ESC/VP21 Command User's Guide for Business Projectors

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Revision History

Revision	Issued Date	Page	Description
A	2004.1.30	All pages	First Release

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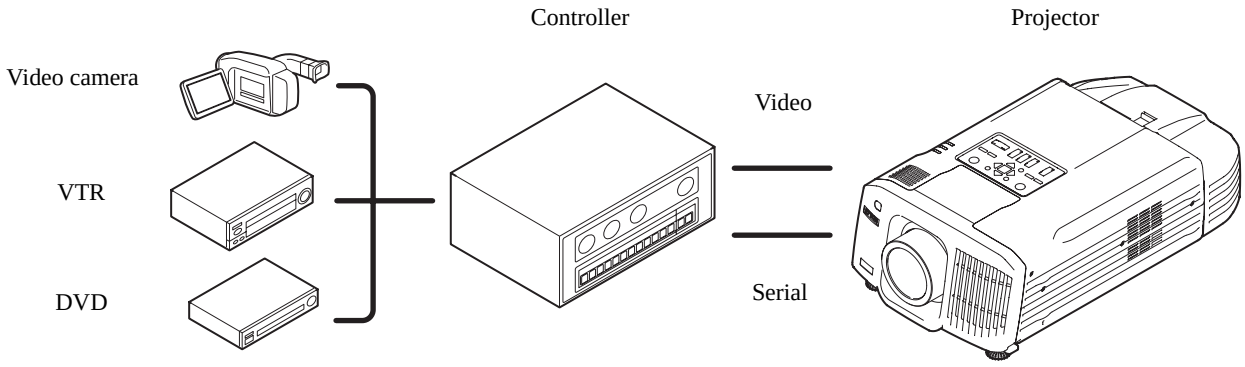
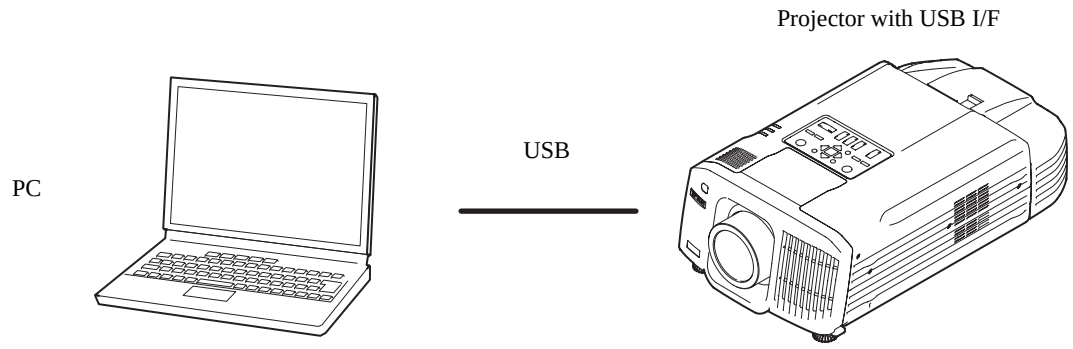
1.Introduction to ESC/VP21

ESC/VP21 is a control command and protocol for Epson projectors, which is used for A/V controller to control and monitor Epson projectors. The command codes are comprised of ASCII codes. Therefore the command codes can be understood very easily and you can easily control projectors using a PC with a terminal emulator such as Microsoft Hyper terminal.
Since ESC/VP21 is independent of communication protocols,Serial, USB or TCP/IP network can be used to transmit the commands to projectors.

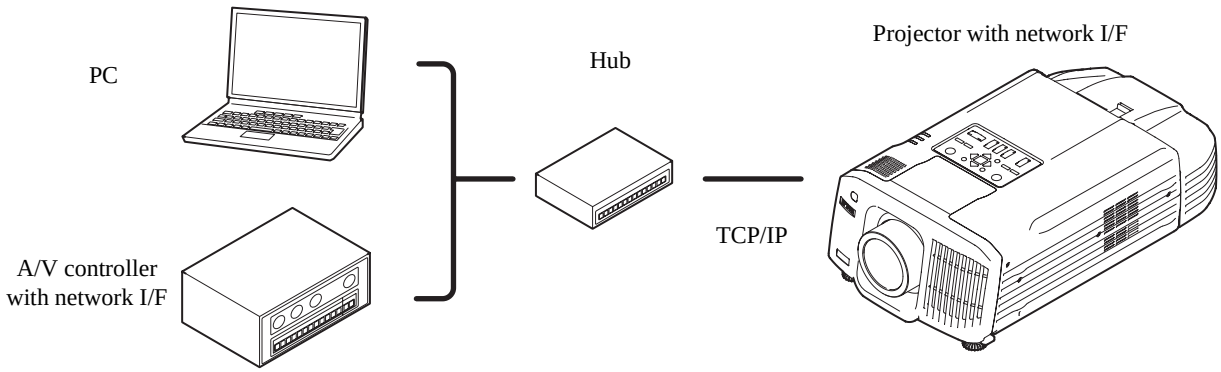
•Serial connection
A/V controllers normally use a serial connection to control projectors. Refer to Appendix for details.



•USB connection
A USB interface can be used to control a projector. Refer to Appendix for details.



•Network connection
After establishing a TCP session, ESC/VP21 commands can be sent to projectors. Refer to ESC/VP.net protocol manual.



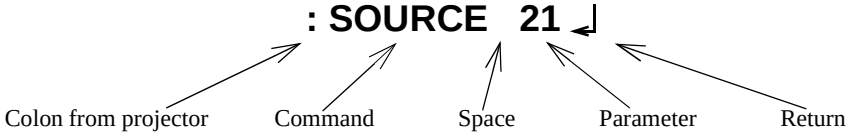
2.ESC/VP21 Command Formats

2.1.Set command format

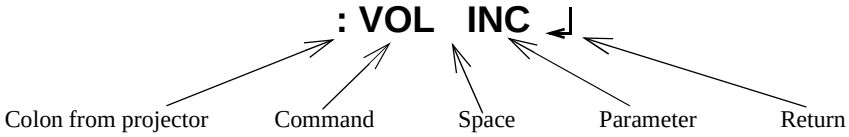
A set command consists of a command and a parameter. Projector returns a colon after executing the command.
There are two types of parameters. One is fixed such as ON, OFF, or 21.Other is a step parameter such as INC, DEC or INIT.

INC increments the parameter by one.
DEC decrements the parameter by one.
INIT initializes the parameter.

Set command example 1



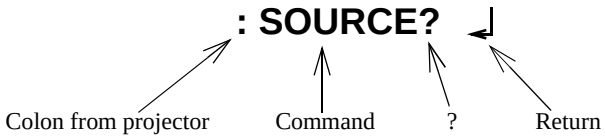
Set command example 2



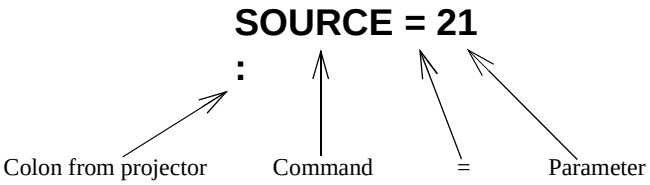
2.2.Get command format

A get command consists of a command and ?. Projector returns a response parameter after executing the command.

Get command example



Response parameter example



2.3.Null command

The null command is a command code of the return key code (Hex 0D). Projector returns a colon. The null command can be used to confirm that the projector is in operation.

2.4.Illegal commands

Projector returns “ERR” and a return key code (Hex 0D) and a colon when it receives invalid commands.

ERR
:

3.Projector state and commands

3.1.Standby state (operation indicator is in orange)

When a projector is in a standby state, executable commands depend on projector models and standby configuration (network on, network off). Refer to the following table.

Models	Configuration	Executable Commands
7800/7850/ 8300/9300 (note3)	network on	PWR ON , PWR? , SOURCE? , Null command (note1)
	network off	PWR ON (note2)
Others	-	

(note1) 8300/9300 supports the SOURCE command in the standby state. Projector returns “ERR” when it received commands other than PWR ON, PWR?, SOURCE (only 8300/9300), SOURCE? and NULL command.
(note2) Projector ignores commands when it received commands other than PWR ON.
(note3) Although 735 can be set the standby configuration to “network on”, it accepts only the PWR ON command in the standby state. The power consumptions of projectors in the standby state depend on the standby configurations and are shown below.

Models	Power Consumption	
	Network off	Network on
78007850	about 1.5W	about 47W
8300/9300	about 1.5W	about 60W
8300+ELPXP01	about 1.5W	about 60W

3.2.Power on state (operation indicator is in green)

All commands are executable.

4.Command transmission timing

4.1.Standby state

1) For 7800/7850/8300/9300 with the standby configuration of "network on"
The first command can be sent anytime and the subsequent commands should be sent after receiving a colon from the projector.
2) Other than 1)
PWR ON can be sent any time.

4.2.Power-on state

A command should be sent after receiving the colon of the previous command from the projector. The following is an exception. When the PWR OFF command is sent to 7800/7850/8300/9300 with the standby configuration of “network off”, the subsequent command should be sent 10 seconds after the colon is received.
In case that you can not wait for the colon and send a command after receiving it, instead send a command after the execution time listed in the following table.

Command	Models	Execution time
PWR ON	-	40 seconds (note1)
PWR OFF	600/800/810/811/820	130 seconds
	All others	50 seconds
SOURCE (note3)	-	5 seconds (note2)
All others	-	3 seconds

(note1) When a projector receives the PWR ON command, it tries to ignite the lamp by activating the ballast unit. In case that the lamp fails to be ignited, it tries to ignite the lamp three times at maximum.
When the lamp fails to be ignited three times, it is a lamp failure.
The projector returns a colon within 40, 70 and 100 seconds when successful in the first, second and third times respectively.
(note2) When the input video sync signal is stable, a colon is returned within 5 seconds. However, it may take more than 5 seconds when the input video sync signal is unstable.
(note3) Projector initiates the process of the input video signal recognition when it receives a SOURCE command. If the signal of the video input is changing (for example, from SVGA to XGA by A/V controller) during the process of the input video signal recognition, the projector returns “ERR”.

4.3.Warning and abnormal cases

Projector executes commands normally while a warning indicator such as a high temperature warning is on.
Projector does not execute commands nor return a colon when the projector is in an abnormal state such as a lamp failure and abnormal high temperature.

5.Command list and Applicable Models

5.1.Command table 1 (Fixed parameter)

(**O**Supported **-**Not supported)

Function	Command	600/800/ 810/811/ 820	720/730/ 520/735	30/52	73/53 74/54	8300/ 9300	7800/ 7850	S1
Power control	PWR	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Input source	SOURCE	**O**	**O**	**O**	**O**	**O**	**O**	**O**
PinP setting	PINP	**O**	**-**	**-**	**-**	**O**	**O**	**-**
A/V Mute Screen	MSEL	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Auto Keystone	AUTOKEYSTONE	**-**	**O**	**-**	**O**	**-**	**O**	**-**
Aspect setting	ASPECT	**-**	**-**	**-**	**O**	**O**	**O**	**O**
Color Mode	CMODE	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Lamp hour	LAMP?	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Brightness level	LUMINANCE	**-**	**-**	**-**	**O**	**O**	**O**	**-**
A/V Mute	MUTE	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Freeze	FREEZE	**-**	**O**	**O**	**O**	**O**	**O**	**O**
Rear Projection	HREVERSE	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Ceiling	VREVERSE	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Audio Input	AUDIO	**O**	**-**	**O**	**O**	**-**	**O**	**-**
Key operation	KEY	**O**	**O**	**O**	**O**	**O**	**O**	**O**

5.2.Command table 2 (Step parameter)

(**O**Supported **-**Not supported)

Function	Command	600/800/ 810/811/ 820	720/730/ 520/735	30/52	73/53 74/54	8300/ 9300	7800/ 7850	S1
Adjust the volume	VOL	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Adjust the treble setting (Adjust the tone setting)	TONEH	**O**	(**O**)	(**O**)	**-**	**O**	**O**	**-**
Adjust the bass setting	TONEL	**O**	**-**	**-**	**-**	**O**	**O**	**-**
Set Brightness	BRIGHT	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Set vertical keystone value	VKEYSTONE	**O**	**O**	**O**	**O**	**O**	**O**	**O**
Set horizontal keystone value	HKEYSTONE	**O**	**-**	**-**	**-**	**-**	**O**	**-**

6.Command Details

6.1.Command table 1 (Fixed parameter)

Set commands	Get commands	Parameter for set (Return code for get)	Models	Function
PWR xx	-	ON	All models	Power on
	-	OFF	All models	Power off
	PWR?	01 : Power on	All models	Return the power on status
		00 : Standby	7800/7850 8300/9300	Return the standby status
SOURCE xx	SOURCE?	11 : PC1(analog-RGB) 12 : PC1(digital-RGB) 13 : PC1(RGB-Video) 21 : PC2(analog-RGB) 22 : PC2(RGB-Video RGsB) 23 : Component Video(YCbCr) 24 : Component Video(YPbPr) 41 : Video (RCA) 42 : Video (S)	600/800/810/811/820	Select the input source
		11 : RGB 14 : Input 1(YCbCr) 15 : Input 1(YPbPr) 40 : Vlideo 41 : Video(RCA) 42 : Video(S)	30/52 73/53 720/730 S1	
		11 : RGB 14 : Input 1(YCbCr) 15 : Input 1(YPbPr) 40 : Vlideo 41 : Video(RCA) 42 : Video(S) 50 : EasyMP(IM-X)	735	
		10 : INPUT1(D-Sub) 11 : INPUT1(analog-RGB) 13 : INPUT1(RGB-Video) 20 : INPUT2(D-Sub) 21 : INPUT2(analog-RGB) 23 : INPUT2(RGB-Video) 30 : INPUT3(DVI-D) 31 : INPUT3(D-RGB) 40 : Video 41 : Video(RCA) 42 : Video(S) B0 : INPUT4(BNC) B1 : INPUT4(analog-RGB) B2 : INPUT4(RGB-Video) B3 : INPUT4(YCbCr) B4 : INPUT4(YPbPr)	8300/9300	
		10 : INPUT1(D-Sub) 11 : INPUT1(analog-RGB) 13 : INPUT1(RGB-Video) 30 : INPUT3(DVI-D) 31 : INPUT3(D-RGB) 40 : Video 41 : Video(RCA) 42 : Video(S) B0 : INPUT4(BNC) B1 : INPUT4(analog-RGB) B2 : INPUT4(RGB-Video) B3 : INPUT4(YCbCr) B4 : INPUT4(YPbPr)	7800/7850	
		50 : EasyMP	7850 8300+ELPXP01	

Set commands	Get commands	Parameter for set (Return code for get)	Models	Function
SOURCE xx	SOURCE?	11 : RGB 14 : Input 1(YCbCr) 15 : Input 1(YPbPr) 20 : Input 2 21 : Input 2(RGB) 24 : Input 2(YCbCr) 25 : Input 2(YPbPr) 40 : Vlideo 41 : Video(RCA) 42 : Video(S)	54/74	Select the input source
PINP [source posX posY size] (Ex) PINP␣42␣1␣2␣1	-	source : Video source of sub-screen (Video or S-video) source code posX : X coordinate (0-15)of sub-screen from left Horizontal is divided into 16 (default value is used when omitted) posY : Y coordinate (0-15)of sub-screen from top Vertical is divided into 16 (default value is used when omitted) size : Size of sub-screen 0-4 incremental zoom (default value is used when 0 or omitted)	600/800/810/811/820 7800/7850 8300/9300	Set P in P
PINP xx	-	OFF		End PinP
MSEL xx	MSEL?	00 : Black screen 01 : Blue screen 02 : User logo	600/800/810/811/820 730/720/520/735 7800/7850 8300/9300	Set A/V Mute Screen
AUTOKEYSTONE xx	AUTOKEY-STONE ?	ON : Auto Keystone ON OFF : Auto Keystone OFF	73/53/74/54 735 7800/7850	Set autokeystone on or off
	-		730/720/520	
ASPECT xx	ASPECT?	10 : 4:3 12 : zoom 4:3 20 : 16:9	74/54 7800/7850 8300/9300 S1	Set aspect ratio
		10 : 4:3 20 : 16:9	73/53 735	

Set commands	Get commands	Parameter for set (Return code for get)	Models	Function
CMODE xx	CMODE?	01 : sRGB 02 : Normal 03 : Meeting 04 : Presentation 05 : Theater 06 : Amusement	30/52 73/53 720/730 735 600/800/810/811/820	Set color Mode
		01 : sRGB 04 : Presentation 05 : Theater 08 : Dynamic	7800/7850 8300/9300	
		01 : sRGB 04 : Presentation 05 : Theater 06 : Living Room 08 : Dynamic	S1	
		01 : sRGB 04 : Presentation 05 : Theater 06 : Living Room 08 : Dynamic 11 : Black Board	54/74	
-	LAMP?	0-32767	All models	Return the lamp hour
LUMINANCE xx	LUMINANCE ?	00 : High 01 : Low	73/53/74/54 7800/7850 8300/9300	Set brightness level
MUTE xx	MUTE?	ON : A/V Mute ON OFF : A/V Mute OFF	All models	Set A/V Mute
FREEZE xx	FREEZE?	ON : Freeze ON OFF : Freeze OFF	All models except 600/800/ 810/811/820	Set freeze
HREVERSE xx	HREVERSE?	ON : rear ON OFF : rear OFF	All models	Set rear projection
VREVERSE xx	VREVERSE?	ON : ceiling ON OFF : ceiling OFF	All models	Set ceiling projection
AUDIO xx	AUDIO?	01 : Audio1 02 : Audio2 03 : USB	600/800/810/811/820	Select audio input
		01 : Audio (Computer) 02 : Audio (Video)	30/52 73/53/74/54	
		00 : Audio (Computer/DVI) 01 : Audio (Computer) 02 : Audio (DVI)	7800/7850	
KEY xx	-	4A	All models except 600/800/ 810/811/820	Perfrom"Auto-sync" of a remote control button
		47		Perfrom"Freeze" of a remote control button

6.2.Command table 2 (Step parameter)

Set commands	Initial value	Steps	Models	Function
VOL xx	15	0 - 31	600/800/810/811/820	Set the volume level
	10	0 - 20	720/730/735	
	10	0 - 20	30/52	
	10	0 - 20	73/53/74/54	
	15	0 - 31	8300/9300	
	15	0 - 31	7800/7850	
	10	0 - 20	S1	
TONEH xx	0	-6 - 6	600/800/810/811/820	Set bass level
	0	-8 - 8	720/730/735	
	0	-8 - 8	30/52	
	0	-6 - 6	8300/9300	
	0	-6 - 6	7800/7850	
TONEL xx	0	-6 - 6	600/800/810/811/820	Set bass level
	0	-6 - 6	8300/9300	
	0	-6 - 6	7800/7850	
BRIGHT xx	0	-30 - 30	600/800/810/811/820	Set brightness
	0	-64 - 64	720/730/735	
	0	-64 - 64	30/52	
	0	-64 - 64	73/53/74/54	
	0	-30 - 30	8300/9300	
	0	-30 - 30	7800/7850	
	0	-20 - 20	S1	
VKEYSTONE xx	0	-60 - 59	600/800/810/811/820	Set vertical keystone value
	0	-30 - 30	720/730/735	
	0	-30 - 30	30/52	
	0	-30 - 30	73/53/74/54	
	0	-64 - 64	8300/9300	
	0	-64 - 64	7800/7850	
	0	-30 - 30	S1	
HKEYSTONE xx	0	-29 - 29	600/800/810/811/820	Set horizontal keystone value
	0	-39 - 39	7800/7850	

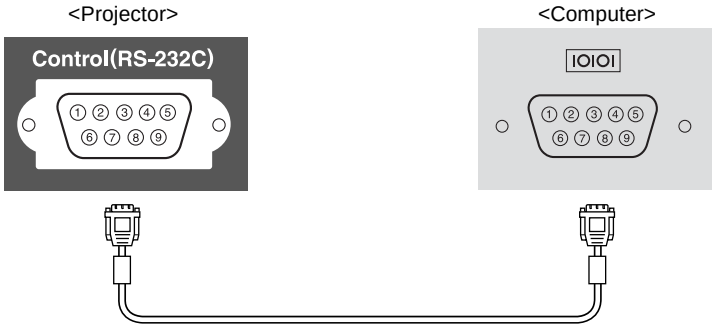
7.Appendix

7.1.Communication specification.

A projector and a computer can be connected using a serial or USB port. The projector can be remotely controlled by sending commands to the projector.

Serial Connection (600/800/810/811/820,30/52,73/53/74/54,8300/9300,7800/7850,S1)

- Select RS-232C at Advanced Setting of the Menu.
- Communication condition
  - Baud rate : 9600 bps
  - Data length : 8 bits
  - Parity : No
  - Stop bit : 1 bit
  - Flow control : No
- Connector : D-sub 9pin
- Projector input : Control(RS-232C)



Projector		PC serial cable	Computer	
GND	5	———	5	GND
RD	2	◄———	3	TD
TD	3	———►	2	RD

Signal name	Function
GND	Common ground
TD	Transmitted data
RD	Received data

*DTR and DSR are not used.

USB Connection (600/800/810/811/820,720/730/520,73/53/74/54,735,8300/9300,7800/7850)

- Select USB at Advanced Setting of the Menu. Only 730/720/520/735 should set Link 21L as ON.
- Epson USB COM Driver has to be installed in your computer to use USB for communication. A COM port is added to your computer, when the projector and your computer is connected by a USB cable. The added COM is listed at PORT (COM/LPT) in the device manager tab of System in Control Panel as EPSON COM Emulation port (COMn).

USB COM Driver	Models
EMPUSBSetup.exe	600/800/810/811/820/720/730/520/73/53/74/54/735
EMPUSB2Setup.exe	7800/7850/8300/9300

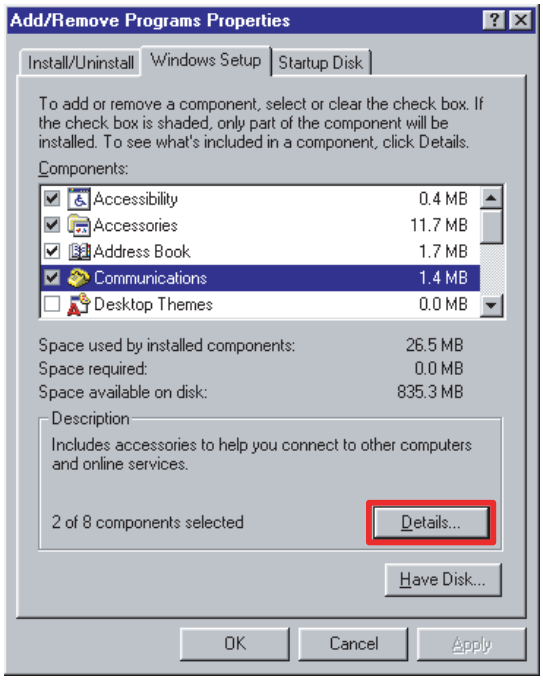
- Connector : USB(B type)

7.2.Hyper Terminal Installation and Configuration

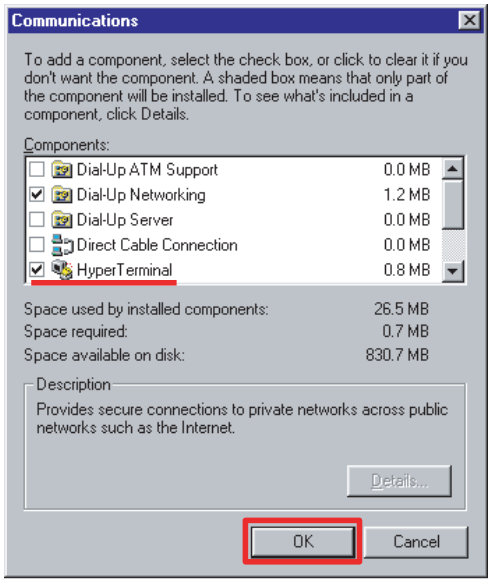
It is convenient to use Hyper Terminal included in Microsoft Windows to confirm the operation of ESC/VP21 commands using a PC. If Hyper Terminal is not included in “PROGRAM”, install it as follows.

7.3.Hyper terminal installation

• Open the “Add/Remove Programs” icon in the Control Panel.
• Select “Communications” of “Windows Setup” and click the “Details”.

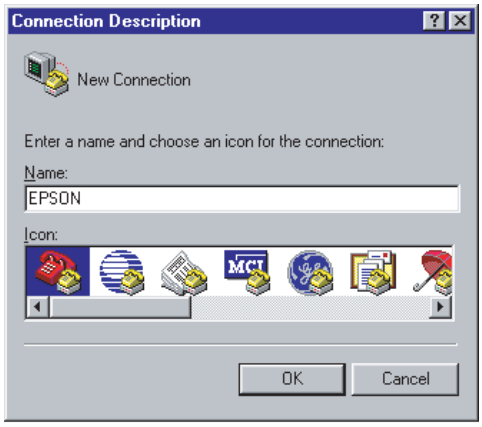


• Mark “Hyper Terminal” and click the “OK” bottom, which completes the installation.

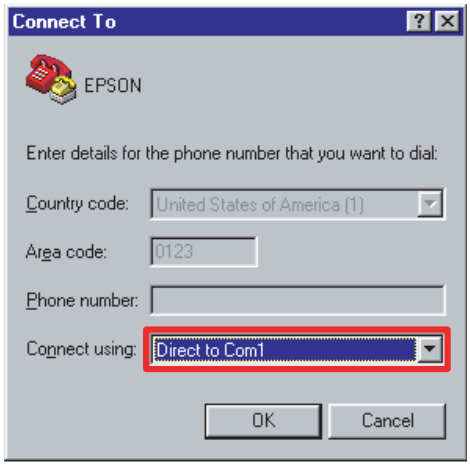


7.4.Hyper Terminal configuration

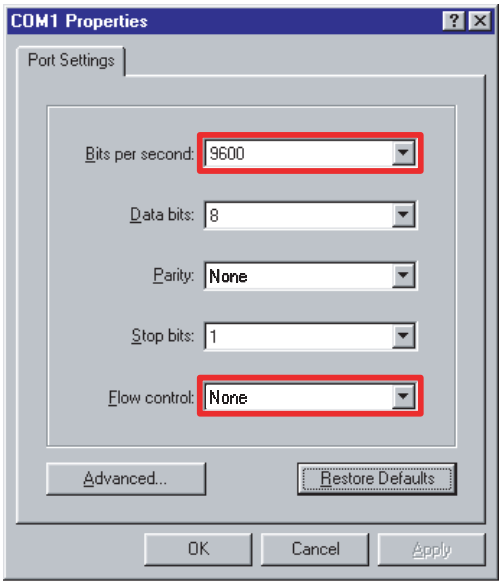
• Open Hyper terminal, input the name, select an icon and click “OK”.



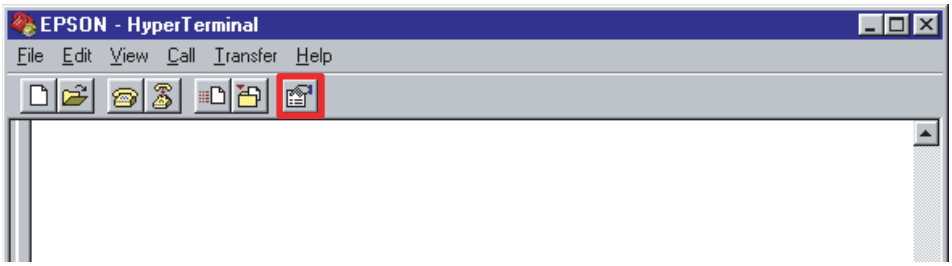
• Serial connection
Select the communication port (Example **:** Direct to COM1) in “Connect using”.
• USB connection
Select Epson COM emulation port (COMn) in “Connect using”.
When the COM port is changed,restart Hyper terminal.



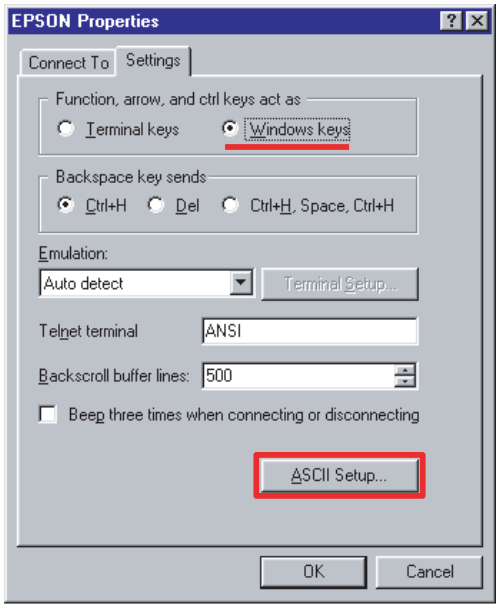
• Select 9600 bps, 8 data bits, no parity, 1 stop bit and None.



• Open the “property” of Hyper Terminal.



• Mark the “Windows keys” and click “ASCII Setup” bottom.



• Mark “Send line ends with line feeds”, “Echo typed characters locally”and “Append line feeds to incoming line ends”. Click “OK”, which completes the configuration.