PTP TRANSLATOR

USER MANUAL

TEKRON

Contents

1 Introduction

The PTP Translator converts IEEE 1588 (PTP) signals into legacy time codes including IRIG-B, DCF77, user defined pulses and serial strings. Orderable options include the power supply, which can be ordered as high, medium or low; and an optional output, which can be ordered as TTL copper, AM IRIG-B copper or serial strings.

User friendly, secure Windows™ software and Ethernet connectivity make customization and setup easy.

Figure 1 – PTP Translator Front View

2 LED Indicators

The top of the PTP Translator features two LED indicators. The **SYN LED** shows synchronization status of the internal PTP decoder, while the **ALM LED** shows the alarm status of the unit.

Outputs are synchronized to UTC time only when the SYN LED is fully illuminated.

The tables below provide information regarding the interpretation of the LEDs.

SYN LED	Meaning
Off	The PTP Translator is not synchronized.
Slow Flash	The PTP Translator is in hold-over mode.
Fast Flash	The PTP Translator is out of sync and not in holdover.
On	The PTP Translator is synchronized.

Table 1 – SYN LED Functionality

ALM LED	Meaning
Off	The PTP Translator is operating normally and has no alarms.
Fast Flash	An alarm is active. To identify the alarm, use the configuration tool.

Table 2 – ALM LED Functionality

3 Inputs and Outputs

ETH: Ethernet Port (RJ45 connector / Dual ST Fiber)

PTP Translator units are fitted with either a RJ45 10/100 Ethernet interface or a dual ST Fiber 100FX Ethernet interface. The unit can be configured over the LAN (Local Area Network) and can be upgraded to include a NTP / SNTP License.

Next to the Ethernet connector are two LEDs with the "**LNK**" LED (green) above the "**ACT**" LED (yellow). The LNK LED will be on when the unit is connected to a valid Ethernet port whilst the ACT LED will be on/flashing when there is activity on either the transmit or receive pair.

TX: Fiber Output

The fiber output can be configured by the configuration tool to output an IRIG-B (B00x, B22x) signal, a DCF-77 signal or user defined pulse. The fiber transmitter is compatible with 50/125 µm, 62.5/125 µm and 100/140 µm glass fiber.

TTL: TTL Output

The TTL output is a high drive, non-isolated TTL level driver which can be configured by the Configuration Tool to output an IRIG-B (B00x, B22x) signal, a DCF-77 signal or user defined pulse.

ALM: Alarm Output

The alarm output is a high voltage isolated contact capable of switching up to 300 V at 100 mA. It is normally-closed so that the alarmed state is the contacts open (i.e. the same as when the power is off). The alarm source is configurable by the configuration tool.

OPT: Optional Output

The PTP Translator has a slot for one IO card to allow a variety of user interfaces. Each card is limited to one additional port with at least 3 kV isolation from the rest of the system to avoid current loops.

The table below shows the main variants and orderable options:

Output Type	Features
TTL	TTL (5 V, 150 mA) IRIG-B (B00x, B22x), DCF-77 or user defined pulse output.
Serial	RS232 level (9 V, 10 mA) output supporting serial strings.
AM IRIG-B	Analog IRIG-B (B12x) signal, typically 8 V with 3:1 mark space ratio. Output Impedance 120 Ω. Requires a 100 – 180 Ω terminator.

Table 3 – PTP Translator Available Interface Modules

4 Power Supply Options

There are three different power supply options available for the PTP Translator. Low, medium or high voltage supplies are available as a card and feature similar maximum output ratings but different levels of isolation.

Power Supply	Features	
Low	14 – 36 Vdc	Maximum 5 W, 1.6 kV Isolation
Medium	20 – 75 Vdc	Maximum 5 W, 1.6 kV Isolation
High	90 – 300 Vdc	Maximum 5 W, 3.75 kV Isolation

Table 4 – PTP Translator Available Power Supplies

5 Isolation & Protection

The TTL output features an earthed, non-isolated driver and is designed for connection within the same rack. Since it is the only output with an earth reference, it is isolated from the power supply via the power supply isolation and from all other IO by their isolation. All the other outputs are galvanically isolated (including the optional TTL output card) from the internal electronics and power supply.

The Alarm port has a UL and VDE approved, 3.75 kV AC isolated contact and is protected by a 600 V, 175 mA self-resetting fuse and a 350 V transient suppressor diode.

The Copper Ethernet provides 1.5 kV isolation and includes ESD suppression on board.

All optional output cards feature at least 3 kV isolation from earth and have ESD suppression suitable for the interface type.

The power supply isolation varies from 1.6 kV for Low and Medium power supplies to 3 kV for the High power supply. In addition, a varistor protects the power supply against transverse voltages and transient suppressor diodes protect the internal electronics from longitudinal events.

6 Installation

Identification

Each PTP Translator unit is shipped with an identification label on the side of the case. The label provides details of the optional output (if any) and power supply fitted to the unit as well as the serial number and firmware revision.

Check the identification label on the side of the unit to ensure that the correct output and voltage has been supplied before proceeding to install.

The label on the side of PTP Translator contains the voltage range: Do not apply power outside of this range!

Mounting the PTP Translator

The PTP Translator is designed to be mounted to a standard din rail mount using the supplied clips on the base (See Figure 2). The clips can also be used to screw mount the unit by extending them beyond the case edge.

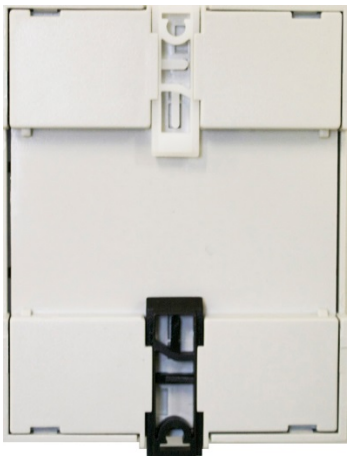

Figure 2 – Base of PTP Translator

Connecting the PTP Translator

The PTP Translator has a RJ45/ 100Base FX connector and ST Fiber output on the top and a row of rising clamp screw terminals on the bottom. Any connection not required may be left unterminated. The screw terminals are designed for the following cables;

- 0.2-4.0mm² (30-12AWG) solid cable
- 0.2-2.5mm² (30-12AWG) stranded cable

The Fiber PTP Translator has a dual ST Fiber connector for the Ethernet and is labeled **ETH** on the case whereas the IRIG-B fiber out is simply labeled **TX**.

The connections from left to right along the bottom are optional output (**OPT**) '+' and '-'; Alarm (**ALM**) '+' and '-'; TTL '+' and '-'; Ground; Power Supply Negative; Power Supply Positive. If the optional output isn't fitted, then the unused terminals are covered.

Note: The Power supply has polarity protection built in to prevent damage.

The label on the side of PTP Translator indicates the type of IO card: Do not apply voltages to output only cards and ensure that switch cards are connected appropriately!

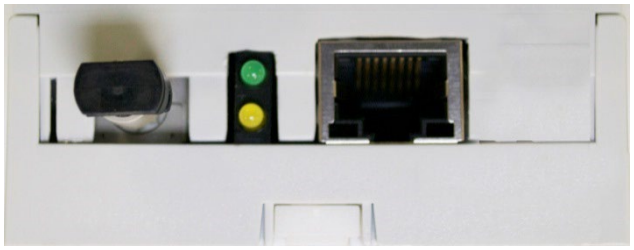

Figure 3 - PTP Translator Top Connectors

Figure 4 - PTP Translator Bottom Connectors

7 Product Configuration

Any configuration changes will need to be done via the Windows based Configuration Tool. The Configuration Tool is compatible with and version of Windows after Windows XP Service Pack 3, including Windows 7, 8 and 8.1. The latest version of the tool is available from the Tekron web site www.tekron.com/ptp-translator under the "Resources" tab.

8 Appendix

PTP Translator Specifications

Physical Specifications				
UL94-V0 polycarbonate flame retardant DIN rail enclosure with IP40 (Ingress Protection rating).				
Performance Property		**Metric**		
Dimensions	Width Depth Height	72 mm 60 mm 90 mm		
Weight		0.15 kg		
Input and Output Specifications				
Type		**Electrical**	**Physical**	**Accuracy at the port**[1]
TTL		5 V (4.5 V @ 150 mA)	2 Pin	< 100 ns of UTC
Fiber (λ = 820 nm)[2]		-19 dB optical power	ST	< 100 ns of UTC
Alarm		265 Vac / 300 Vdc, 100 mA	2 Pin	
Ethernet (Copper)			RJ45	
Ethernet (Fiber)[3]		TX: -17 dB optical power RX: -33 dB sensitivity	Dual ST, ½ inch pitch	
Optional Output Specifications				
Type		**Electrical**	**Physical**	**Accuracy at the port**[1]
TTL		5 V (4.5 V @ 150 mA)	2 Pin	< 100 ns of UTC
Serial (String)		± 9 V	2 Pin	< 1 ms of UTC
AM IRIG-B (modulated)		8 V	2 Pin	< 2 µs of UTC
Environmental Specifications				
Performance Property		**Metric**		
Operating Temperature Range		-10 to +65 oC		
Electrical Specifications				
Performance Property		**Electrical**	**Physical**	
Power Supply	Low Voltage	14 - 36 Vdc	2 Pin + common earth	
	Medium Voltage	20 - 75 Vdc	2 Pin + common earth	
	High Voltage	90 - 300 Vdc	2 Pin + common earth	
Power drain		4 W max		

[1] Note the UTC accuracy depends on the PTP interface and the accuracy of the clock supplying the master time signal.

[2] Fibre transmitter is compatible with 50/125 µm, 62.5/125 µm and 100/140 µm multimode glass fiber.

[3] Fibre Ethernet is compatible with 50/125 µm and 62.5/125 µm multimode glass fiber.

9 Serial Output String (Serial Output Option)

General Key to Fields

Fields between brackets ('<' and '>') represent ASCII character codes. The used codes are in the following table:

Placeholder	HEX	Content
<SOH>	01	ASCII Start of Header character
<STX>	02	ASCII Start of Text character
<ETX>	03	ASCII End of Text character
<BEL>	07	ASCII BEL character
<LF>	0A	ASCII Line Feed character
<CR>	0D	ASCII Carriage Return character
␣	20	ASCII Space character

NGTS Time Code O/P

Timing Transmitted once per minute. Sent during the last second before the minute rollover to which the data in the string refers.

Timing	Transmitted once per minute. Sent during the last second before the minute rollover to which the data in the string refers.
Default Comms	9600 bps, 8-bit ASCII, no parity
Definition	TyyMMDDWhhmmx<CR><LF>
Placeholder	**Content**
T	"T"
yy	Last two digits of the year: e.g. "12" = the year 2012
MM	Month: "00" = January … "12" = December
DD	Day of Month: 01…31
W	Day of week: "1"=Monday … "7"=Sunday
hh	Two digit hour
mm	Two digit minute
x	Time mode: "0" = Local time, "1" = UTC time

Example Interpretation:

T0204221123340<CR><LF> Monday 22 April 2002 – 12:34 local time

IRIG J-17 Time Code O/P

About	This code is compatible with IRIG Standard 212-00.
Timing	Transmitted once every second. The leading edge of the "start" bit of the first character <SOH> is exactly on the second that the message describes.
Default Comms	9600 bps, 7-bit ASCII, odd parity
Definition	<SOH>ddd:hh:mm:ss<CR><LF>
Placeholder	**Content**
ddd	Day of year: range "001" – "366"
:	HEX 3A
hh	hour: "00" – "23"
mm	minute: "00" – "2
ss	Seconds: "00" – "59"

Example Interpretation:

<SOH>112:12:34:36<CR><LF> day 112, time 12:34:36

String-A Time Code O/P

About	This code is very similar in data content to the IRIG J-17 code, but adds a two-character field containing the year, and uses 8-bit ASCII, no parity data format.
Timing	Transmitted once every second. The leading edge of the "start" bit of the first character <SOH> is exactly on the second that the message describes.
Default Comms	9600 bps, 8-bit ASCII, no parity
Definition	<SOH>ddd:hh:mm:ss:yy<CR><LF>
Placeholder	Content
ddd	Day of Year: range "001" – "366"
:	HEX 3A
hh	hour: "00" – "23"
mm	minute: "00" – "59"
ss	seconds: "00" – "59"
yy	year: "00" – "99" representing the last two digits of the year since 2000

Example Interpretation:

<SOH>112:12:34:36:10<CR><LF> day 112, time 12:34:36, year (20)10

String-B Time Code O/P

About	This code substitutes a "Quality" indicator byte for the year field, but otherwise is identical in form, function and timing to String-A.	
Timing	Transmitted once every second. The leading edge of the "start" bit of the first character <SOH> is exactly on the second that the message describes.	
Default Comms	9600 bps, 8-bit ASCII, no parity	
Definition	<SOH> ddd:hh:mm:ssQ<CR><LF>	
"Quality" Character (Q)		Content
HEX	ASCII	
20	' ' (space)	Clock in sync, timing accuracy is better than 60 ns
2E	'.' (full stop)	Clock is accurate to 1 µs
2A	'*'	Clock is accurate to 10 µs
23	'#'	Clock is accurate to 100 µs
3F	'?'	Clock accuracy may be worse than 100 µs

*Refer to String-A table (above) for the definitions of the common digits

Example Interpretation:

<SOH>112:12:34:36?<CR><LF> day 112, time: 12:34:36, >100 µs sync error

String-C Time Code O/P

About	This code is effectively a combination of String-A and String B. It provides both year information and a sync indicator field.
Timing	Transmitted once every second. The leading edge of the "start" bit of the first character, <CR>, is exactly on the second to which the message data refers.
Default Comms	9600 bps, 8-bit ASCII, no parity
Definition	<CR><LF>Q□yy□ddd□hh□mm□ss.000□□□
Placeholder	Content
Q	Quality indicator: ' ' = in-sync, '?' = out-of-sync
□	HEX 20 (space)
yy	Year: "00" – "99" representing the last two digits of the year
ddd	Day of year: range "001" – "366"

Placeholder	Content
hh	hour: “00” – ”23”
mm	minute: “00” – “59”
ss	seconds: “00” – “59”
.000	ASCII “.000”

Example Interpretation:

<CR><LF>? 02 112 12:34:36.000 day 112 of year (20)02, time: 12:34:36, out-of-sync

String-D Time Code O/P

String-D is IDENTICAL in content to String-B, but the second mark is at the leading edge of the start-bit of the (<CR>).

Example Interpretation:

<SOH>112:12:34:36?<CR><LF> day 112, time: 12:34:36, >100 µs sync error

String-E Time Code O/P

About	This provides time, year information, and a sync indicator field.
Timing	The string is transmitted once every second, with the leading edge of the “start” bit of the <CR> exactly on the second.
Default Comms	9600 bps, 8-bit ASCII, no parity
Definition	<SOH>YYYY:ddd:hh:mm:ssQ<CR><LF>
Placeholder	**Content**
YYYY	4-digit year
:	HEX 3A
ddd	Day of year: range “001” – “365”
hh	hour: “00” – ”23”
mm	minute: “00” – “59”
ss	seconds: “00” – “59”
Q	Quality character, as defined in String-B (above)

Example Interpretation:

<SOH>2004:112:12:34:36?<CR><LF> 2004, day 112, 12:34:36pm, >100us sync error

String-F Time Code O/P

About	This string complies with the protocol required to drive Vorne type Time Displays.
Timing	The string is transmitted once every second, with the leading edge of the “start” bit of the last <BEL> exactly on the second.
Default Comms	9600 bps, 8-bit ASCII, no parity
Definition	<CR><LF>1100<CR><LF>44hhmmss<CR><LF>54ddd<CR><LF><CR><LF>45HHMMss<CR><LF>55DDD<CR><LF><BEL>
Placeholder	**Content**
1100	ASCII “1100”
44	ASCII “44” (means local time follows)
hh	Local hour of day: “00” – ”23”
mm	Local minute of day: “00” – “60”
ss	seconds: “00” – “59”
54	ASCII “54” (means local day of year follows)
ddd	Local day of year: “001” – “365”
45	ASCII “45” (means UTC time follows)

Placeholder	Content
HH	UTC hour: “00” – ”23”
MM	UTC minute: “00” – “59”
55	ASCII “55” (means UTC day of year follows)
DDD	UTC Day of year: “001” – “365”

String-G Time Code O/P

About	This general time string is used predominantly in Europe.
Timing	The string is transmitted once every second, with the leading edge of the “start” bit of the last <ETX> exactly on the second.
Default Comms	9600 bps, 8-bit ASCII, no parity
Definition	<STX>swhhmmssDDMMyy<LF><CR> <ETX>
Placeholder	**Content**
s	Clock Status (see below)
w	Day of Week (see below)
hh	hour of day: “00” – ”23”
mm	minute of day: “00” – “60”
ss	seconds: “00” – “59”
DD	day of month: “01” – “31”
MM	month of year: “01” – ”12”
yy	year: “10” – “99”

Clock Status					
The s “Clock Status” is an ASCII character in the range 0-9, A-F representing a single hex digit (nibble)					
Bits	3	2	1	0	
				0	No announcement for time change
				1	Announcement for time change – active for an hour before
			0		Local Standard Time (LST)
			1		Daylight Saving Time (DST)
	0	0			Time/date invalid – clock is out of sync
	0	1			Hold-over mode – running on local Oscillator
	1	0			GPS / IRIGB controlled mode
	1	1			GPS / IRIGB controlled mode (high accuracy)
Day of Week					
The w “Day of Week” is an ASCII character in the range 1-7, 9, A-F representing a single hex digit (nibble)					
Bits	3	2	1	0	
	0				Local Time
	1				UTC time
		0	0	1	Monday
		0	1	0	Tuesday
		0	1	1	Wednesday
		1	0	0	Thursday
		1	0	1	Friday
		1	1	0	Saturday
		1	1	1	Sunday

Example Interpretation:

<STX>E3123456170410<LF><CR><ETX> High Accuracy Mode, DST, Wed, 12:34:56, 17/4/2010

NMEA ZDA Time Code O/P

About	This string is defined by the NMEA-0183 standard and transmitted at 9600 bps.
Timing	Transmission is once every second. The leading edge of the “start” bit of the “$” is exactly on the second.
Default Comms	9600 bps, 8-bit ASCII, no parity
Definition	$GPZDA,hhmmss.00,dd,mm,yyyy,s,xx,yy*CC<CR><LF>
Placeholder	**Content**
$GPZDA	ASCII “$GPZDA”
,	ASCII “,” (comma)
hh	UTC hour of day: “00” – ”23”
mm	UTC minute of day: “00” – “60”
ss	UTC Seconds: “00” – “59”
.00	ASCII ”.00”
dd	UTC day of month: “01” – “31” depending on which month
mm	UTC month: “01” – “12”, “01” = January
yyyy	UTC year, 4 digits.
s	Local time zone offset sign (positive means local time leads UTC)
xx	Local time zone offset from UTC in hours
yy	Local time zone offset from UTC in minutes
*	ASCII “*”
CC	2-digit hex representation of the result of XORing the 8 data bits of each character between, but not including the "$" and "*". (00-FF)

Example Interpretation:

$GPZDA,123456.0023042010+1200* UTC time is 12:34:56, 23 April 2010, the local time offset is +12:00

NMEA RMC Time Code O/P

About	This string is defined by the NMEA-0183 standard and transmitted at 9600 bps.
Timing	Transmission is once every second. The leading edge of the “start” bit of the “$” is exactly on the second.
Comms	9600 bps, 8-bit ASCII, no parity
Definition	$GPRMC,hhmmss.00,a,tttt.tttt,N,ggggg.gggg,W,0.0,0.0,ddmmyy,0.0,E*CC<CR><LF >
Placeholder	**Content**
$GPRMC	ASCII “$GPRMC”
,	ASCII “,” (comma)
hhmmss	UTC hour, minute, seconds
.	ASCII “.” (full stop)
0	ASCII “0”
a	Status: “A” = valid, “V” = invalid
tttt.tttt	Latitude : “00” – “89” degrees; “00.0000” – “59.9999” minutes
N	Latitude (north/south): “N” = north, “S” = south
ggggg,gggg	Longitude (degrees, minutes): “000” – “359” degrees; “00.0000” – “59.9999” minutes
W	Longitude (east/west): “E” = east, “W” = west
ddmmyy	UTC day of month, month & 2-digit year
E*	ASCII “E*”
CC	2-digit hex representation of the result of XORing the 8 data bits of each character between, but not including the "$" and "*".

10 Warranty

For terms and conditions of Tekron's Warrantee see the Web Site

http://tekron.com/about-tekron/warranty

WARNING
This product has been designed to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against such interference when operating in a commercial environment.

Notes

The information in this manual may change without notice. The manufacturer assumes no responsibility for any errors that may appear in this manual.

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