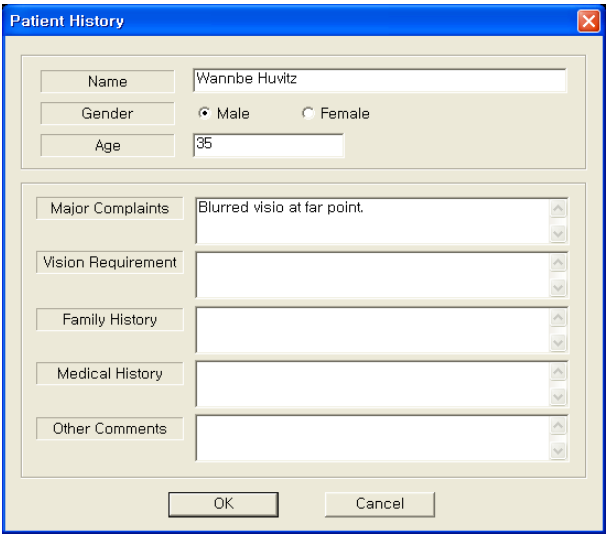
The Zernike Map data of HDR Mate is transmitted from HDR-7000 and them of HDR-7000 is transmitted from HRK-7000/HRK-7000A. Therefore if you want to show the Zernike Map, it is positively necessary as follow. Currently it is recommend as follow version.

- HRK-7000A : Ver 1.02.14A or higher
- HRK-7000(1Ring) : Ver 2.01.14A or higher
- HRK-7000(2Ring) : Ver 1.01.14A or higher

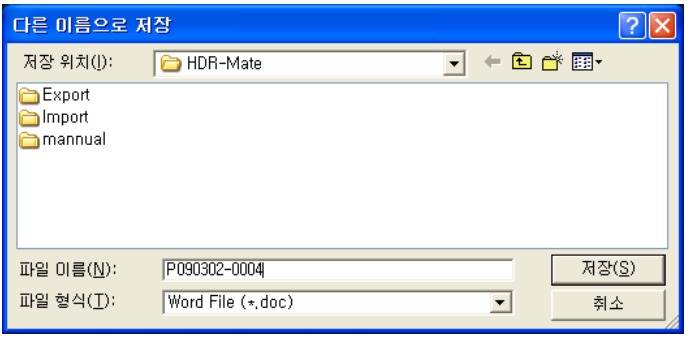


Print menu on Data View window executes the same function as the Print button on the Received List in the main window.

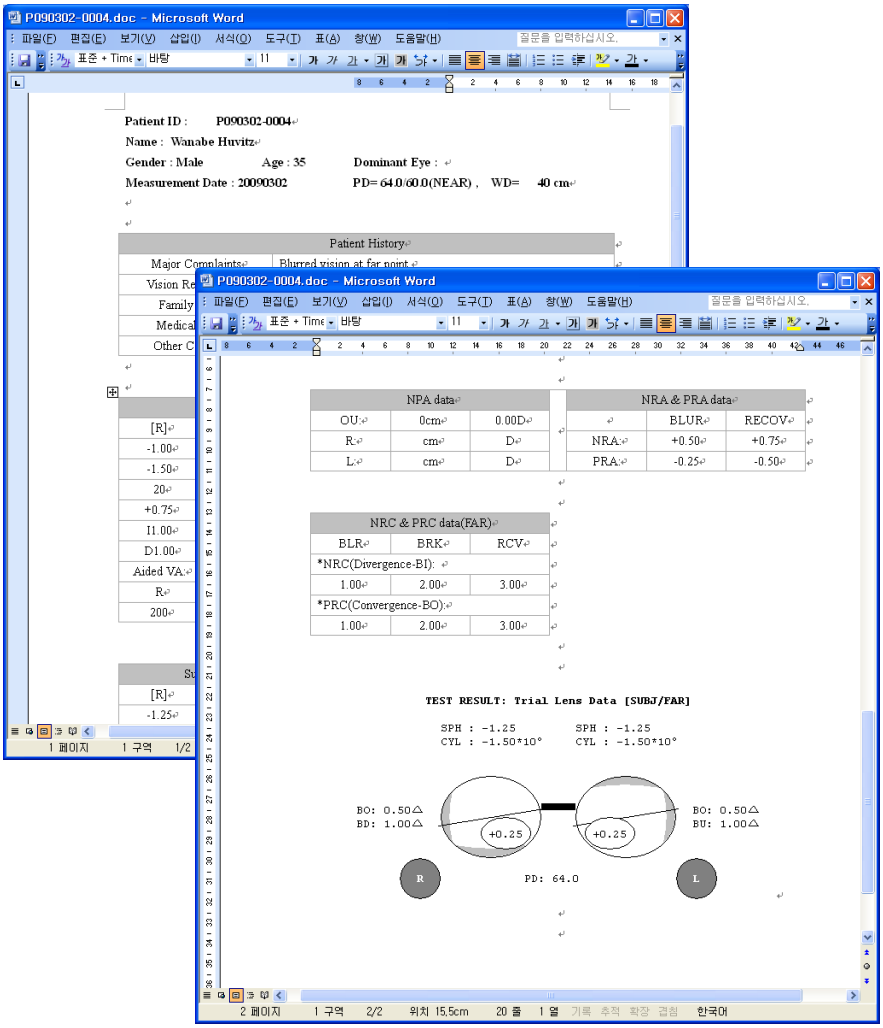
The Export button on the Received List is to export patient record manually. If any of the 'Manual Export' options is changed in Advanced Data Receiving option tab, it affects the behavior of the Export button. For example, turning on the 'Pop up dialog for patient history input' makes manual export function to display the Patient History window like the figure below.



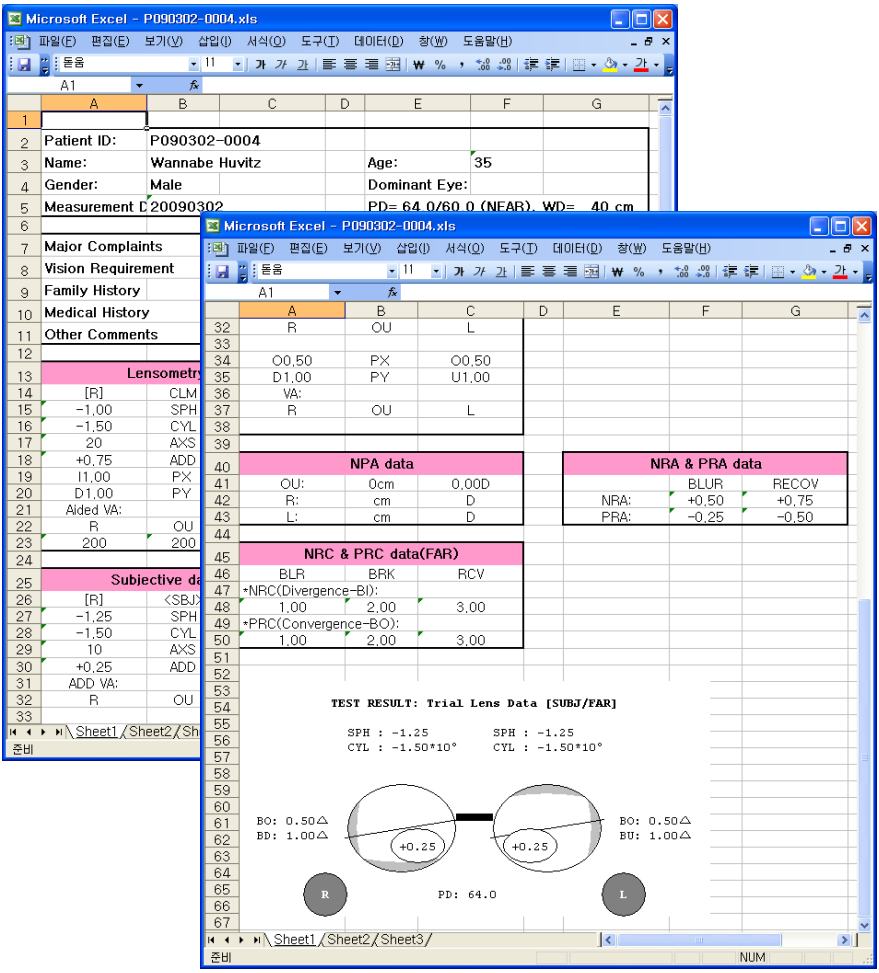
And if the 'File Creation' option is set to 'By patient name' in the Manual Export options group, clicking OK button in the figure above call up Save As window with default filename set by the combination of patient name and age.



Following figures are showing an exported output in MS word and Excel format.

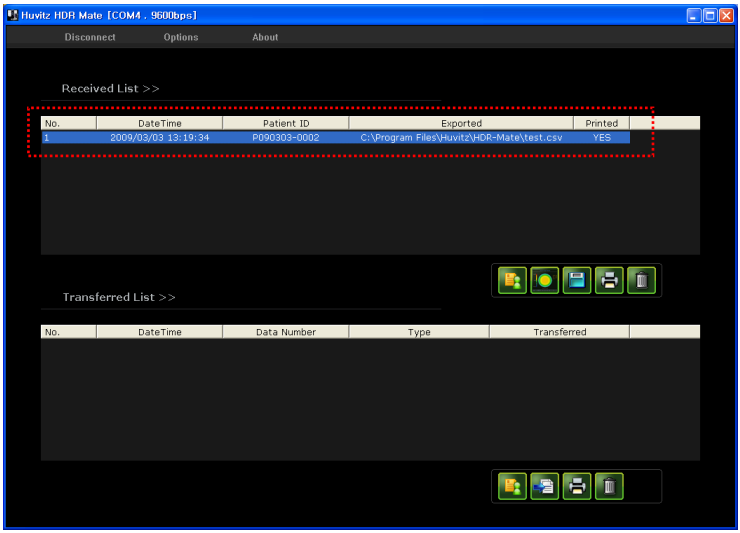


[Export output in MS Word format]



[Export output in MS Excel format]

Either patient record is printed or it is exported, the Received Data List is updated with the status information. Following figure shows that the exported path and printed status are updated.

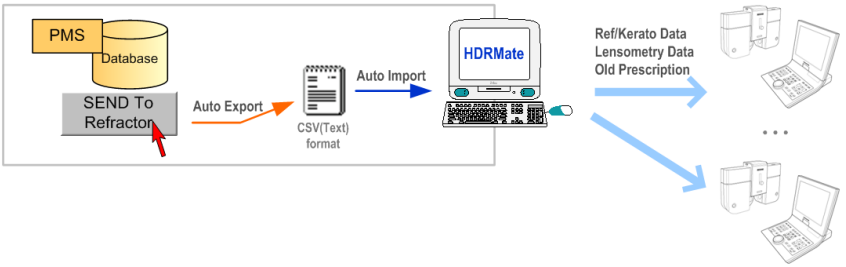


NOTE

Sometimes data export in MS Word/Excel format causes unexpected errors. Usually that's not caused by HDR Mate but caused by Windows System or MS office program. In that case, just terminates all the MS Office applications and retry. To make it sure to terminate MS Office applications, check MS Office application processes on the Windows Task Manager.

7.4. Managing Imported Data

If there is a 3rd party Windows application such as Practice Management Software that supports data export in HDR Mate-compliant format, user can configure HDR Mate as it imports the output from 3rd party software and transfer it to Digital Refractor. HDR Mate recognizes ref/keratometry data and lensometry (old prescription) data as its import file.



The Transferred List of main window provides four buttons.

-  [View Detail Button]

  Shows the detailed information about selected import file in the list.

-  [Send To HDR Button]

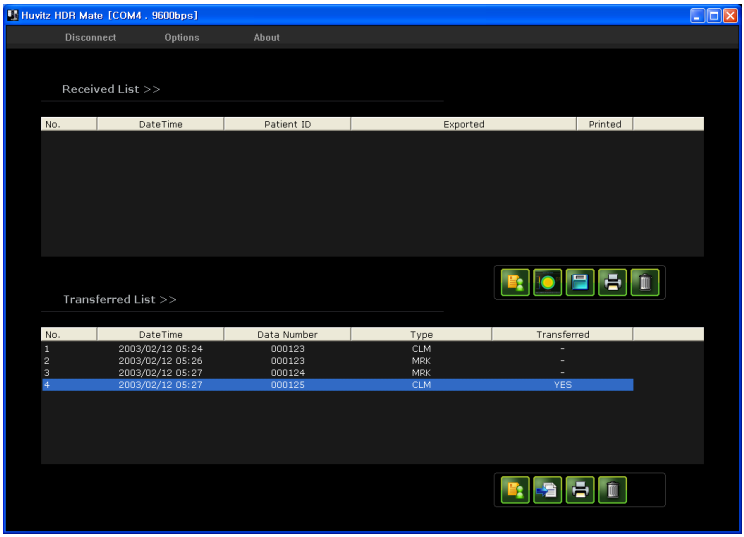
  Transfer selected import file to Digital Refractor(s). If PC is interfaced with networked system, that means more than one Digital Refractors are

networked together, HDR Mate transfer selected data to all of the Digital Refractors. At this point, System Id has no influence on data transmission. If the 'Deleting Record' option in the Data Transfer Option group is set to 'After transferred', selected record is deleted automatically after completing the transmission.

-  [Print Button]
  Prints out selected import file thru Windows default printer.

-  [Delete Button]
  Deletes selected import file. But it is also possible to have transferred record deleted automatically after it is transferred. Refer to 6.3.2. Data Receiving & Transfer Options for detailed information about delete options.

After a record is transferred, the Transferred Data List is updated with the status information. Following figure shows it.



8. Troubleshooting

8.1. Can't start HDR Mate program

- If warning dialog box shows an error, "Failed to find DLL", confirm that cdrm_comm.dll file exists in the same directory with the HDRMate.exe file.
- Remove and re-install HDR Mate program.

8.2. Can't connect to serial port

If the same serial port that HDR Mate is trying to use is occupied by other application or there is another HDR Mate in execution, it can't connect to specified serial port.

- Check if there is any other application running that is occupying the serial port.
- Check the Windows System Tray if there is another HDR Mate running.

8.3. Can't receive any data from Digital Refractor

There can be two types of errors, hardware settings error and inappropriate configuration error

- Check if the System Id setting is identical to that of Digital Refractor.
- Check the Port Connection options whether those are set properly.
- Check if HDR Mate is connected to serial port. If HDR Mate is connected to serial port, the title bar of HDR Mate window shows the connection information. For example, COM1, 9600bps.
- Check if the 'Print To Serial' option in the Operation Panel of Digital Refractor is turned on.
- Check the communication mediators according to the HDR-7000 (or CDR-3100) Service Manual. Or check the PC-type Converter Box if it is turned on and working properly.

8.4. HDR Mate doesn't import external data

HDR Mate imports external data from the import directory set in its options menu. And the external data should be compliant with the import format of HDR Mate.

- Check the import directory option.
- Check the external data file whether it follows the import format of HDR Mate.

8.5. Can't transfer data to Digital Refractor

It can be happen due to general communication failure. If this kind of errors are encountered, check the communication mediators according to the HDR-7000 (or CDR-3100) Service Manual. Or check the PC-type Converter Box if it is turned on and working properly.

8.6. Can't find HDR Mate window

Once HDR Mate is minimized by clicking the minimize button on the right upper corner of its window, HDR Mate is iconized and hided in the Windows System Tray.

- Double click HDR Mate icon in the Windows System Tray on the right side of Windows Task bar.

8.7. Can't export in MS Word/Excel format successfully

Sometimes MS Office applications are not terminated successfully, in that case, it causes an error on HDR Mate's data export in MS Word/Excel format.

- Terminates all the MS Office applications. And check if there is abnormally terminated MS Office process on the Windows Task Manager.
- Then try to export again.

9. Hardware and Software Requirements

PC Hardware	
CPU	Equal or higher than 486 CPU with higher clock frequency than 90M Hz
Main Memory	Minimum 8 MB
Hard Disk Space	Minimum 2 MB
CD-ROM Drive	
Printer	Windows-compatible printer (Required for paper printout)
Operating System & Other Software Components	
Operating System	● Windows 95/98/ME ● Windows 2000 ● Windows XP
Other Software Components	Microsoft Office 97 or higher (Required for data export in the format of MS Word or Excel)
HDR-7000 Firmware	
Operation Panel (GUI)	● Versions before 0.99 doesn't transmit z-map data which is received from HRK-7000/HRK-7000A.
Operation Panel (BTN)	Version 0.90 or higher

10. Package Components List

Converter Box (PC Type)	1 EA
Power Adapter	1 EA
Interface Cable (4-pin CAN, 3m)	1 EA
Interface Cable (9-pin DSub Serial, 2m)	1 EA
Terminator	1 EA
Software Installation CD	1 EA
Certificate Of Authenticity	1 EA
End-User License Agreement	1 EA

11. Service Information

If the software appears malfunctioning, before calling a customer service, it is highly recommended to check the software according to the troubleshooting procedure in this manual.

If any problem persists or the software is damaged or malfunctioning, contact Huvitz or local distributor for service with the following information:

- Name of the product: HDR Mate
- Serial number of the product: refer to the 7-digit number on its Certificate Of Authenticity
- Descriptions of Problem: In detail

Date of Purchase: _____

Dealer's Name: _____

Dealer Address: _____

Dealer Phone No.: _____

Version No.: _____

Serial No.: _____

(※ Huvitz recommends customers to fill up the above form after purchase and retain this manual as a permanent record of purchase.)

Write us at:

HUVITZ Co., Ltd.

Huvitz B/D, 689-3 Geumjeong-dong

Gunpo-si Gyeonggi-do, 435-862,

Republic of Korea

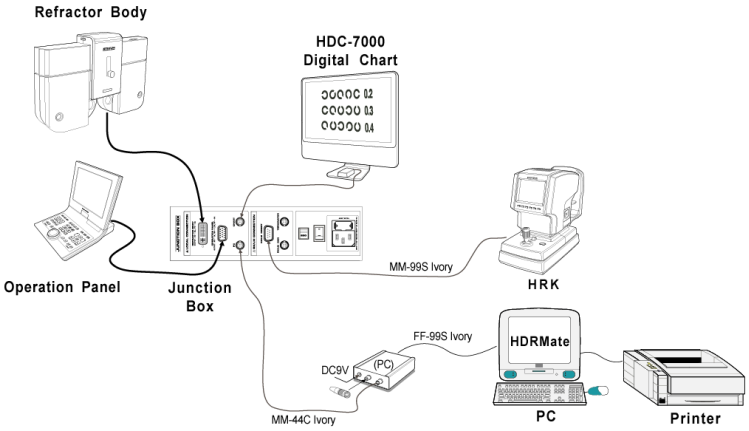
Tel: +82-31-442-8868

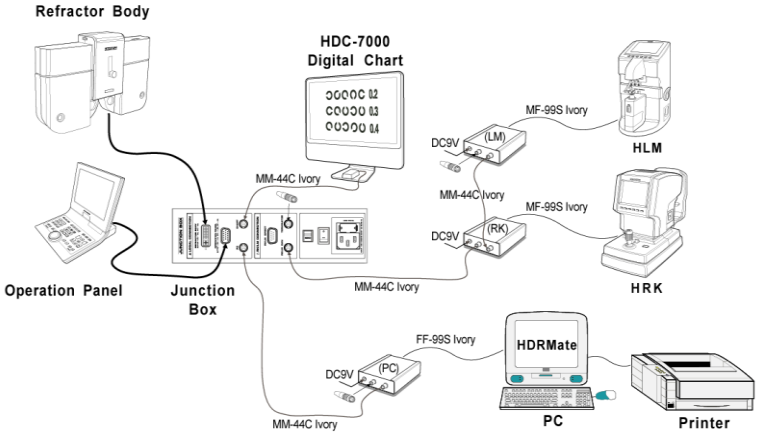
Fax: +82-31-442-8619

http://www.huvitz.com

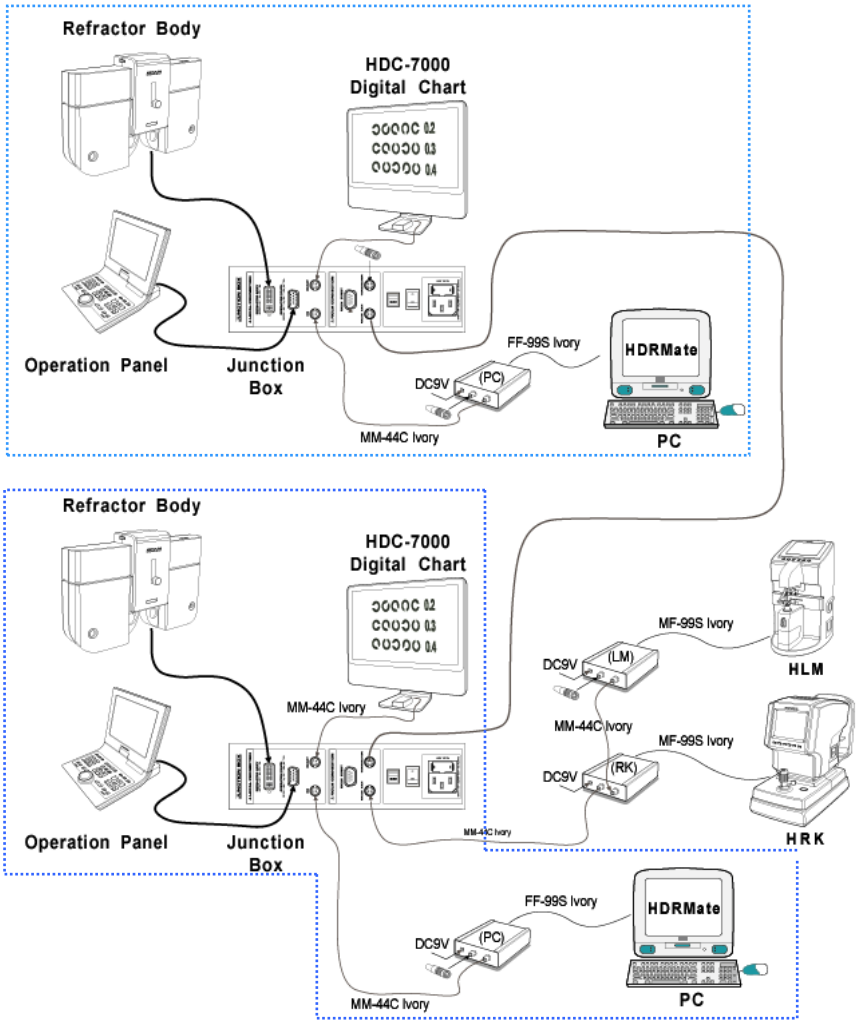
e-mail: cdrmate@huvitz.com

■ Appendix A. Stand-Alone System Configuration





■ Appendix B. Networked System Configuration



■ Appendix C. CSV-Format Export in Protocol Version 1.0

Field No.	Description
1	Company Name
2	Product Model
3	Version Number
4	Patient ID
5	Measurement Date
6	Age
7	Dominant Eye
8	PD
9	Near PD
10	Working Distance
11	Unaided VA(FAR:OU)
12	Unaided VA(FAR:Right)
13	Unaided VA(FAR:Left)
14	Unaided VA(NEAR:OU)
15	Unaided VA(NEAR:Right)
16	Unaided VA(NEAR:Left)
17	Lensometry Data(Sph-Right)
18	Lensometry Data(Cyl-Right)
19	Lensometry Data(Axis-Right)
20	Lensometry Data(ADD-Right)
21	Lensometry Data(Hor.Prism-Right)

22	Lensometry Data(Vert.Prism-Right)
23	Lensometry Data(Sph-Left)
24	Lensometry Data(Cyl-Left)
25	Lensometry Data(Axis-Left)
26	Lensometry Data(ADD-Left)
27	Lensometry Data(Hor.Prism-Left)
28	Lensometry Data(Vert.-Left)
29	Aided VA(OU)
30	Aided VA(Right)
31	Aided VA(Left)
32	Refractometry Data(Sph-Right)
33	Refractometry Data(Cyl-Right)
34	Refractometry Data(Axis-Right)
35	Refractometry Data(Sph-Left)
36	Refractometry Data(Cyl-Left)
37	Refractometry Data(Axis-Left)
38	Subjective Data(FAR:Sph-Right)
39	Subjective Data(FAR:Cyl-Right)
40	Subjective Data(FAR:Axis-Right)
41	Subjective Data(FAR:ADD-Right)
42	Subjective Data(FAR:Hor.Prism-Right)
43	Subjective Data(FAR:Vert.Prism-Right)
44	Subjective Data(FAR:Sph-Left)
45	Subjective Data(FAR:Cyl-Left)

46	Subjective Data(FAR:Axis-Left)
47	Subjective Data(FAR:ADD-Left)
48	Subjective Data(FAR:Hor.Prism-Left)
49	Subjective Data(FAR:Vert.Prism-Left)
50	Subjective Data(FAR:VA with ADD-OU)
51	Subjective Data(FAR:VA with ADD-Right)
52	Subjective Data(FAR:VA with ADD-Left)
53	Subjective Data(FAR:VA-OU)
54	Subjective Data(FAR:VA-Right)
55	Subjective Data(FAR:VA-Left)
56	Subjective Data(NEAR:Sph-Right)
57	Subjective Data(NEAR:Cyl-Right)
58	Subjective Data(NEAR:Axis-Right)
59	Subjective Data(NEAR:Hor.Prism-Right)
60	Subjective Data(NEAR:Vert.Prism-Right)
61	Subjective Data(NEAR:Sph-Left)
62	Subjective Data(NEAR:Cyl-Left)
63	Subjective Data(NEAR:Axis-Left)
64	Subjective Data(NEAR:Hor.Prism-Left)
65	Subjective Data(NEAR:Vert.Prism-Left)
66	Subjective Data(NEAR:VA-OU)
67	Subjective Data(NEAR:VA-Right)
68	Subjective Data(NEAR:VA-Left)
69	Final Prescription Data(FAR:Sph-Right)

70	Final Prescription Data(FAR:Cyl-Right)
71	Final Prescription Data(FAR:Axis-Right)
72	Final Prescription Data(FAR:ADD-Right)
73	Final Prescription Data(FAR:Hor.Prism-Right)
74	Final Prescription Data(FAR:Vert.Prism-Right)
75	Final Prescription Data(FAR:Sph-Left)
76	Final Prescription Data(FAR:Cyl-Left)
77	Final Prescription Data(FAR:Axis-Left)
78	Final Prescription Data(FAR:ADD-Left)
79	Final Prescription Data(FAR:Hor.Prism-Left)
80	Final Prescription Data(FAR:Vert.Prism-Left)
81	Final Prescription Data(FAR:VA with ADD-OU)
82	Final Prescription Data(FAR:VA with ADD-Right)
83	Final Prescription Data(FAR:VA with ADD-Left)
84	Final Prescription Data(FAR:VA-OU)
85	Final Prescription Data(FAR:VA-Right)
86	Final Prescription Data(FAR:VA-Left)
87	Final Prescription Data(NEAR:Sph-Right)
88	Final Prescription Data(NEAR:Cyl-Right)
89	Final Prescription Data(NEAR:Axis-Right)
90	Final Prescription Data(NEAR:Hor.Prism-Right)
91	Final Prescription Data(NEAR:Vert.Prism-Right)
92	Final Prescription Data(NEAR:Sph-Left)
93	Final Prescription Data(NEAR:Cyl-Left)

94	Final Prescription Data(NEAR:Axis-Left)
95	Final Prescription Data(NEAR:Hor.Prism-Left)
96	Final Prescription Data(NEAR:Vert.Prism-Left)
97	Final Prescription Data(NEAR:VA-OU)
98	Final Prescription Data(NEAR:VA-Right)
99	Final Prescription Data(NEAR:VA-Left)
100	NPC Data(Break-cm)
101	NPC Data(Break-MA)
102	NPC Data(Break-Prism)
103	NPA Data(Binocular-CM)
104	NPA Data(Binocular-Diopter)
105	NRA Data(Blur)
106	NRA Data(Recovery)
107	PRA Data(Blur)
108	PRA Data(Recovery)
109	NRC Data(FAR:Blur)
110	NRC Data(FAR:Break)
111	NRC Data(FAR:Recovery)
112	PRC Data(FAR:Blur)
113	PRC Data(FAR:Break)
114	PRC Data(FAR:Recovery)
115	NRC Data(NEAR:Blur)
116	NRC Data(NEAR:Break)
117	NRC Data(NEAR:Recovery)

118	PRC Data(NEAR:Blur)
119	PRC Data(NEAR:Break)
120	PRC Data(NEAR:Recovery)
121	Prism Test-Schober(FAR:Hor.Prism-Right)
122	Prism Test-Schober(FAR:Vert.Prism-Right)
123	Prism Test-Schober(FAR:Hor.Prism-Left)
124	Prism Test-Schober(FAR:Vert.Prism-Left)
125	Prism Test-Schober(NEAR:Hor.Prism-Right)
126	Prism Test-Schober(NEAR:Vert.Prism-Right)
127	Prism Test-Schober(NEAR:Hor.Prism-Left)
128	Prism Test-Schober(NEAR:Vert.Prism-Left)
129	Prism Test-Von Graefe(FAR:Hor.Prism-Right)
130	Prism Test-Von Graefe(FAR:Vert.Prism-Right)
131	Prism Test-Von Graefe(FAR:Hor.Prism-Left)
132	Prism Test-Von Graefe(FAR:Vert.Prism-Left)
133	Prism Test-Von Graefe(NEAR:Hor.Prism-Right)
134	Prism Test-Von Graefe(NEAR:Vert.Prism-Right)
135	Prism Test-Von Graefe(NEAR:Hor.Prism-Left)
136	Prism Test-Von Graefe(NEAR:Vert.Prism-Left)
137	Prism Test-Coincidence(FAR:Hor.Prism-Right)
138	Prism Test-Coincidence(FAR:Vert.Prism-Right)
139	Prism Test-Coincidence(FAR:Hor.Prism-Left)
140	Prism Test-Coincidence(FAR:Vert.Prism-Left)
141	Prism Test-Coincidence(NEAR:Hor.Prism-Right)

142	Prism Test-Coincidence(NEAR:Vert.Prism-Right)
143	Prism Test-Coincidence(NEAR:Hor.Prism-Left)
144	Prism Test-Coincidence(NEAR:Vert.Prism-Left)
145	Prism Test-Polarized Cross(FAR:Hor.Prism-Right)
146	Prism Test-Polarized Cross(FAR:Vert.Prism-Right)
147	Prism Test-Polarized Cross(FAR:Hor.Prism-Left)
148	Prism Test-Polarized Cross(FAR:Vert.Prism-Left)
149	Prism Test-Polarized Cross(NEAR:Hor.Prism-Right)
150	Prism Test-Polarized Cross(NEAR:Vert.Prism-Right)
151	Prism Test-Polarized Cross(NEAR:Hor.Prism-Left)
152	Prism Test-Polarized Cross(NEAR:Vert.Prism-Left)
153	Prism Test-Polarized Cross w/ Fix.(FAR:Hor.Prism-Right)
154	Prism Test-Polarized Cross w/ Fix.(FAR:Vert.Prism-Right)
155	Prism Test-Polarized Cross w/ Fix.(FAR:Hor.Prism-Left)
156	Prism Test-Polarized Cross w/ Fix.(FAR:Vert.Prism-Left)
157	Prism Test-Polarized Cross w/ Fix.(NEAR:Hor.Prism-Right)
158	Prism Test-Polarized Cross w/ Fix.(NEAR:Vert.Prism-Right)
159	Prism Test-Polarized Cross w/ Fix.(NEAR:Hor.Prism-Left)
160	Prism Test-Polarized Cross w/ Fix.(NEAR:Vert.Prism-Left)
161	Prism Test-Maddox Rod(FAR:Hor.Prism-Right)
162	Prism Test-Maddox Rod(FAR:Vert.Prism-Right)
163	Prism Test-Maddox Rod(FAR:Hor.Prism-Left)
164	Prism Test-Maddox Rod(FAR:Vert.Prism-Left)
165	Prism Test-Maddox Rod(NEAR:Hor.Prism-Right)

166	Prism Test-Maddox Rod(NEAR:Vert.Prism-Right)
167	Prism Test-Maddox Rod(NEAR:Hor.Prism-Left)
168	Prism Test-Maddox Rod(NEAR:Vert.Prism-Left)
169	Bino. Visual Function Test-Worth(FAR)
170	Bino. Visual Function Test-Stereo(FAR)
171	Bino. Visual Function Test-Minute Stereo(FAR)
172	Bino. Visual Function Test-Aniseikonia(FAR)
173	Bino. Visual Function Test-Vert. Aniseikonia(FAR)
174	Bino. Visual Function Test-Worth(NEAR)
175	Bino. Visual Function Test-Stereo(NEAR)
176	Bino. Visual Function Test-Minute Stereo(NEAR)
177	Bino. Visual Function Test-Hor. Aniseikonia(NEAR)
178	Bino. Visual Function Test-Vert. Aniseikonia(NEAR)
179	Keratometry Data(R1:mm-Right)
180	Keratometry Data(R1:Diopter-Right)
181	Keratometry Data(R1:Axis-Right)
182	Keratometry Data(R1:mm-Left)
183	Keratometry Data(R1:Diopter-Left)
184	Keratometry Data(R1:Axis-Left)
185	Keratometry Data(R2:mm-Right)
186	Keratometry Data(R2:Diopter-Right)
187	Keratometry Data(R2:Axis-Right)
188	Keratometry Data(R2:mm-Left)
189	Keratometry Data(R2:Diopter-Left)

190	Keratometry Data(R2:Axis-Left)
191	"@" (End of Data)

■ Appendix D. CSV-Format Export in Protocol Version 1.1

Field No.	Description
1	Protocol(Data Format) Version Number
2	Company Name
3	Product Model
4	Version Number
5	Patient ID
6	Measurement Date
7	Age
8	Dominant Eye
9	PD
10	Near PD
11	Working Distance
12	Unaided VA(FAR:OU)
13	Unaided VA(FAR:Right)
14	Unaided VA(FAR:Left)
15	Unaided VA(NEAR:OU)
16	Unaided VA(NEAR:Right)
17	Unaided VA(NEAR:Left)
18	Lensometry Data(Sph-Right)
19	Lensometry Data(Cyl-Right)
20	Lensometry Data(Axis-Right)
21	Lensometry Data(ADD-Right)

22	Lensometry Data(Hor.Prism-Right)
23	Lensometry Data(Vert.Prism-Right)
24	Lensometry Data(Sph-Left)
25	Lensometry Data(Cyl-Left)
26	Lensometry Data(Axis-Left)
27	Lensometry Data(ADD-Left)
28	Lensometry Data(Hor.Prism-Left)
29	Lensometry Data(Vert.-Left)
30	Aided VA(OU)
31	Aided VA(Right)
32	Aided VA(Left)
33	Refractometry Data(Sph-Right)
34	Refractometry Data(Cyl-Right)
35	Refractometry Data(Axis-Right)
36	Refractometry Data(Sph-Left)
37	Refractometry Data(Cyl-Left)
38	Refractometry Data(Axis-Left)
39	Subjective Data(FAR:Sph-Right)
40	Subjective Data(FAR:Cyl-Right)
41	Subjective Data(FAR:Axis-Right)
42	Subjective Data(FAR:ADD-Right)
43	Subjective Data(FAR:Hor.Prism-Right)
44	Subjective Data(FAR:Vert.Prism-Right)
45	Subjective Data(FAR:Sph-Left)

46	Subjective Data(FAR:Cyl-Left)
47	Subjective Data(FAR:Axis-Left)
48	Subjective Data(FAR:ADD-Left)
49	Subjective Data(FAR:Hor.Prism-Left)
50	Subjective Data(FAR:Vert.Prism-Left)
51	Subjective Data(FAR:VA with ADD-OU)
52	Subjective Data(FAR:VA with ADD-Right)
53	Subjective Data(FAR:VA with ADD-Left)
54	Subjective Data(FAR:VA-OU)
55	Subjective Data(FAR:VA-Right)
56	Subjective Data(FAR:VA-Left)
57	Subjective Data(NEAR:Sph-Right)
58	Subjective Data(NEAR:Cyl-Right)
59	Subjective Data(NEAR:Axis-Right)
60	Subjective Data(NEAR:Hor.Prism-Right)
61	Subjective Data(NEAR:Vert.Prism-Right)
62	Subjective Data(NEAR:Sph-Left)
63	Subjective Data(NEAR:Cyl-Left)
64	Subjective Data(NEAR:Axis-Left)
65	Subjective Data(NEAR:Hor.Prism-Left)
66	Subjective Data(NEAR:Vert.Prism-Left)
67	Subjective Data(NEAR:VA-OU)
68	Subjective Data(NEAR:VA-Right)
69	Subjective Data(NEAR:VA-Left)

70	Final Prescription Data(FAR:Sph-Right)
71	Final Prescription Data(FAR:Cyl-Right)
72	Final Prescription Data(FAR:Axis-Right)
73	Final Prescription Data(FAR:ADD-Right)
74	Final Prescription Data(FAR:Hor.Prism-Right)
75	Final Prescription Data(FAR:Vert.Prism-Right)
76	Final Prescription Data(FAR:Sph-Left)
77	Final Prescription Data(FAR:Cyl-Left)
78	Final Prescription Data(FAR:Axis-Left)
79	Final Prescription Data(FAR:ADD-Left)
80	Final Prescription Data(FAR:Hor.Prism-Left)
81	Final Prescription Data(FAR:Vert.Prism-Left)
82	Final Prescription Data(FAR:VA with ADD-OU)
83	Final Prescription Data(FAR:VA with ADD-Right)
84	Final Prescription Data(FAR:VA with ADD-Left)
85	Final Prescription Data(FAR:VA-OU)
86	Final Prescription Data(FAR:VA-Right)
87	Final Prescription Data(FAR:VA-Left)
88	Final Prescription Data(NEAR:Sph-Right)
89	Final Prescription Data(NEAR:Cyl-Right)
90	Final Prescription Data(NEAR:Axis-Right)
91	Final Prescription Data(NEAR:Hor.Prism-Right)
92	Final Prescription Data(NEAR:Vert.Prism-Right)
93	Final Prescription Data(NEAR:Sph-Left)

94	Final Prescription Data(NEAR:Cyl-Left)
95	Final Prescription Data(NEAR:Axis-Left)
96	Final Prescription Data(NEAR:Hor.Prism-Left)
97	Final Prescription Data(NEAR:Vert.Prism-Left)
98	Final Prescription Data(NEAR:VA-OU)
99	Final Prescription Data(NEAR:VA-Right)
100	Final Prescription Data(NEAR:VA-Left)
101	NPC Data(Break-cm)
102	NPC Data(Break-MA)
103	NPC Data(Break-Prism)
104	NPC Data(Recovery-cm)
105	NPC Data(Recovery-MA)
106	NPC Data(Recovery-Prism)
107	NPA Data(Binocular-CM)
108	NPA Data(Binocular-Diopter)
109	NPA Data(Right-cm)
110	NPA Data(Right-Diopter)
111	NPA Data(Left-cm)
112	NPA Data(Left-Diopter)
113	NRA Data(Blur)
114	NRA Data(Recovery)
115	PRA Data(Blur)
116	PRA Data(Recovery)
117	NRC Data(FAR:Blur)

118	NRC Data(FAR:Break)
119	NRC Data(FAR:Recovery)
120	PRC Data(FAR:Blur)
121	PRC Data(FAR:Break)
122	PRC Data(FAR:Recovery)
123	NRC Data(NEAR:Blur)
124	NRC Data(NEAR:Break)
125	NRC Data(NEAR:Recovery)
126	PRC Data(NEAR:Blur)
127	PRC Data(NEAR:Break)
128	PRC Data(NEAR:Recovery)
129	Prism Test-Schober(FAR:Hor.Prism-Right)
130	Prism Test-Schober(FAR:Vert.Prism-Right)
131	Prism Test-Schober(FAR:Hor.Prism-Left)
132	Prism Test-Schober(FAR:Vert.Prism-Left)
133	Prism Test-Von Graefe(FAR:Hor.Prism-Right)
134	Prism Test-Von Graefe(FAR:Vert.Prism-Right)
135	Prism Test-Von Graefe(FAR:Hor.Prism-Left)
136	Prism Test-Von Graefe(FAR:Vert.Prism-Left)
137	Prism Test-Von Graefe(NEAR:Hor.Prism-Right)
138	Prism Test-Von Graefe(NEAR:Vert.Prism-Right)
139	Prism Test-Von Graefe(NEAR:Hor.Prism-Left)
140	Prism Test-Von Graefe(NEAR:Vert.Prism-Left)
141	Prism Test-Coincidence(FAR:Hor.Prism-Right)

142	Prism Test-Coincidence(FAR:Vert.Prism-Right)
143	Prism Test-Coincidence(FAR:Hor.Prism-Left)
144	Prism Test-Coincidence(FAR:Vert.Prism-Left)
145	Prism Test-Polarized Cross(FAR:Hor.Prism-Right)
146	Prism Test-Polarized Cross(FAR:Vert.Prism-Right)
147	Prism Test-Polarized Cross(FAR:Hor.Prism-Left)
148	Prism Test-Polarized Cross(FAR:Vert.Prism-Left)
149	Prism Test-Polarized Cross w/ Fix.(FAR:Hor.Prism-Right)
150	Prism Test-Polarized Cross w/ Fix.(FAR:Vert.Prism-Right)
151	Prism Test-Polarized Cross w/ Fix.(FAR:Hor.Prism-Left)
152	Prism Test-Polarized Cross w/ Fix.(FAR:Vert.Prism-Left)
153	Prism Test-Maddox Rod(FAR:Hor.Prism-Right)
154	Prism Test-Maddox Rod(FAR:Vert.Prism-Right)
155	Prism Test-Maddox Rod(FAR:Hor.Prism-Left)
156	Prism Test-Maddox Rod(FAR:Vert.Prism-Left)
157	Prism Test-Maddox Rod(NEAR:Hor.Prism-Right)
158	Prism Test-Maddox Rod(NEAR:Vert.Prism-Right)
159	Prism Test-Maddox Rod(NEAR:Hor.Prism-Left)
160	Prism Test-Maddox Rod(NEAR:Vert.Prism-Left)
161	Bino. Visual Function Test-Worth(FAR)
162	Bino. Visual Function Test-Stereo(FAR)
163	Bino. Visual Function Test-Minute Stereo(FAR)
164	Bino. Visual Function Test-Aniseikonia(FAR)
165	Bino. Visual Function Test-Worth(NEAR)

166	Keratometry Data(R1:mm-Right)
167	Keratometry Data(R1:Diopter-Right)
168	Keratometry Data(R1:Axis-Right)
169	Keratometry Data(R1:mm-Left)
170	Keratometry Data(R1:Diopter-Left)
171	Keratometry Data(R1:Axis-Left)
172	Keratometry Data(R2:mm-Right)
173	Keratometry Data(R2:Diopter-Right)
174	Keratometry Data(R2:Axis-Right)
175	Keratometry Data(R2:mm-Left)
176	Keratometry Data(R2:Diopter-Left)
177	Keratometry Data(R2:Axis-Left)
178	"@" (End of Data)

■ Appendix E. CSV-Format Export in Protocol Version 1.2

Field No.	Description
1	Protocol(Data Format) Version Number
2	Company Name
3	Product Model
4	Version Number
5	Patient ID
6	Measurement Date
7	Age
8	Dominant Eye
9	Far PD (OU)
10	Far PD (Right)
11	Far PD (Left)
12	Near PD (OU)
13	Near PD (Right)
14	Near PD (Left)
15	Working Distance
16	Unaided VA(FAR:OU)
17	Unaided VA(FAR:Right)
18	Unaided VA(FAR:Left)
19	Unaided VA(NEAR:OU)
20	Unaided VA(NEAR:Right)
21	Unaided VA(NEAR:Left)

22	Lensometry Data(Sph-Right)
23	Lensometry Data(Cyl-Right)
24	Lensometry Data(Axis-Right)
25	Lensometry Data(ADD-Right)
26	Lensometry Data(Hor.Prism-Right)
27	Lensometry Data(Vert.Prism-Right)
28	Lensometry Data(Sph-Left)
29	Lensometry Data(Cyl-Left)
30	Lensometry Data(Axis-Left)
31	Lensometry Data(ADD-Left)
32	Lensometry Data(Hor.Prism-Left)
33	Lensometry Data(Vert.-Left)
34	Aided VA(OU)
35	Aided VA(Right)
36	Aided VA(Left)
37	Refractometry Data(Sph-Right)
38	Refractometry Data(Cyl-Right)
39	Refractometry Data(Axis-Right)
40	Refractometry Data(Sph-Left)
41	Refractometry Data(Cyl-Left)
42	Refractometry Data(Axis-Left)
43	Retinoscopy Data (Far: Sph-Right)
44	Retinoscopy Data (Far: Cyl-Right)
45	Retinoscopy Data (Far: Axis-Right)

46	Retinoscopy Data (Far: Sph-Left)
47	Retinoscopy Data (Far: Cyl-Left)
48	Retinoscopy Data (Far: Axis-Left)
49	Subjective Data(FAR:Sph-Right)
50	Subjective Data(FAR:Cyl-Right)
51	Subjective Data(FAR:Axis-Right)
52	Subjective Data(FAR:ADD-Right)
53	Subjective Data(FAR:Hor.Prism-Right)
54	Subjective Data(FAR:Vert.Prism-Right)
55	Subjective Data(FAR:Sph-Left)
56	Subjective Data(FAR:Cyl-Left)
57	Subjective Data(FAR:Axis-Left)
58	Subjective Data(FAR:ADD-Left)
59	Subjective Data(FAR:Hor.Prism-Left)
60	Subjective Data(FAR:Vert.Prism-Left)
61	Subjective Data(FAR:VA with ADD-OU)
62	Subjective Data(FAR:VA with ADD-Right)
63	Subjective Data(FAR:VA with ADD-Left)
64	Subjective Data(FAR:VA-OU)
65	Subjective Data(FAR:VA-Right)
66	Subjective Data(FAR:VA-Left)
67	Subjective Data(NEAR:Sph-Right)
68	Subjective Data(NEAR:Cyl-Right)
69	Subjective Data(NEAR:Axis-Right)

70	Subjective Data(NEAR:Hor.Prism-Right)
71	Subjective Data(NEAR:Vert.Prism-Right)
72	Subjective Data(NEAR:Sph-Left)
73	Subjective Data(NEAR:Cyl-Left)
74	Subjective Data(NEAR:Axis-Left)
75	Subjective Data(NEAR:Hor.Prism-Left)
76	Subjective Data(NEAR:Vert.Prism-Left)
77	Subjective Data(NEAR:VA-OU)
78	Subjective Data(NEAR:VA-Right)
79	Subjective Data(NEAR:VA-Left)
80	Final Prescription Data(FAR:Sph-Right)
81	Final Prescription Data(FAR:Cyl-Right)
82	Final Prescription Data(FAR:Axis-Right)
83	Final Prescription Data(FAR:ADD-Right)
84	Final Prescription Data(FAR:Hor.Prism-Right)
85	Final Prescription Data(FAR:Vert.Prism-Right)
86	Final Prescription Data(FAR:Sph-Left)
87	Final Prescription Data(FAR:Cyl-Left)
88	Final Prescription Data(FAR:Axis-Left)
89	Final Prescription Data(FAR:ADD-Left)
90	Final Prescription Data(FAR:Hor.Prism-Left)
91	Final Prescription Data(FAR:Vert.Prism-Left)
92	Final Prescription Data(FAR:VA with ADD-OU)
93	Final Prescription Data(FAR:VA with ADD-Right)

94	Final Prescription Data(FAR:VA with ADD-Left)
95	Final Prescription Data(FAR:VA-OU)
96	Final Prescription Data(FAR:VA-Right)
97	Final Prescription Data(FAR:VA-Left)
98	Final Prescription Data(NEAR:Sph-Right)
99	Final Prescription Data(NEAR:Cyl-Right)
100	Final Prescription Data(NEAR:Axis-Right)
101	Final Prescription Data(NEAR:Hor.Prism-Right)
102	Final Prescription Data(NEAR:Vert.Prism-Right)
103	Final Prescription Data(NEAR:Sph-Left)
104	Final Prescription Data(NEAR:Cyl-Left)
105	Final Prescription Data(NEAR:Axis-Left)
106	Final Prescription Data(NEAR:Hor.Prism-Left)
107	Final Prescription Data(NEAR:Vert.Prism-Left)
108	Final Prescription Data(NEAR:VA-OU)
109	Final Prescription Data(NEAR:VA-Right)
110	Final Prescription Data(NEAR:VA-Left)
111	NPC Data(Break-cm)
112	NPC Data(Break-MA)
113	NPC Data(Break-Prism)
114	NPC Data(Recovery-cm)
115	NPC Data(Recovery-MA)
116	NPC Data(Recovery-Prism)
117	NPA Data(Binocular-CM)

118	NPA Data(Binocular-Diopter)
119	NPA Data(Right-cm)
120	NPA Data(Right-Diopter)
121	NPA Data(Left-cm)
122	NPA Data(Left-Diopter)
123	NRA Data(Blur)
124	NRA Data(Recovery)
125	PRA Data(Blur)
126	PRA Data(Recovery)
127	NRC Data(FAR:Blur)
128	NRC Data(FAR:Break)
129	NRC Data(FAR:Recovery)
130	PRC Data(FAR:Blur)
131	PRC Data(FAR:Break)
132	PRC Data(FAR:Recovery)
133	NRC Data(NEAR:Blur)
134	NRC Data(NEAR:Break)
135	NRC Data(NEAR:Recovery)
136	PRC Data(NEAR:Blur)
137	PRC Data(NEAR:Break)
138	PRC Data(NEAR:Recovery)
139	Prism Test-Schober(FAR:Hor.Prism-Right)
140	Prism Test-Schober(FAR:Vert.Prism-Right)
141	Prism Test-Schober(FAR:Hor.Prism-Left)

142	Prism Test-Schober(FAR:Vert.Prism-Left)
143	Prism Test-Von Graefe(FAR:Hor.Prism-Right)
144	Prism Test-Von Graefe(FAR:Vert.Prism-Right)
145	Prism Test-Von Graefe(FAR:Hor.Prism-Left)
146	Prism Test-Von Graefe(FAR:Vert.Prism-Left)
147	Prism Test-Von Graefe(NEAR:Hor.Prism-Right)
148	Prism Test-Von Graefe(NEAR:Vert.Prism-Right)
149	Prism Test-Von Graefe(NEAR:Hor.Prism-Left)
150	Prism Test-Von Graefe(NEAR:Vert.Prism-Left)
151	Prism Test-Coincidence(FAR:Hor.Prism-Right)
152	Prism Test-Coincidence(FAR:Vert.Prism-Right)
153	Prism Test-Coincidence(FAR:Hor.Prism-Left)
154	Prism Test-Coincidence(FAR:Vert.Prism-Left)
155	Prism Test-Polarized Cross(FAR:Hor.Prism-Right)
156	Prism Test-Polarized Cross(FAR:Vert.Prism-Right)
157	Prism Test-Polarized Cross(FAR:Hor.Prism-Left)
158	Prism Test-Polarized Cross(FAR:Vert.Prism-Left)
159	Prism Test-Polarized Cross w/ Fix.(FAR:Hor.Prism-Right)
160	Prism Test-Polarized Cross w/ Fix.(FAR:Vert.Prism-Right)
161	Prism Test-Polarized Cross w/ Fix.(FAR:Hor.Prism-Left)
162	Prism Test-Polarized Cross w/ Fix.(FAR:Vert.Prism-Left)
163	Prism Test-Maddox Rod(FAR:Hor.Prism-Right)
164	Prism Test-Maddox Rod(FAR:Vert.Prism-Right)
165	Prism Test-Maddox Rod(FAR:Hor.Prism-Left)

166	Prism Test-Maddox Rod(FAR:Vert.Prism-Left)
167	Prism Test-Maddox Rod(NEAR:Hor.Prism-Right)
168	Prism Test-Maddox Rod(NEAR:Vert.Prism-Right)
169	Prism Test-Maddox Rod(NEAR:Hor.Prism-Left)
170	Prism Test-Maddox Rod(NEAR:Vert.Prism-Left)
171	Bino. Visual Function Test-Worth(FAR)
172	Bino. Visual Function Test-Stereo(FAR)
173	Bino. Visual Function Test-Minute Stereo(FAR)
174	Bino. Visual Function Test-Aniseikonia(FAR)
175	Bino. Visual Function Test-Worth(NEAR)
176	Keratometry Data(R1:mm-Right)
177	Keratometry Data(R1:Diopter-Right)
178	Keratometry Data(R1:Axis-Right)
179	Keratometry Data(R1:mm-Left)
180	Keratometry Data(R1:Diopter-Left)
181	Keratometry Data(R1:Axis-Left)
182	Keratometry Data(R2:mm-Right)
183	Keratometry Data(R2:Diopter-Right)
184	Keratometry Data(R2:Axis-Right)
185	Keratometry Data(R2:mm-Left)
186	Keratometry Data(R2:Diopter-Left)
187	Keratometry Data(R2:Axis-Left)
188	"@" (End of Data)

■ Appendix F. HDR Mate Import Format

■ Ref/Keratometry Data

No.	Name	Format	Example
1	Data Number	"######"	"000123"
2	Refractometry Data(Sph-Right)	{+|-|(EMPTY)}"##.##"	"-6.00"
3	Refractometry Data(Cyl-Right)	{+|-|(EMPTY)}"#.##"	"0.00"
4	Refractometry Data(Axis-Right)	"###"	"0"
5	Refractometry Data(Sph-Left)	{+|-|(EMPTY)}"##.##"	"-5.50"
6	Refractometry Data(Cyl-Left)	{+|-|(EMPTY)}"#.##"	"0.00"
7	Refractometry Data(Axis-Left)	"###"	"0"
8	Keratometry Data(R1:mm-Right)	"##.##"	"7.78"
9	Keratometry Data(R2:mm-Right)	"##.##"	"7.76"
10	Keratometry Data(Axis-Right)	"###"	"0"
11	Keratometry Data(R1:mm-Left)	"##.##"	"7.80"
12	Keratometry Data(R2:mm-Left)	"##.##"	"7.78"
13	Keratometry Data(Axis-Left)	"###"	"0"
14	Refractometry Data(PD)	"##.#"	"64.0"

- Importing file should be a plain text CSV format with filename extension of **mrk or hrk**. For example, 12345**.hrk**.
- '#' means a digit of number

■ Lensometry Data

No.	Name	Format	Example
1	Data Number	"######"	"000123"
2	Lensometry Data(Sph-Right)	{+|-|(EMPTY)}"##.##"	"-2.50"
3	Lensometry Data(Cyl-Right)	{+|-|(EMPTY)}"#.##"	"0.00"
4	Lensometry Data(Axis-Right)	"###"	"0"
5	Lensometry Data(Hor.Prism-Right)	{+|-|(EMPTY)}"##.##"	"0.00"
6	Lensometry Data(Vert.Prism-Right)	{+|-|(EMPTY)}"##.##"	"0.00"
7	Lensometry Data(ADD-Right)	{+|-}"#.##"	"+0.00"
8	Lensometry Data(Sph-Left)	{+|-|(EMPTY)}"##.##"	"-3.00"
9	Lensometry Data(Cyl-Left)	{+|-|(EMPTY)}"#.##"	"-0.25"
10	Lensometry Data(Axis-Left)	"###"	"41"
11	Lensometry Data(Hor.Prism-Left)	{+|-|(EMPTY)}"##.##"	"0.00"
12	Lensometry Data(Vert.-Left)	{+|-|(EMPTY)}"##.##"	"0.00"
13	Lensometry Data(ADD-Left)	{+|-}"#.##"	"+0.00"
14	Lensometry Data(PD)	"##.#"	"64.0"

- Importing file should be a plain text CSV format with filename extension of **clm or hlm**. For example, 12345**.hlm**.
- '#' means a digit of number
- '#' means a digit of number
- In horizontal prism fields, '+' means BI and '-' means BO
  In vertical prism fields, '+' means BU and '-' means BD