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ProDVD170
Technical Manual

Document version v1.3

APPLICABLE FOR PLAYERS WITH FIRMWARE VERSION :

v9.25

For more information about the ProDVD-170,
please check our website: www.prodvd.philips.com

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INTRODUCTION

This is the technical documentation for the ProDVD170 series of DVD-Video Players. This documentation is especially made to support development of sophisticated DVD-Video applications for this special player.

Please notice that this document is valid for ProDVD-170 players executed with firmware version: v9.25

If you have any questions about this document, please feel free to contact either Eric Gielen (Eric.Gielen@Philips.com) or Edwin Duijnisveld (Edwin.Duijnisveld@Philips.com).

Procedure to check the DVD-170 firmware version :

The firmware version of the ProDVD-170 player can easily be checked by switching on the ProDVD-170 player without a disc and then pushing the "setup" button on the remote. Then push the "Menu Down Cursor Movement button" on the remote (Yellow button with downwards arrow) till you reach the "OSD Language" selection field. One extra click on the "Menu Down Cursor Movement button" of the remote (Yellow button with downwards arrow) and the content of the OSD Language field will change in (C)Philips'98-'99) x.y.z. ..... where x.y.z. stands for the firmware release version.
Example :   (C)Philips'98-'99) v8.00

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I/O port

The ProDVD170 professional DVD player can also be controlled by an external controller or a pointing device. This can be done via the I/O port at the rear of the player. The connector type is a D-sub 9 male.

One and the same interface is used for pointing devices as well as for external control.

- The pointing device protocol has an automatic pointing device protocol activated when the transmission speed is 1200 baud.
- The control via an external controller is activated when the transmission speed is 9600 baud.

Pointing device protocol

Communications signals follow the RS-232-C specifications. For details of this see the EIA RS-232-C standard.

- 1 start bit
- 7 data bits LSB first
- 2 stop bits
- Speed 1200 bauds

For pointing devices only two signal lines carry data. The first is RTS, which is always output from the player. The second is RXD, which is always input to the player.

Pinning input (sub-D9 male on the player):		
pin	signal	I/O
1		
2	RXD	I
3	TXD	O
4	+5V	max 200mA
5	GND	
6		
7	RTS	O
8	CTS	I
9		

I = input signal for the Player
O = output signal from the Player
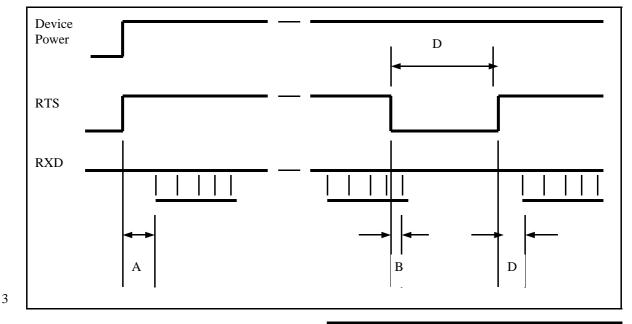
RATINGS:

+5V output from the player:
- accuracy: +5V 10%
- supply current: min 200mA

RXD /TXD
- logical 1: -15V < signal level < +0.8V
- logical 0: +2.4V < signal level < +15V (Output impedance pointing device max 4.7kOhm)

RTS /CTS
- Off (Negated): -15V < signal level <+0.8V
- On (Asserted): +2.4V < signal level < +15V

This interface allows for pointing devices and accessories which are powered from the player using logic circuits operating on 5V only.

Device ID codes		
Device Type	d6 – – d0	ASCII
Relative	1001101	'M'
Maneuvering	1001010	'J'
Absolute	1010100	'T'
Absolute Screen	1010011	'S '

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Device identification pointing devices

Every pointing device is to transmit its type identification (ID) byte on request. This allows the player to identify the device type that is connected to it for maximum flexibility and ease of use.

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Device ID sequence
- Negate RTS: Current data transmission to the player is stopped.
- Assert RTS.
- The device sends its 1-byte device ID.

Note: It is adviseable to send a complete data packet after the identification byte to establish the state of the buttons.

Device ID timing
- A:

device power-on to ID byte timing
- Min. 100ms
- Max. 500ms.
- B:

negate RTS timing:
- Min. 10ms
- Max. irrelevant.
- C:

Residual data transmission time when RTS is negated:
- Min. 0 ms.
- Max. 1 byte period (1200 baud = 8.3ms)
- D:

Assert RTS to ID byte timing when device is powered:
- Max. 10ms.

External controller protocol

The communication with an external ProDVD controller is done with the following settings :
- 8 data bits,
- 1 stop,
- no parity bit
- speed of 9600 Baud.

Communication between a ProDVD controller and the DVD player consist of 3 different types of information:
- External control commands
- External control status
- Asynchronous responses

The messages between the ProDVD and the ProDVD controller look like: "[group, command, parameter-list]\r"
A group, command and parameter-list between square-brackets, followed by a carriage-return character (\r).
The group and command are not case sensitive; there is no difference in the usage of uppercase and lowercase characters. The parameter-list exists of comma separated parameters, and are case sensitive.

When the player receives a message from the external controller, it will be acknowledged. This acknowledgment will be done in 2 different ways.

- For external control commands, the acknowledgment will look like:
  - group: group specified in the received message (PC)
  - command: command specified in the received message
  - parameter-list ReturnValue

  ReturnValue can have one of the following values
  - 0: No error
  - x: Error code x

  Example:
  - player receives: [PC, RC, 66]\r
  - player sends: [PC, RC, 0]\r

When the external controller receives the response this implies that the player has verified the received message (syntax), and the command will be executed (It does not imply that the command is executed without errors).

- For external control status messages there is specified a response message on a request. The response is the acknowledgment of the request.

Example:
- Request: [PS, GetAudioStream]\r
- Response: [PS, GetAudioStream, 0, 2]\r

When the external controller receives the response, the player has executed the command.

- When an external control command causes an error, an asynchronous error message will be send to the external controller.

  Example:
  - Player receives: [PC, RC, 44]\r
  - Player sends: [PC, RC, 0]\r
  - Player sends: [PR, Error, 10]\r

When the external controller receives the response, the player has verified the message (syntax), and when no errors occurred, the command will be executed. If an internal error occurs and the command can not be executed, an error message will be send.

- When the command does not cause an error, but execution of this command changes the state of the player, this status change will be send to the external controller. Also other asynchronous responses, e.g. start of chapter, can be expected.

  Example:
  - Player receives: [PC, RC, 44]\r
  - Player sends: [PC, RC, 0]\r
  - Player sends: [PR, StatusChange, 4]\r
  - Player sends: [PR, SOC, 2]\r

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RELATIVE COORDINATE AND MANEUVRING DEVICES

Relative Coordinate devices e.g. Mice, Trackballs and Maneuvring devices e.g. Joysticks and joypads

Data Flow

During normal operation (RTS asserted):
- Data is sent to the player via RXD.
- Every time the device is moved or button state is changed, 3-byte data packets should be transmitted to the player.
- No data should be transmitted when the device is stationary (in center position) and the button state is unchanged (pressed or released).
- A button state change or device position change should not interrupt a data packet transmission.
- To allow for additional buttons on the pointing device, one additional byte (with d6 =0) may be added to the data package. Systems specified to work with the specific device will react to this byte; other systems will ignore it.

bt 1 = button 1:　　1 = pressed
　　　　　　　　　　0 = not pressed
bt 2 = button 2:　　1 = pressed
　　　　　　　　　　0 = not pressed
X7..XO:　　　　8-bit data horizontal movement. 2's complement. left direction = negative ($FF..$80) right direction = positive ($01 ..$7F)
Y7..YO:　　　　8-bit data vertical movement.

	d6	d5	d4	d3	d2	d1	d0
Byte 0	1	bt1	bt2	Y7	Y6	X7	X6
Byte 1	0	X5	X4	X3	X2	X1	X0
Byte 2	0	Y5	Y4	Y3	Y2	Y1	Y0
Byte 3 (optional)	0						

2's complement. up direction = negative ($FF..$80) down direction = positive ($01 ..S7F)
A value of $00 for horizontal or vertical movement indicates no movement in that direction.

note: bt1 and bt2 will be implemented as OK button

ABSOLUTE SCREEN DEVICES AND ABSOLUTE COORDINATE DEVICES

Absolute screen devices and absolute coordinate devices e.g. Touch Screens, Light Pens.

Data flow

During normal operation (RTS asserted):
- Data is sent to the player via RXD.
- Every time the pointing indicator is in motion in the active area or a button state is changed, 4-byte data packets should be transmitted to the player.
- No data should be transmitted when the pointing indicator is not in the active area and the button state is unchanged (pressed or released).
- A button state change or device position change should not interrupt a data packet transmission.
- To allow for additional buttons on the pointing device, one additional byte (with d6 =0) may be added to the data package. Systems specified to work with the specific device will react to this byte; other systems will ignore it.

bt 1 = button 1:　　1 = pressed
　　　　　　　　　　0 = not pressed
bt 2 = button 2:　　1 = pressed
　　　　　　　　　　0 = not pressed

pd
　　0 = when screen is pressed
　　1 = when screen is released followed by pd=0

	d6	d5	d4	d3	d2	d1	d0
Byte 0	1	bt1	bt2	X9	X8	X7	X6
Byte 1	0	pd	0	Y9	Y8	Y7	Y6
Byte 2	0	X5	X4	X3	X2	X1	X0
Byte 3	0	Y5	Y4	Y3	Y2	Y1	Y0
Byte 4 (optional)	0	not supported in DVD170					

X9..XO:　　　　10-bit absolute horizontal position. Outermost left position $000. Outermost right position $3FF
Y9..YO:　　　　10-bit absolute vertical position. Outermost upper position $000. Outermost

Note: bt1 and bt2 are not supported in the DVD170

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ADDITIONAL BYTES
POINTING DEVICES

Key	Value
Keys released	$00
Menu	$10
Stand-by	$11
Mute on/off	$12
Help	$1C
Player/TV	$1D
Volume up	$1E
Volume down	$1F
Play	$20
Stop	$21
Pause	$22
next	$23
Previous	$24
Search forward	$25
Search reverse	$26
Repeat	$27
Next disc	$28
Previous disc	$29
Still forward	$2A
Still reverse	$2B
Slow forward	$2C
Slow reverse	$2D
Return	$2E
Open/close	$3B
#0	$30
#1	$31
#2	$32
#3	$33
#4	$34
#5	$35
#6	$36
#7	$37
#8	$38
#9	$39
Zoom	$40
Angle	$41

EXTERNAL CONTROL COMMANDS

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External control commands

Remote control commands

group   :   PC
command   :   RC
parameter list :   RCCode

RCCode:The RC6 code of the remote control signal to execute.

See Appendix for the list of supported RC commands

Example   :   [PC, RC, 66]\r

Player will react as if the the Open/Close button was pressed.

Play title

group   :   PC
command   :   PlayT
parameter list: TitleNumber

TitleNumber: Number of the title (DVD) or track (VCD or CDDA) to play

Example: [PC, PlayT, 3]\r

Player will start playing the first chapter of title 3 (in the case of a DVD disc). Player will start playing from the beginning of track 3 (in the case of a VCD or CD-DA disc).

Note: The behaviour of the PlayT and PlayC commands are influenced by the SetPlayMode command.

Play chapter

group   :   PC
command   :   PlayC
parameter list: TitleNumber, ChapterNumber

TitleNumber: Number of the title (DVD) or track (VCD) to play

ChapterNumber: Number of the chapter (DVD) or entry (VCD) to start in the specified title or track.

Example: [PC, PlayC, 3, 2]\r

The player will start playing chapter 2 of title 3 (DVD) or entry 2 of track 3 (VCD).

Note-1: The behaviour of the PlayT and PlayC commands are influenced by the SetPlayMode command.

Note-2: When the player is in 'stop' or 'pause' mode, the player starts playing chapter 1 regardless of the chapter number that is being used.

Switch on/off OSD (On Screen Display)

By this command the player can be forced not to show OSD icons like for instance "pause" and "play" during the playback of a disc.

When the disc is stopped the normal OSD with title/chapter/track information remains displayed.

group   :   PC
command   :   OSD
parameter list: Mode

Mode can have one of the following values:
    "OFF": OSD is switched OFF
    "ON": OSD is switched ON

Example: [PC, OSD, ON]\r

OSD is switched ON.

Note : OSD will always be switched ON after starting up the player by switching on the power of the player.

Switch on/off LKC (Local Keyboard Control)

This command allows to switch on/off all the buttons of the keyboard at the front of the player.

group   :   PC
command   :   LKC
parameter list: Mode

Mode can have one of the following values:
    "OFF": Local keyboard is switched OFF
    "ON": Local keyboard is switched ON

Example: [PC, LKC, ON]\r

Local keyboard is switched ON.

Note : The LKC mode will always be switched ON after starting up the player by switching on the power of the player.

Switch on/off RC (Remote Control)

This command allows to enable/disable the execution of RC commands received from the Remote Control.

group   :   PC
command   :   RCC
parameter list: Mode

Mode can have one of the following values:
    "OFF": RC is switched OFF
    "ON": RC is switched ON

Example: [PC, RCC, OFF]\r

RC is switched OFF.

The DVD player will not react on a RC command.

Note-1 : RC commands sent via RS232 are not affected by this command and therefore will be executed.

Note-2 : The RC mode will always be switched ON after starting up the player by switching on the power of the player.

Switch on/off UOPs

```
group          :    PC
command        :    UOP
parameter list:     Mode
```

Mode can have one of the following values:
  "OFF": the check on UOPs is switched OFF
  "ON": the check on UOPs is switched ON

Example: [PC, UOP, OFF]\r

The DVD player will ignore the UOPs.

Warning: This feature can be dangerous especially with DVD disc not tested specifically for this non standard DVD feature. The system may crash. Use with care !

Note :The UOP mode will always be switched ON after starting up the player by switching on the power of the player.

Set audio stream

```
group          :    PC
command        :    SetAST
parameter list:     AudioStreamNumber
```

AudioStreamNumber:Number of the selected audio stream

Example: [PC, SetAST, 1]\r

The DVD player will change the audio stream to stream number 1.

Set sub-picture stream

```
group          :    PC
command        :    SetSPST
parameter list:     SubPictureStreamNumber
```

SubPictureStreamNumber:Number of the selected sub-picture stream

Example: [PC, SetSPST, 4]\r

The DVD player will change the sub-picture stream to stream number 4.

CD-DA Lock

```
group          :    PC
command        :    CDDALock
parameter list:     Lock
```

Lock can have one of the following values:
  "OFF": Lock is switched off.
  "ON": Lock is switched on.

Example: [PC, CDDALock, ON]\r

The DVD player will not play any CD-DA disc until the lock is switched off.

Note : The status of this feature remains unchanged after switching off and on the power of the player. (Stored in NVRAM)

Provider lock

```
group          :    PC
command        :    PVRLock
parameter list:     Lock, ProviderID
```

Lock can have one of the following values:
  "OFF": Lock is switched off.
  "ON": Lock is switched on,

ProviderID: The identification of the provider. When Lock is "OFF", this parameter is ignored.

Example: [PC, PVRLock, ON, PRODVDGPRM]\r

The DVD player will only play DVD discs from the specified publisher. This lock will be active from the next started disc onwards.

Important : The provider lock implies a CD-DA Lock.

Note-1 :The provider ID will be searched in either the Publisher field "Primary volume descriptor of ISO9660" of the disc or the player will check whether there is an info.id file located on the disc. For more information about the info.id file, please check the available NVRAM manual.

Note-2 :There is no interface function available to retrieve the actual set ProviderID the player is looking for when the provider lock is activated.

Note-3 : The status of this feature remains unchanged after switching off and on the power of the player. (Stored in NVRAM)

Set play mode

```
group          :    PC
command        :    SetPlayMode
parameter list:     PlayMode,
```

PlayMode is one of the following strings :

"CHAPTER" :
The disc will stop when a chapter is played.

"TITLE":
The disc will stop when the last chapter of a title are played.

"DISC":
The disc will start the next title when a title is played and stop after the last titles of the disc are played.

Example: [PC, SetPlayMode, CHAPTER]\r

The play mode is set to chapter play.

Note-1: The parameter list is case sensitive, thus the PlayMode must be in uppercase.

Note-2: The behaviour of this feature can be influenced by and combined with user settings like for instance "repeat disc" and "repeat chapter" given by the user trough the remote control or the RS-232.

Note-3 :The play mode status will be set to the standard setting after switching on the power of the player. (not stored in NVRAM)

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External control status

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Player status

Message from external controller to DVD
group   :   PS
command   :   GetStatus

Message from DVD to external controller.
group   :   PS
command   :   GetStatus
parameter list: ReturnValue, Status

Status can have one of the following values:
0:	Error
1:	Opened
2:	No Disc
3:	Stopped
4:	Playing
5:	Paused

Example:
Request: [PS, GetStatus]\r
Response: [PS, GetStatus, 0, 4]\r

The player is in the "playing" state.

Disc type

Message from external controller to DVD
group   :   PS
command :   GetDiscType

Message from DVD to external controller
group   :   PS
command :   GetDiscType
parameter list: ReturnValue, DiscType

DiscType can have one of the following values
0:	No disc
1:	DVD
2:	VCD or SVCD
3:	CD-DA

Example:
Request: [PS, GetDiscType]\r
Response: [PS, GetDiscType, 0, 3]\r

There is a CD-DA disc in the tray

Note: When the player does not recognise the disc, asking the disc type will result in 0: No disc

Current audio stream

Message from external controller to DVD
group   :   PS
command :   GetAST

Message from DVD to external controller
group   :   PS
command :   GetAST
parameter list: ReturnValue, AudioStreamNumber

AudioStreamNumber: Number of the current audio stream.

Example:
Request: [PS, GetAST]\r
Response: [PS, GetAST, 0, 2]\r

The current audio stream is audio stream number 2.

Current sub-picture stream

Message from external controller to DVD
group   :   PS
command :   GetSPST

Message from DVD to external controller
group   :   PS
command :   GetSPST
parameter list: ReturnValue, SubPictureStreamNumber

SubPictureStreamNumber: Number of the current sub-picture stream.

Example:
Request: [PS, GetSPST]\r
Response: [PS, GetSPST, 0, 2]\r

The current sub-picture stream is sub-picture stream number 2.

Number of titles

Message from external controller to DVD
group   :   PS
command :   GetNrT

Message from DVD to external controller
group   :   PS
command :   GetNrT
parameter list: ReturnValue, NrTitles

NrTitles: Number of titles (DVD) or number of tracks (VCD, CD-DA) of the current disc.

Example:
Request: [PS, GetNrT]\r
Response: [PS, GetNrT, 0, 32]\r

The current disc contains 32 titles (DVD) or tracks (VCD, CD-DA).

Number of chapters

Message from external controller to DVD
group   :   PS
command :   GetNrC
parameter list: TitleNr

TitleNr: Number of the title (DVD) or track (VCD).

Message from DVD to external controller
group   :   PS
command :   GetNrC
parameter list: ReturnValue, NrChapters

NrChapters: Number of chapters (DVD) or entries (VCD) of the requested title or track.

Example:
Request: [PS, GetNrC, 2]\r
Response: [PS, GetNrC, 0, 13]\r

Title 2 contains 13 chapters (DVD) or track 2 contains 13 entries (VCD).

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Current title

Message from external controller to DVD
group   :   PS
command   :   GetT

Message from DVD to external controller
group   :   PS
command   :   GetT
parameter list: ReturnValue, TitleNr

TitleNr: Number of the current title (DVD) or track (VCD, CD-DA).

Example:
Request: [PS, GetT]\r
Response: [PS, GetT, 0, 6]\r

The current title (DVD) or track is 6 (VCD, CD-DA).

Current chapter

Message from external controller to DVD
group   :   PS
command   :   GetC

Message from DVD to external controller
group   :   PS
command   :   GetC
parameter list: ReturnValue, TitleNr, ChapterNr

TitleNr:Title (DVD) or track (VCD) number of the current title or track

ChapterNr: Chapter (DVD) or entry (VCD) number of the current chapter or entry.

Example:
Request: [PS, GetC]\r
Response: [PS, GetC, 0, 1 7]\r

Current chapter is chapter 7 of title 1 (DVD) or the current entry is entry 7 of track 1 (VCD).

Disc ID (only for DVD)

Message from external controller to DVD
group   :   PS
command   :   GetDiscID

By player caculated string of 16 bytes. of currently inserted disc

Message from DVD to external controller
group   :   PS
command   :   GetDiscID
parameter list: ReturnValue, DiscID

DiscID   :   ID of the disc

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Example:
Request   :   [PS, GetDiscID]\r
Response   :   [PS, GetDiscID, 0, Disc 123]\r

The ID of the current disc id "Disc 123"

Download data from DVD disc

Message from external controller to DVD
group   :   PS
command   :   GetSector
parameter list: SectorNr

SectorNr: Address of the sector to start downloading

Message from DVD to external controller
group   :   PS
command   :   GetSector
parameter list: ReturnValue, NumOfBytes

NumOfBytes: Number of bytes read from the disc
<binary data>:Binary data from the DVD disc found at the specified sector.
Note: The binary data is not within the '[' and ']\r' pair.

Example:
Request: [PS, GetSector, 123456789]\r
Response: [PS, GetSector, 0, 2048]\r<binairy data>

2048 Bytes of <binary data> is read from the DVD disc started from sector 123456789.
Note: The data is only sent in the case the ReturnValue is 0.

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Asynchronous responses

End of a title

Message from DVD to external controller
group   :   PR
command   :   EOT
parameter list: ReturnValue, TitleNr

TitleNr:Number of the title (DVD) or track (VCD, CD-DA) of which the end is reached

Example: [PR, EOT, 3]\r

End of title 3 (DVD) or end of track 3 (VCD, CD-DA) is reached

Note: This message will be sent if a new title is started or if the disc is finished. It can not be guaranteed that no frames from the next title are played when the stop command is given immediately after the End of title message is received and the disc mode is DISC.

Start of a chapter

Message from DVD to external controller
group   :   PR
command   :   SOC
parameter list: ReturnValue, ChapterNr

ChapterNr: Number of the chapter of which playing is started.

Example   :   [PR, SOC, 0 , 2]\r

Chapter 2 is started to be played.

End of a chapter

Message from DVD to external controller
group   :   PR
command   :   EOC
parameter list: ReturnValue, ChapterNr

ChapterNr: Number of the chapter of which the end is reached

Example   :   [PR, EOC, 2]\r

End of chapter 2 is reached

Note: This message will be sent if a new chapter is started or if the disc is finished. It can not be guaranteed that no frames from the next title are played when the stop command is given immediately after the End of chapter message is received and the disc mode is TITLE or DISC.

Execution of a command

Notification of a status changes:

Message from DVD to external controller
group   :   PR
command   :   StatusChange
parameter list: ReturnValue, ReturnStatus

Status can have one of the following values, and is only valid in the case no error has occurred:

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0:     Error

1:     Opened
2:     No Disc
3:     Stopped
4:     Playing
5:     Paused

Example: [PR, StatusChange, 5]\r

The player is in the pause state.

Note: The player distinguishes internally more detailed status information, e.g. search forward, search backward, slow forward, slow backward, menu, or setup. This data is not made available. When the player goes to a state which is not made available, no message is sent to the external controller.

Error notification

Notification of an error:

Message from DVD to external controller
group   :   PR
command   :   Error
parameter list: ReturnValue, Error code

A list with error codes is appended

Example: [PR, Error, 4]\r

A command is send to the player which caused an error. Error code 4 identifies the occurred error.

TRADE MODE

The DVD-170 player can be brought into a "Trade Lock" mode by pushing two player control buttons on the front while switching on the player.

These buttons are :
"OPEN/CLOSE button + PLAY button.

After this has been done the player will act as below :

- Auto play at power on. (All playable formats)
- After end of title automatic "Repeat" function.
- All control buttons are disabled on the player front.
- All remote control buttons remain operational.

Disc change can still be done by pushing the STOP button on the remote control till the tray opens.

The player can be "Delocked" by pushing two player control buttons on the front (OPEN/CLOSE button and PLAY button) while swithching on the player.

Remark :
To check in what "mode" the player is the user only has to check the functionality of the "Open/Close" button.

NAVIGATION AND HANDLING NON VOLATILE MEMORY

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The ProDVD-170 professional DVD-Video player is equipped with NVRAM (Non Volatile Random Access Memory) for saving application data. The data written to the NVRAM will be available every time the application is played or can be used to transfer data from one disc-application to another disc-application.

The DVD application will be able to set, update and react on the contents of this non-volatile data. This data can be retrieved through the players' RS232 interface for data processing or statistical analysis.

A few examples of what you can do with NVRAM are:
- Playlist: Create your own selection of video sequences and automatically play this selection every time you power on the player.
- Let the user take a test and save the results of the test for later (protected) reviews by the manager.
- Allow certain ProDVD-170 players to play specific video fragments while other ProDVD-170 players will not play these video fragments, using the same disc.
- Store visitors' statistics: how many times have people made specific selections at the kiosk?

To use the NVRAM functionality, the ProDVD-170 must be equipped with firmware version 9.25 or higher.

NVRAM manual

More information about what you can do with the NVRAM functionality and how it can be used can be found in the special NVRAM manual.

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Error codes		
Name	Code	Description
ecEXT_ERR_OK	0	No error
ecEXT_ERR_UNKNOWN	1	Cause of error not known
ecEXT_ERR_INVALID_PARAM	2	Invalid parameter
ecEXT_ERR_INV_BUF_SIZE	3	Message exceeds buffer size
ecEXT_ERR_INV_MSG	4	Message syntax not valid
ecEXT_ERR_INV_CMD	5	Command not valid
ecEXT_ERR_COMM_ERROR	6	Communication error
ecEXT_ERR_FLOW_OFF	7	No more commands can be sent
ecEXT_ERR_FLOW_ON	8	Commands can be sent again
ecEXT_ERR_UOP_ERROR	9	Command not executed due to UOP
ecEXT_ERR_INVALID_NA_DISC_ERROR	10	Command not valid for current disc
ecEXT_ERR_DISC_ERROR	11	Disc read error
ecEXT_ERR_DIRTY_DISC_ERROR	12	Disc error due to dirty disc
ecEXT_ERR_INVALID_COMMAND_STATE	13	Command not allowed in this state of the player
ecEXT_ERR_NO_GPRM_AVAILABLE	14	Requested GPRMs not available
ecEXT_ERR_CMD_NOT_ALLOWED	15	Command to deliver binary data not allowed

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PHILIPS

Supported RC commands	

Description	RC Code
Standby	012
Stop	049
Play Forward	044
Play Reverse	045
Pause/Step	048
Step Forward	246
Step Backward	245
Fast Run Forward x2	040
Fast Run Forward x4	223
Fast Run Forward x8	224
Fast Run Reverse x2	041
Fast Run Reverse x4	222
Fast Run Reverse x8	221
Slow Run Forward x1/2	034
Very Slow Forward x1/4	217
Slow Run Reverse x1/2	035
Very Slow Reverse x1/4	218
Next	032
Previous	033
Step Up	088
Step Down	089
Step Left	090
Step Right	091
OK	092
TV/DVD	067
FTS	251
Open/Close	066
Reserver for Zoom	247

Description	RC Code
0	000
1	001
2	002
3	003
4	004
5	005
6	006
7	007
8	008
9	009
Select T-C	200
Angle	133
Audio	078
Subtitle	075
Subtitle On/Off	227
C-Menu	084
T-Menu	113
Menu	209
Settings	130
OSD	015
Return	131
Resume	215
Scan	042
Shuffle Play	028
Repeat	029
Repeat A-B	059
Reserved for Aspect Ratio	249
Reserved for 3D Sound	082

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OVERVIEW OF COMMANDS

PHILIPS

Overview external control commands (group PC)	
command	parameter-list
RC	RCCode
PlayT	TitleNumber
PlayC	TitleNumber, ChapterNumber
OSD	Mode
LKC	Mode
RCC	Mode
UOP	Mode
SetAST	AudioStreamNumber
SetSPST	SubPictureStreamNumber
CDDALock	Lock
PVRLock	Lock, ProviderID
SetPlayMode	CHAPTER | TITLE | DISC

Overview asynchronous response (group PR)	
command	parameter-list
EOT	ReturnValue, TitleNr
EOC	ReturnValue, ChapterNr
StatusChange	ReturnValue, Status
Error	ReturnValue, ErrorNr

Overview external control status (group PS)			
command	parameter-list request	parameter-list response	binary data
GetStatus		ReturnValue, Status	-
GetDiscType		ReturnValue, DiscType	-
GetAST		ReturnValue, AudioStreamNumber	-
GetSPST		ReturnValue, SubPictureStreamNumber	-
GetNrT		ReturnValue, NrTitles	-
GetNrC	TitleNr	ReturnValue, NrChapters	-
GetT		ReturnValue, TitleNr	-
GetC		ReturnValue, TitleNr, ChapterNr	-
GetDiscID		ReturnValue, DiscID	-
GetSector	SectorNr	ReturnValue, NumBytes	Yes
GetCyclicBuffer		ReturnValue, NumBytes	Yes

Note: On case binary data is "Yes", the Binary data will be send immediately after the ASCII parameter list response. It will only be send in case Return Value = 0.