

VP-2
Color Video-Printer Interface
for the Honeywell TDC 3000*
Universal Station

USERS MANUAL

Revision 1.15

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INTRODUCTION

The VP-2 Color Video-Printer Interface captures a screen image from a Honeywell TDC 3000* Universal Station and sends the output to an HP-compatible or Postscript-compatible inkjet or laser printer. Using an industry-standard plain-paper printer gives you low-maintenance, low cost color copies of your Honeywell video screens.

Once installed and set up, printed copies of video screens are created by a simple press of a button which can be located near the Universal Station keyboard.

INSTALLATION

The VP-2 can be installed either on a desk top or in a standard 19-inch rack.

Connect the power cord between the VP-2 and a source of clean 115VAC power. Alternatively, the VP-2 can operate from 230VAC. With a small screwdriver, slide the recessed 115/230V switch to the 230V position before applying 230 volts.

Connect the printer cable between the 25-pin female connector on the rear panel of the VP-2 and your printer. This is a standard PC parallel printer cable, so you can use standard extension cables or printer switch boxes available to the PC market.

Connect the remote control assembly connector to DB-9 male connector on the rear panel of the main unit. The remote control assembly can be placed at any location convenient for the user, typically near the Universal Station keyboard. Optional 25-foot and 50-foot extension cables are available should they be needed.

The VP-2 video connector is a DB-9 female connector on the rear of the main unit. Use the provided special ribbon cable to connect the VP-2 between the EPDG I/O card and the display monitor as follows: Fold the special ribbon cable at the center connector labeled "VP-2" so that the male and female end connectors are together. Remove the connector from either the rear of your display monitor or from the EPDG I/O card. Connect the male and female connectors at the ends of the special ribbon cable to the female and male connectors that were just disconnected (at the display monitor or EPDG I/O card). Use the appropriate locking hardware provided to secure these connections. This has effectively added some length to your existing video cable and added an in-line "tap" connector for the VP-2 to sample the video image. This remaining male connector in the middle of the special ribbon cable can then be connected to the rear of the VP-2. Electrically, the VP-2 is an unterminated "tap" in your video cable. (Alternatively, you can completely replace your existing video cable with the special cable provided by connecting the female end to the EPDG I/O card, the male end to the display, and the center connector to the VP-2.) Refer to the figures on the following page.

NOTES:

1. To avoid a possible attenuation of the video sync signals, you may find that the VP-2 should be powered up before connecting it to the video signal.
2. For troubleshooting purposes, you can remove the VP-2 from the US circuitry without interrupting the EPDG I/O card to Display connection by simply removing the DB-9 connector from the back of the VP-2.
3. An optional video cable with BNC connectors is available. BNC coaxial cables can be extended for longer distance applications or applications where BNC connectors are available on the Universal Station or the display.

Before VP-2 installation:

```

-----
| EPDG I/O card >>-----Display |
-----

```

After VP-2 installation:

```

-----
| EPDG I/O card >>----->>>> Display |
-----

```

```

-----
>> VP-2 |
-----

```

--- OR ---

```

-----
| EPDG I/O card >>  >>----->> Display |
-----

```

```

-----
>> VP-2 |
-----

```

--- OR ---

```

-----
| EPDG I/O card >>                >> Display |
-----

```

```

-----
>> VP-2 |
-----

```

```

-----= original video cable
      = video cable supplied with VP-2
>> = connector

```

SETUP

The VP-2 is configured using the 4-button keypad and the LCD display located in the control compartment behind the lockable access door.

Entering Setup:

Pressing the F1 key while the VP-2 is in the ready condition enters the setup mode. The ready condition is indicated by a "READY" message on the LCD display and by an illuminated LED on the remote control module.

```
-----  
| READY                               |  
|                                     |  
-----
```

You will be given a choice to select which parameter set you wish to use.

```
-----  
| F1:File   F2:Printer|  
| F3:Video  F4:Option |  
-----
```

The printer parameters allow you to tell the VP-2 what kind of printer you have, and how you prefer the printed page to look. The video parameters allow you to set the VP-2 to match the specific video characteristics of your Universal Station and cabling installation. Once set up properly, the video parameters should not need re-adjusting. The option parameters allow you to change some general VP-2 option settings. As the LCD display will indicate, press the F2 button to review or change the printer parameters, the F3 button to review or change the video parameters, etc.

Printer Parameters:

Printer type - this is how you tell the VP-2 what type of printer you have. The choices are PCL3, PCL3 Color, PCL5, PCL5 Color, Postscript, and None. PCL is Hewlett Packard's standard Printer Control Language. Many other brand printers adhere to this standard. Postscript is a standard printer language developed by Adobe Systems, Inc. See the appendix for a table describing which printer type to use for many common printers. A printer selection of none will suppress all printing. This selection is for users who wish to utilize the .BMP image file feature without printing captured images.

True B/W Mode - Video displays usually have a black background and use white or colored lines for graphics and text. However, a printer prints on white paper (white background) and obviously cannot print white ink on white paper. The normal solution to this problem is to print white video as black and leave the white paper unprinted where there is a black video background. However, this parameter allows you to have the VP-2 print a black background and leave white where there is video white. Thus, the printed copy is the same black/white colors as the display. The disadvantage of this true black/white mode is the high usage (and increased cost) of printer toner or ink required to fill-in a large background area. This parameter can be set to "On" or "Off."

Yellow Conversion - Yellow, which is very prominent on a display screen, is very hard to see printed on white paper. This parameter allows you to instruct the VP-2 to convert yellow into

orange or brown so that it is easier to see on the printed page. This parameter can be set to "Yellow=Yellow", "Yellow=Orange", or "Yellow=Brown".

Econofast Mode - Some of the HP ink jet printers have an economy mode feature which results in a significant decrease in ink usage, an increase in print speed, but with a decrease in printed quality. This parameter tells the VP-2 to utilize this feature; it can be set to "On" or "Off".

Print Test - A color test pattern can be sent to the printer by turning this parameter on. This feature allows you to confirm that you have selected the correct printer type and that your printer is connected and working properly. The LCD display will indicate if any print errors occur and when the test is completed. Press any function key to clear a message from the display and resume operation. The test pattern should appear as a black border containing a plaid pattern of red, green, blue, yellow, cyan, and magenta lines. This image is also stored so that it may be extracted as a .BMP test image file.

NOTE: This parameter automatically returns to the "Off" state after the print test is complete; there is no need to turn the print test parameter back to off.

Video Parameters:

Pixel Phase - A video display is made up of an array of pixels or dots of red, green, and/or blue. These pixels are a translation of a timed sequence of electrical pulses sent to the video display via a video cable. The VP-2, which samples the voltage on this cable, must sample this voltage at the precise moment in time when pixel pulses are present. If the video signal is sampled between pixels, then the VP-2 will capture either neither of the adjacent pixels, resulting in a 'spotty' printed image, or it may capture the edges of both pixels resulting in a 'smeared' or 'thickened' printed image. The Pixel Phase parameter allows the user to precisely adjust the moment in time when the pixels are sampled. This parameter can be set to a value between -255 and 255 in increments of 5.

Brightness - The brightness threshold parameter allows the user to adjust the video level at which the VP-2 determines a "pixel on" condition. This adjustment is necessary to compensate for the variation in video level due to video cable length and the signal loading effect of the connected display. This is similar to a "brightness" control on a display monitor, except that it works backward: setting a higher value means a higher video voltage must be present to print a pixel, thus causing the printed image to fade or disappear. This parameter can be set to a value between 0 to 255 in increments of 5.

Sub-brightness - The sub-brightness threshold parameter allows the user to adjust the video level at which the VP-2 determines a half-intensity condition. It works similar to the Brightness parameter described above. It is therefore set to a level below that of the brightness parameter. This parameter can be set to a value between 0 and 255 in increments of 5.

Green Offset - Sometimes the video level of the red, green, and blue signal are not all the same. A monitor would display this condition as an unnoticeably slight change in color hue. However, the VP-2 must tell the printer which one of only 8 colors to print. This parameter allows the user to compensate for a green video signal that is a little stronger or weaker than the red signal. This offset parameter is added to the Brightness parameter described above. It can be set in a range

between -25 and +25. In most cases your EDPG, cabling, and monitor are well balanced, so this parameter can be left at 0.

Sub Green Offset - This is similar to the Green Offset parameter, except that it adjusts the sub-brightness determination.

Blue Offset - This is similar to the Green Offset parameter, except that it adjusts the blue video determination.

Sub Blue Offset - This is similar to the Sub Green Offset parameter, except that it adjusts the blue sub-brightness determination.

Pixel Stability - This parameter adjusts the pixel phase sampling stability. Normally it should be left at 5 and should not be adjusted unless instructed by a technical support representative.

Horizontal Position - This parameter adjusts the horizontal position of the captured video image. Normally it should be left at 0 and should not be adjusted unless instructed by a technical support representative.

Option Parameters:

Qty of Mux Ports - This parameter allows you to set the number of multiplexor ports connected to your VP-2. It is factory set, based upon the multiplexor hardware option ordered.

Special Configuration - This option allows for special or custom configuration settings. The standard VP-2 allows no setting other than "Standard."

Reviewing/Changing Parameters:

After you have pressed the F1 key to enter setup mode and pressed either F2 (for printer parameters) or F3 (for video parameters), the LCD will show a help screen indicating the general method of reviewing and changing parameters:

```
-----  
| F1:Param F2:Val+/on |  
| F3:Val-/off F4:Exit |  
-----
```

Press the F1 key to display the first parameter.

```
-----  
| Printer Type:      |      or      | Pixel Phase:      |  
| PCL3 Color        |              | -90               |  
-----
```

The first line of the display will indicate the parameter and the second line of the display will indicate the current value or setting of that parameter. The F1 key, when pressed, will change to the next parameter for you to review or change value. If you wish to change the value of the displayed parameter, then press either the F2 key to change to the next selection (or higher value) or the F3 key to change to the previous selection (or lower value) for that parameter. If the parameter is an On or Off type, then press F2 to turn the parameter On and press F3 to turn the parameter Off. When you are finished reviewing and/or changing parameters, press F4 to return to the "ready" mode. All changed parameters will be saved at this point even if you turn the VP-2

power off.

Setup Summary:

In general the functions of the keypad buttons are as follows:

F1 - enter setup (see note below), select the next parameter

F2 - select the next selection or higher value for the current parameter (or turn it On)

F3 - select the previous selection or lower value for the current parameter (or turn it Off)

F4 - save any changed parameters and exit back to operation "ready" mode

NOTE: Immediately after entering setup mode by pressing F1 from the "ready" mode, the F1, F2, F3 & F4 buttons have a one-time function of selecting which set of parameters are to be reviewed/changed:

F1 - activate the .BMP file transfer function

F2 - select the printer parameter set

F3 - select the video parameter set

F4 - select the special function parameter set.

Video Parameter Display Modes:

There are two modes available to set up the video parameters. The default mode, called "LCD mode", uses the built-in front panel LCD to display video parameters and their values. When using this mode, you must go through a series of 'adjust-then-test-by-printing' cycles until you get all video parameters set properly.

The second mode is called "VGA mode" and requires a temporary VGA monitor connected to the "SVGA" connector on the back of the VP-2. This monitor must be capable of displaying 800x600 resolution video. The "VGA mode" is activated by pressing the red capture button on the remote control module. This must be done after you have entered the setup mode, selected video parameters, and pressed F1 to get past the help display. When the red button is pressed, the LCD will indicate that the "VGA mode" is active. The VGA display, then, will list all video parameters and their value. A graphic view of a video capture will also be displayed. The 4-button keypad functions the same as in "LCD mode". The currently selected parameter and its value will be indicated on the VGA display by an arrow symbol. At any time, the red capture button can be pressed to capture and display a new video frame using any recently changed parameters. This 'adjust-then-test-by-viewing' cycle goes much quicker than with the "LCD mode".

Video Setup Sequence:

Because of the interrelation of some parameters, the video parameters should be set up in a prescribed manner.

The VP-2 video parameters have been factory set for the typical installation. Most of them should already be set fairly close to your requirements. Hopefully, you will only need to tweak a little.

Preparation: It is best to have a good test display screen during the setup. The screen should have samples of all 7 colors as well as the 7 half-intensity colors. There should be line graphics and solids as well as text. At least one line of white text extending from the right side to the left side of the screen will make the Pixel Phase parameter adjustment go much smoother.

1. Temporarily move the Sub-Brightness parameter up to 200-250 so that it does not interfere with the adjustments we are about to make.

Pixel Phase:

2. Set the brightness parameter high enough to cause the image of white text to begin to become "spotty" or faded [as in example #2]. Repeatedly adjust the parameter, press the red capture button, and view the results until this condition is achieved.
3. Then change the pixel phase parameter up and down until the spottiness is minimal. If the spottiness goes completely away, you should increase the brightness parameter to bring back the spottiness so that you can minimize it with the pixel phase adjustment. You may notice that the spottiness is predominately in a certain area, left or right side, of the text line [as in example #3]; and that changing the pixel phase will move this spotty area to the left and right. The goal, then, is to change the pixel phase parameter until you move the spottiness area completely off the left or the right side of the image; or balance the spottiness between the left and right sides of the image. Don't worry if you have not completely eliminated the spottiness; you just want to minimize it at this point.

Brightness:

4. Now decrease the brightness parameter until the spottiness goes away. Make note of this parameter value. Continue to decrease the brightness parameter until you begin to see some of the half-intensity video [as in example #4]. Make note of this value. Set the brightness parameter to a value half-way between the threshold of spottiness and the threshold of seeing half-intensity video.

Sub-Brightness:

5. Now decrease the sub-brightness parameter to the brightness value determined in step 4 above. As you further decrease the sub-brightness parameter, you will begin to see some half-intensity video. Continue decreasing until all half-intensity video is clearly visible. Make note of this value. Further decrease the sub-brightness parameter until you notice a subtle "thickening" of full-intensity text; you may also notice reverse text starting to fill in or spurious spots begin to appear [as in example 5]. Make note of this value. Set the sub-brightness parameter to a value $1/2$ to $2/3$ of the way from the last (lower) noted value to the first (higher) noted value.

Green & Blue Offsets:

If there is an imbalance between the red, green, and blue video signals, you will notice that some video symbols change to a different color as it fades out when you increase the brightness parameter or that some colors disappear before others as the brightness is increased. You also may notice that one color, especially solids of that color, that are supposed to be half-intensity are printed as partially full intensity [as in example #6]. If this occurs, you can individually adjust the green and blue brightness and sub-brightness threshold levels. Use the display color chart in the appendix to help you. For example it will tell you that if what is supposed to be white is actually

printed as magenta, then the green video signal must be slightly lower. To compensate for this, the green brightness threshold setting should be reduced so that the VP-2 can detect the lower level green video signal. This is done by reducing (negative value) the green level offset parameter. And if, for example, half-intensity blue solids are partially printed as full brightness, then you may want to increase the blue offset parameter.

EXAMPLES

Example #1: Properly Set Up Image Capture Printout

Example #2: Spotty or faded image. Temporarily set a too-high brightness adjustment to adjust pixel phase.

Example #3: Spottiness on one side (left in this example).

Example #4: Half-intensity video starts showing up as full when brightness is set too low.

Example #5: Sub-brightness set too low causes spurious spots to show up especially in and around solids.

Example #6: Blue video signal higher than red and green, requiring a positive blue offset adjustment. Notice half-intensity blue solids have spots of full-intensity.

OPERATION

The power switch is located in the setup panel compartment behind the lockable access cover. The VP-2 will be initialized and ready for operation approximately 30 seconds after power on. This "ready" condition will be indicated by a "READY" message on the LCD display in the control panel as well as by a steady illuminated green LED on the remote control assembly.

When you wish to print a copy of what is on the screen, simply press the pushbutton on the remote pushbutton assembly. The green LED will go out meaning the VP-2 is busy capturing and printing. The VP-2 will have the image captured within 1 second. The remainder of the time is spent sending the captured image to the printer. The green LED will go back on when the VP-2 is ready to capture another screen. A printed replica of the image should soon come out of the printer.

If the VP-2 has trouble capturing the screen or printing, the green LED on the remote control assembly will blink rapidly. The LCD display in the setup panel compartment will indicate what type of problem exists, such as printer out of paper, or printer not ready. Correct the problem, then press the remote control assembly pushbutton or any one of the setup keypad buttons (F1-F4). This will put the VP-2 back into the ready condition.

The VP-2 saves the last 9 video images captured as .BMP formatted files. These files can be retrieved via the 3 1/2" floppy disk drive on the front of the VP-2. The files can then be loaded onto an IBM compatible office computer for display, archival, presentation, or training purposes. The user must have PC software capable of reading .BMP type image files. To copy the image files from the VP-2 to a floppy disk, press the F1 key on the 4-button keypad. This causes the VP-2 to enter setup mode; the LCD display will give you the four setup options. Choose the "File" option by pressing the F1 key again. The LCD display will then instruct you to insert a blank diskette and press the F2 key when ready. Alternatively, at this point, you can abort the copy process by pressing the F3 key. After pressing the F2 key, the display will indicate filenames as each file is copied to the floppy disk. The files on the floppy disk are named IMAGE1.BMP through IMAGE9.BMP. IMAGE1.BMP is the most recent image captured and IMAGE9.BMP is the 9th oldest image captured. The LCD display will indicate whether the copy process finishes successfully or unsuccessfully. Remove the diskette and press the capture button or any keypad button to return the VP-2 to the READY status.

NOTICE: If the VP-2 is powered down, some attenuation of video sync signals occurs which may result in breaking up of the display monitor image. If this occurs, either leave the VP-2 powered on or remove the video cable connector from the rear of the VP-2.

User Maintenance:

The air filter, accessed from the front panel compartment, should be checked on a regular basis and cleaned or replaced when needed.

WARRANTY

The VP-2 is warranted against defect for a period of one year.

SPECIFICATIONS

Voltage Requirements:

The VP-2 will operate on 115VAC or 230VAC 50/60Hz. Power consumption is 45 Watts.

Duty Cycle:

The VP-2 can be powered on continuously.

Physical:

Heavy-duty industrial metal case, 7" x 19" x 17.8". May be mounted in a 19" rack. Weight 33 1/2 pounds.

Operator Controls:

Power switch, reset button, 4-button setup keypad, and a 2 x 16 character LCD display in a lockable compartment.

Remote control module with large pushbutton to initiate a capture. This module also has a green LED which indicates ready, busy, or error operating condition. It includes a 6-foot cord.

Capture time:

Less than 1 second to capture all 3 color video signals. Sequence of capture is red, green, then blue.

Print time:

Print speed is mainly determined by the speed of the printer. See Appendix for print times for various printer models.

File output:

The 9 most recently captured images can be copied to an IBM compatible 1.44 MByte 3 1/5" diskette as .BMP files.

Includes:

Main unit, remote control module, printer cable, ribbon type video cable.

Options:

2, 4, or 6 port multiplexor allows single VP-2 to be connected to multiple Universal Stations

Rack-mount brackets and handles can be removed and replaced with optional blank panels.

Video input cable assembly with BNC connectors.

Push-button switch/indicator module extension cables.

On-site installation and setup.

PDG & HPV-2 compatibility.

APPENDIX

VP-2 Compatible Printers:

The VP-2 is designed to drive printers using PCL3, PCL5, and Postscript (Level 2) print languages. PCL3 and PCL5 are standard Printer Control Languages developed by Hewlett-Packard. Postscript is a standard printer language developed by Adobe Systems. Please refer to the insert for the current known list of printer manufacturers and models that are compatible with the VP-2.

Video/Display Color Chart:

Red - primary

Green - primary

Blue - primary

Yellow - Red + Green

Cyan - Green + Blue

Magenta - Red + Blue

White - Red + Green + Blue

Helpful Hints When Setting Up Video Parameters:

The VP-2 individually examines each of the 286,720 (640X448) video pixel locations for each video color (red, green, and blue) signal coming from the EPDG I/O card. First it checks to see if the pixel is of intensity exceeding the brightness parameter level; if it is, the pixel is declared full intensity. If not, then it checks to see if the pixel is of an intensity exceeding the sub-brightness parameter level; if it is, then the pixel is declared half-intensity. If not, then it the pixel is declared off.

If you examine a VP-2 printout (from a non-Postscript printer) very closely, you will see that full-intensity pixels are tiny squares. This is most noticable with black, red, green, magenta, and cyan pixels. Yellow and blue pixels have additional color specks added to improve readability; this makes it difficult to identify the "squares".

Half-intensity pixels are tiny rectangles; horizontal if they are black in color, vertical if they are red, green, magenta, or cyan. As with full-intensity pixels, blue and yellow rectangles are hard to distinguish as rectangles due to the additional colors added.

So, if you are having trouble distinguishing if parts of a display are being printed as full vs. half intensity, close examination of tiny squares vs. tiny rectangles should help you determine.

With that in mind, in general, if spurious half-intensity pixels (tiny rectangles) are printed where there should be nothing, then the sub-brightness parameter is set too low. This typically occurs to the right of full intensity characters or solids and in the blank areas which form the characters of reverse video.

If specs of full intensity pixels (tiny squares) appear where it should be half-intensity (tiny rectangles), then the brightness parameter is set too low causing the VP-2 to detect half intensity video as full intensity.

Full intensity video which has spots of half-intensity printed pixels implies that the brightness parameter is set too high; the VP-2 brightness was set too high for it to "see" and declare these pixels as full-intensity, but the level was plenty high enough to be detected and declared as half-intensity. Reduce the brightness parameter.

The primary video colors are red, green, and blue. Magenta, cyan, yellow, and white are combinations of these three colors, as follows:

MAGENTA = RED + BLUE

CYAN = GREEN + BLUE

YELLOW = RED + GREEN

WHITE = RED + GREEN + BLUE

So, for example, if what is appearing on the display as MAGENTA is being printed as red, then the blue video is not being detected enough by the VP-2. Assuming you set the brightness parameter correctly, then the BLUE offset parameter needs to be reduced to make it more sensitive to detection by the VP-2. When the VP-2 can detect both the red and the blue, it knows to print magenta. Likewise CYAN being printed as blue implies the VP-2 is not detecting GREEN, decrease the GREEN offset parameter; if white is being printed as magenta instead of black, then the VP-2 is not detecting GREEN.

USER NOTES

