Tahoma Technology
Models 10119, 10120, 10121
IEEE1284 & Ethernet to VPI Converters
Specification

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Tahoma Technology was formerly known as Ikon Corporation

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Introduction

The Tahoma Technology Models 10119, 10120, and 10121 provide new connectivity options for VPI (Versatec differential) compatible printers and plotters.

The 10119 IEEE1284/VPI Converter is a raw OEM board for mounting inside a plotter. It makes it possible to drive a VPI plotter from any IEEE1284 data source. The 10119 accepts a stream of bytes from an IEEE1284 source in Compatibility (Centronics) or ECP mode at 2+Mbytes/second, and passes it to the VPI device. VPI modes (print/plot/spp), pulsed commands (reset, clear, remote EOT, form feed, line terminate), handshake speed, and special conversion modes are controlled with escape sequences embedded in the '1284 data stream.

The 10120 is a '119 board mounted in an enclosure and combined with a wall-plug power supply. International power supply options are available.

The Model 10121 combines a 10119 and 10/100bT network print server in an enclosure with external power supply, allowing network attachment of any VPI compatible printer or plotter. The '121 can sustain data rates of 1+Mbyte/second (network dependent).

The same enclosure is used for the 10120 and 10121. It is a compact plastic housing with aluminum front and rear panels. Outside dimensions are: 1.5"x8.9"x6.5".

The following document is primarily concerned with the 10119 base board. It describes the 10119's programming and pin-outs. The escape sequences and data formats documented here apply to the 10119, 10120, and the 10121.

The network print server used in the 10121 is similar to the Axis 5400+. Please use the following links for print server documentation and utility software:

http://www.axis.com/products/axis_5400p/index.htm
http://www.axis.com/techsup/software/index.htm

In particular, the Axis IPInstaller software will be useful to Windows users when setting the IP address of the 10121. The label provided on the bottom of the 10121 enclosure indicates the internal server's permanent MAC address. Use this with IPInstaller or Unix utilities to set the required IP address. Please see the Axis documentation for further information on print server operation.

NOTE: 10121s leave Tahoma with the IP address not set, or with a temporary IP address of 192.168.1.44

Once the internal server IP address has been set/determined, a web browser may be used to confirm the server's configuration. The server's parallel port should be set to HIGHSPEED handshake mode (the default). This gives the highest possible throughput - 1+Mbytessecond. The server/Tahoma logic combination negotiates ECP mode for maximum speed.

In ECP mode, reverse status is not available. VPI INOP - the "OR" of offline and paper out -translates to a SELECT false input to the internal server, but once ECP mode is negotiated, this type of simple status is not passed back through the server to the client. A factory option is available that forces the server/Tahoma logic to stay in compatibility mode. This limits the maximum throughput to 500+Kbyte/second, but provides return status to the client. Tahoma Technology is working with Axis to make the high speed and return status combination available in future versions of this product.

10119 Performance/Timing

On board FIFO (4Kbytes standard - up to 32Kbytes optional) allows maximum handshake overlap, and provides data-rate matching. Data rates of 2+Mbytes/second are supported at input and output connectors. In Compatibility mode the IEEE1284 input tolerates nSTROBE pulse widths as short as 200ns. The 10119 responds to nSTROBE with an immediate BUSY assertion, and follows nSTROBE (if/when FIFO space available) with a 250ns nACK pulse, and de-asserts BUSY. An optional 500ns nACK width can be selected for use with slower Centronics data sources. Data set-up and hold time requirements are 0ns. Limited Nibble and ECP modes are also supported: no ID, no reverse data, no RLL encoding (although the '119 supports its own DUP function). In general, IEEE1284 data sources are fastest in ECP mode. The 10119 will negotiate to ECP mode if requested by the data source, otherwise transfers will be in Compatibility mode.

VPI data set-up time, PICLK pulse width, and command pulse lengths are selectable by escape codes in the 1284 data stream. Data set-up times are 100ns, 150ns, 200ns, and 250ns. PICLK and command pulse widths are 200ns, 300ns, 400ns, and 500ns.

Mechanical/Electrical

The 10119 is available as a bare-board OEM product. The 10120 and 10121 versions are housed in a small enclosure - outside dimensions are: 1.5"x8.9"x6.5" - and include an external 110VAC/5VDC power supply, which can be configured for international use. The 10120 provides a 36-pin receptacle (Centronics) input connector, a 37-pin receptacle (VPI) output connector, a green power LED, an amber activity LED, a 5VDC input jack, and a push-button reset switch. The 10121 provides a 37-pin receptacle for VPI output, an RJ45 socket for network connection, and the LEDs, pushbutton, and power connector described above.

NOTE: When used in the 10121 Ethernet/VPI Converter, the 10119's reset switch resets only the 10119 portion of the logic. The print server has its own reset/test print button. The surest way to completely reset the 10121 is to pull its 5V input plug for a few seconds.

The 10119 OEM board can be configured with the Centronics and/or the VPI connector, but normally is supplied with header (pin-strip) connectors for 25 or 36 pin input ribbon cable and 37 pin output cable (26, 40, and 40 pin connectors, respectively). An additional 40 pin connector labeled "AXIS" is provided for connection to the print server when used in the 10121. This connector MUST NOT be used for any other purpose. A 3-pin screw terminal block is provided for connection of +5V, logic ground, and frame ground. The 10119 consumes approximately 1A@5VDC in normal operation. A 10-pin header connector

allows connection of external 10mA high-efficiency LEDs and reset inputs. Two reset inputs are available. One may be driven by a switch or open collector/open drain driver. It is connected internally to the 10119's power-on reset device and reset pushbutton (if so equipped). The reset device detects a power up sequence, or a logic or switch connection to ground. Once power has reached approximately 4.5V, or the reset switch or logic connection to ground is released, the reset logic generates an additional 150ms reset pulse to ground. An internal 3K Ohm pull up to +5 is provided. This signal may also be used as a power-on reset OUTPUT which is capable of sinking approximately 8mA. An additional reset input is provided which bypasses the power-on logic and reset switch. It may be driven by open collector/drain or totem-pole logic. An internal 1.2KOhm pull up to +5 is provided. Both reset inputs are connected directly to internal logic. It is important that any connected cabling be short and electrically "clean".

NOTE: Since the 10119 uses IEEE1284-compatible drivers, receivers, and terminators, the Centronics data source must also be 1284 compatible. When testing/developing with a data source such as the Tahoma Technology 10117 Pci/Hardcopy interface, the optional 470 Ohm termination network should be used on the 10117.

Programming/Data Format

Plotter modes and commands, and converter operations are controlled by escape sequences embedded in the 1284 data. The 10119 allows setting the plotter mode to Print (default), Plot, or Simultaneous Print/Plot. Plotter pulsed commands are Reset, Clear, Form Feed, Remote EOT, and Line Terminate. Four Plotter handshake speeds are available. In addition to plotter mode and command operations, the converter itself supports five op codes: NOP, Normal Pass Mode, Discard, Pass For Count, and Duplicate For Count.

The 10119 passes bytes from the 1284 input to the VPI output unmodified until a 0xBA byte is encountered. When a 0xBA byte is extracted from the FIFO, it causes the 10119 to treat the next byte as a command, unless the next byte is also 0xBA, in which case the second 0xBA is passed to the VPI output as a data byte.

Normal data flow (no 0xBA data): <data byte0> .... <data byte n>

To pass a 0xBA data bye to device: <0xBA> <0xBA>

Speed, mode, or pulse cmd: <0xBA> <command>

NOP, Discard, or Norm Pass Mode cmd: <0xBA> <command>

Pass For Count cmd: <0xBA> <Pass For Count cmd> <count-1 low> <count-1 high>

Dup For Count cmd: <0xBA> <Dup For Count> <count-1 low> <count-1 high> <data byte>

Speed, Mode, and Pulse Commands are issued by following the 0xBA byte with a single command byte.

NOP, Discard, and Norm Pass Mode commands are 0xBA followed by a single byte. NOP can be used to add delay to the output data stream (each 0xBA & each command byte consume one VPI handshake cycle). Either command will terminate Discard Mode. The discard until next 0xBA command may be useful when sending bytes via media with fixed frame sizes. If pad bytes are necessary to fill a frame (typically at the end of a plot) this command can be used to allow transmitting the necessary bytes without actually sending them to the plotter. Note that ending this mode with <0xBA> <0xBA> will NOT send a 0xBA byte to the plotter.

The pass all for count command is intended to increase efficiency when sending data that may include legitimate 0xBA data bytes.

Dup byte for count may be used as a simple form of data compression, or to

complete short raster lines to devices which do not honor the remote line terminate command.

The internal counter is 16 bits wide, and is loaded with the desired count minus 1, sent as two bytes, low byte first. **AGAIN, THE COUNTER IS TO BE LOADED WITH THE DESIRED COUNT MINUS 1.**

Command Byte Format:

7 6 5	4	3 2 1 0
Opcode	R	Sub Op

Opcode:

1 1 1	Reserved
1 1 0	Reserved
1 0 1	Reserved (0xBA)
1 0 0	Reserved
0 1 1	VPI Pulses
0 1 0	VPI Mode
0 0 1	VPI Speed
0 0 0	Command

Sub Op - Command

0 1 0 0	Dup For Count
0 0 1 1	Pass For Count
0 0 1 0	Discard until 0xBA
0 0 0 1	Norm Pass Mode
0 0 0 0	NOP

Sub Op - VPI Speed (PICLK & Pulse Command pulse width)

0 0 1 1	Slowest (500ns)
0 0 1 0	(400ns)
0 0 0 1	Default (300ns)
0 0 0 0	Fastest (200ns)

Sub Op - VPI Mode

0 0 1 1	SPP - Plot
0 0 1 0	SPP - Print
0 0 0 1	Plot
0 0 0 0	Normal Print

Sub Op - VPI Pulses

0 1 0 0	Reset
0 0 1 1	Clear
0 0 1 0	Form Feed
0 0 0 1	EOT
0 0 0 0	Line Terminate

NOTE: The “R” bit (ready) controls whether the 10119 waits for a handshake from the plotter after issuing a mode change or pulsed command. It should be ON for all mode commands (except when connected to ancient 1100 or 1200 series Versatec plotters). It should be OFF for all Pulsed Commands. The above apply for true VPI compatible plotters. It may be necessary to modify this behavior when driving devices with unusual handshake requirements.

Early version of the 10119 do not examine this bit when issuing mode

changes. The logic remains in the ready state following a mode change. This is appropriate behavior for most contemporary plotters, which do not actually receive the mode change until the next data strobe or command pulse.

Connector Pinouts

Centronics (data input)

Signal Name	36 pin "Delta Ribbon" - P3	40 Pin Header - J2	25 pin Header - J1
STROBE-	1	1	1
GND	19	2	10
DATA1	2	3	3
GND	20	4	12
DATA2	3	5	5
GND	21	6	14
DATA3	4	7	7
GND	22	8	16
DATA4	5	9	9
GND	23	10	18
DATA5	6	11	11
GND	24	12	20
DATA6	7	13	13
GND	25	14	22
DATA7	8	15	15
GND	26	16	24
DATA8	9	17	17
GND	27	18	
ACK-	10	19	19
GND	28	20	
BUSY	11	21	21
GND	29	22	
PE	12	23	23
GND	30	24	
SELECT	13	25	25
INPUT PRIME-	31	26	6
AUTO FEED-	14	27	2
FAULT-	32	28	4

Signal Name	36 pin “Delta Ribbon” - P3	40 Pin Header - J2	25 pin Header - J1
LOGIC GND	16	31	
FRAME GND	17	33	
P LOGIC HIGH	18	35	
SELECT IN-	36	36	8

Versatec (data output)

Signal Name - Differential	37-pin "D" - P4	40 pin header - J4
INO1+D	1	1
INO1-D	20	2
INO2+D	2	3
INO2-D	21	4
INO3+D	3	5
IN03-D	22	6
INO4+D	4	7
IN04-D	23	8
IN05+D	5	9
IN05-D	24	10
IN06+D	6	11
IN06-D	25	12
IN07+D	7	13
IN07-D	26	14
IN08+D	8	15
IN08-D	27	16
CLEAR-D	9	17
CLEAR+D	28	18
PICLK+D	10	19
PICLK-D	29	20
READY-D	11	21
READY+D	30	22
PRINT+D	12	23
PRINT-D	31	24
N/C	13	25
INOP-D	32	26
SPP-D	14	27
SPP+D	33	28
RESET-D	15	29
RESET+D	34	30
RFFED-D	16	31

Signal Name - Differential	37-pin "D" - P4	40 pin header - J4
RFFED+D	35	32
REOTR-D	17	33
REOTR+D	36	34
RLTER-D	18	35
RLTER+D	37	36
INOP+D	19	37

Accessory Header - J3 - 10 pins

Pin	Function
1	Activity LED + (amber)
2	Activity LED -
3	Power On LED + (green)
4	Power On LED -
5	RESET Controller In/Out
6	RESET Controller GND
7	Logic Reset In
8	Logic Reset GND
9	+5 (factory use only)
10	GND

NOTE: The 10119 will drive 10mA high-efficiency external LEDs. External LEDs may be used ONLY when LEDs are not installed on the 10119 board.

Power/Ground

Signal	Power Socket P2	Terminal Block P1
Power +5VDC	Pin 1 (center pin)	Pin 1 (right)
Logic Ground	Pin 2 (outer contact)	Pin 2 (center)
Frame Ground		Pin 3 (left)

The 10119 requires approximately 1A @ 5VDC during normal operation. A 1.5-2A supply is recommended. Power may be provided via the power socket at P2, or the terminal block at P1. P2 is normally used with the external power supply provided when the 10119 is used in an enclosure. P1 can be used when the board is installed inside the target printer/plotter.

Pin 1 of the P1 terminal block is on the right when viewed from the board edge. It is closest to the P2 power socket. Pin 3 (frame ground), at the left, is connected to the frames of the two right angle connectors, P3 and P4. It is not normally connected to the board's logic ground. The jumper at JMP4 may be used to connect frame and logic grounds, should that prove appropriate for a particular application.

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