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ptf 3207A features

FOR DUMMIES®

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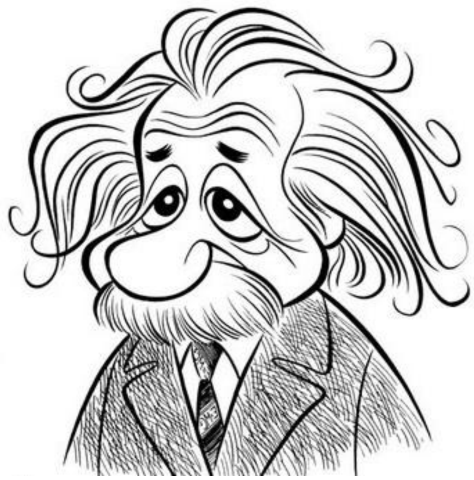
- available inputs
- user setup
- communication protocols
- antenna cable
- interfaces

David Briggs

Precise Time and Frequency, Inc.

Precise Time and Frequency, Inc



Just so many Features it takes a GENIUS to understand them all !

presenting………………………………………………….

ptf 3207A features for DUMMIES !

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Introduction

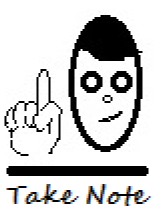
So you've decided to buy the ptf 3207A GNS Time and Frequency Reference Standard. Apparently it's the most accurate, stable and feature rich instrument of its kind on the market today. What they didn't tell you is that with that comes the challenge of understanding what features are available, how to use them, and what their capabilities are, not a trivial piece of homework!

Fortunately, you are probably only interested in a subset of the full feature range, and therefore the challenge becomes somewhat easier. Although this document provides an explanation of all of the available features (if you're feeling particularly masochistic you're welcome to embrace them all) however you really only need to focus on the specific features you plan to use, and become familiar with their setup and capabilities. To navigate to where you want to be, just click on the entry on the contents page. You can go back to contents at any time by clicking on the "return to contents" link in the footer.

Selection of Feature Set or "Where to Start?"

The first job is to decide what you need. The initial selection of required feature set can be a combination of both hardware choices, and firmware setup. As an example, if you don't trust the infallibility of GPS and so want the instrument to be able to receive multi constellation satellite signals, it is necessary to have the appropriate GNS receiver fitted to receive all of the required constellation signals. Once that's decided the firmware has to be setup to process those signals.

Similarly, if you require a certain combination of inputs and outputs, it is necessary to make sure you have both the hardware connectors, and that the firmware is set up to use them !



Don't be mystified if in some cases a particular feature that you've heard about is not available. Different options provide a different mix of features.

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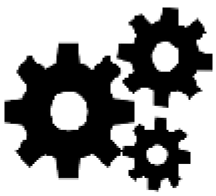
Principle of Operation or "How Does it Work?"



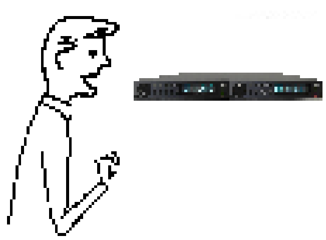
The principle of operation of the ptf 3207A is to use a high quality internal oscillator (usually OCXO or Rubidium Atomic Clock) to provide a low noise output signal with excellent short term stability, and then to "discipline" (frequency lock) this to an external reference that has excellent long term stability and accuracy.

This output forms the basic "heartbeat" of the instrument, and most of the other available output signals are "locked" to this generated reference to provide a variety of precision output signals.

For the majority of applications the external input will come from one of the satellite constellations such as GPS(USA), Glonass(Russia) or Galileo(Europe), however other sources such as time code input, RF input, 1PPS input are also available and may be more convenient in some situations.

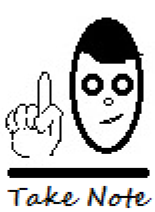
User Setup Interfaces or "How Do I Talk To It?"

Just in case you're one of those people that likes variety, or perhaps you just can't make up your mind, there are five separate user interfaces that allow you to set up the instrument.



Local control is via the front panel membrane keypad (even has a "tactile" feel) used in conjunction with the bright and sharp vacuum fluorescent display. Unfortunately this method is not very convenient if you happen to want to control the instrument remotely! There is also a local serial port (RS232) connection, but again this isn't so convenient for long distance monitoring and control. Instead you may wish to avail yourself of one of the Ethernet interfaces, namely Telnet or Web Browser, that can be used for either local or remote monitor/control. The Front panel, RS232 and Telnet interfaces, are all based on an identical menu system. This means you can conveniently learn to navigate them all by using the same commands. For those of you that spend most of your time surfing the web you may find the structure of the web interface more appealing. Finally, for summary management information the instrument provides SNMP v1, v2, and v3.

To make it easy for the reader(and writer!), this document uses the menu system utilized on the front panel, serial, and telnet interfaces, to describe entering of commands. If you prefer to use the web interface you can always resort to the manual (heaven forbid !) which has quite a good section dedicated to the web interface.



If you do wish to use the front panel keypad, note that it can be protected by a 4 digit PIN. If the 4 digit PIN is set to 0000 the PIN lockout is disabled and you can use the keypad with no PIN entry

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Here is an example of the menu system as presented on a typical computer monitor:

Name	Cmd#	Value	Name	Cmd#	Value
RCVR1-MODE	A01	Survey	RCVR1-AVGS	A02	35
RCVR1-LAT	A03	+42.517149-L	RCVR1-LON	A04	-71.045549-L
RCVR1-HGT	A05	+20.540000-L	RCVR1-CAB	A06	15.00
TIME	A13	13:10:48-L	DATE	A14	03/25/2016-L
TIME-MODE	A15	Local	T-OFFSET	A16	+00:00
DST	A17	Off	DST-TYPE	A18	USA
TIME-FORM	A19	24hr	DATE-FORM	A20	USA
1PPS-SRCE	A21	Rcvr-1	SRCE-SEL	A22	Manual
CNST-SEL	A23	GPS1	DISP-BRITE	A24	4
DISP-BLANK	A25	0	BAUD-RATE	A26	57600
IP(v4)	A27	192.168.000.030-L	NMASK(v4)	A28	255.255.255.000-L
GWAY(v4)	A29	192.168.000.001-L	DHCP	A30	On
SNMP-MGR	A31	192.168.000.001	SNMP-TRPV	A32	1
REM-SERV	A33	000.000.000.000	TNET-T/OUT	A34	0
WEB-T/OUT	A35	0	STATUS	A36	
NTP-MULT	A37	Off	MULT-PER	A38	+16
LOGOUT	A39		INSTR-ID	A40	1
SHOWPTF	A41	+0			

The "Short" descriptions are shown to the left of the command numbers, e.g. the short description for command number A01 is RCVR1-MODE.

Command Line Interface - Command Format.

The format for commands on both the serial and telnet command interfaces is as follows:

3 character command, space, new value[ENTER] << sets new value
or
3 character command, space, help[ENTER] << displays additional help for the command
or
3 character command[ENTER] << displays current value

Example:
A01[SPACE]fixed[ENTER] << sets the positioning mode to fixed

Note: In a novel twist, there are some special commands that can be entered using just the command name e.g. STATUS[ENTER]. These can be easily identified as they do not have a value in the value column of the menu.

To avoid this document becoming horrendously dated in a short period of time, the "short description" in the menu entries are used In describing the setup of various features, rather than the three character command number. This is because the three character command designation changes as features are added, whereas the short description field will remain the same for the same parameter.

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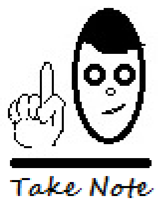
Summary of Feature Groups



Unfortunately it is not practical (and probably not desirable) to fit all of the inputs/outputs and other features to every instrument, as not only would it make the interconnection to other equipment infinitely more difficult, it would add a significant burden of cost that most people would prefer not to bear if they don't need all of the capabilities it represents.

Having said that, most of the software features are included as a matter of course, but if you neither need nor use them, you probably won't even know they're there!

Also, for more "hardware packed" units, it may be necessary to go to the 2U (3.5 inch) high chassis version. This not only gives more space inside to fit everything in, but gives additional rear panel space to accommodate up to 36 outputs – should be more than enough for most applications !

Finally, for applications where equipment redundancy is important, you should be aware that the instrument has been designed to allow two completely independent modules to be housed in a single (either 1U high or 2U high) chassis. If space is at a premium this can be a particularly handy feature, however it does also limit the number of physical inputs/outputs that can be fitted.

The table below is an attempt to present the different features grouped by type. In other words if your main concern is for specific type and number of signal outputs, you can go to the "Signal Outputs" section and begin to make some choices.

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Group	Sub-group	Qty	Menu	Comments
Signal Inputs	Receiver 1 and 2	2	1PPS-SRCE	Selectable, GPS, Glonass, QZSS
			CNST-SEL	SBAS, Galileo, Beidou
	RF sine	1	1PPS-SRCE	Fixed 10MHz
	Digital, 5V TTL	1	1PPS-SRCE	1PPS or IRIG B DCLS, selectable
	IRIG B(am)	1	1PPS-SRCE	Fixed
Signal Outputs	RF Sine	1		Fixed 10MHz, expandable qty. Conversion to other frequencies available
	IRIG B Time Code	1	None	Amplitude Modulated to IEEE 1344
	Digital, 5V TTL	4	DIGOP-1 to 4	1PPS,1PPM, 1PHH, 1PPH, Prog Clock, Time Codes - IRIG A, B, G, H, NASA 36
	Fault relay	1	none	Summary fault output
	NMEA 0183 / TOD	1	NMEA-OUT	Selectable, NMEA messages RMC, GGA ZDA, GLL
Protocols	NTP	1	none	NTPv4
	Telnet 1			Multiple sessions allowed, password protected
	SNMP	1	SNMP-MGR	v1, v2, v3
	RS232	1	BAUD-RATE	Selectable baud rate, optional PIN
	Web Browser	1		Password protected
Date / Time	Local		T-OFFSET	Local offset from UTC
			DST	Daylight saving on or off
			TIME-FORM	12hr or 24hrformat
			DATE-FORM	USA, Europe, Japan
	UTC			
	GPS			
Messages	STATUS		STATUS	Summary of system parameters including Input type, number of satellites, IP addresses, time, date etc.
	SERVO		SERVO	Internal control loop status
	Logout		LOGOUT	Log out of a telnet session
	Timeouts		TNET-T/OUT	Telnet session time out
			WEB-T/OUT	Web Browser time out
Miscellaneous	GNS Survey type		RCVR1-MODE	Survey or Fixed Position
			RCVR1-AVGS	
			RCVR2-MODE	Survey or Fixed Position
			RCVR2-AVGS	
	Mask Angles			Receivers 1 and 2
	Oscillator type		OSC-TYPE	OCXO, Rubidium, ULNO

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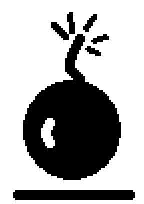
Signal Inputs – Satellites, Atomic Clocks, or Time Codes ?

Receiver 1 and Receiver 2
In most cases the ptf 3207A module will have only one satellite receiver fitted, receiver 1, which can be one of several types, including multi constellation (i.e. capable of receiving signals from different satellite systems, GPS, Glonass etc.) versions. In addition the ptf 3207A is designed to accept up to two independent receivers for additional flexibility and redundancy purposes.
Once a determination has been made as to which receiver type is required, the menu configuration is setup accordingly with the following menu commands:

Note, although we refer to the short descriptions for command entry, the actual format that must be entered on the keyboard is:

AXX[SPACE]Entry<ENTER>   where AXX is the three character command associated with the short description given, e.g. for short description RCVR1-MODE set to Survey, the actual command is:

A01[SPACE]SURVEY<ENTER>



RCVR1-TYPE   Current selections include:
None,GPS1,GPS2,GGS1,GLON,QZSS,SBAS
RCVR1-MASK   The angle above the horizon that a satellite must attain before being used in the timing solution. Usually this is set to 10 degrees

NOTE: Although the above two values are included to explain available features, they are setup in the factory according to the type of receiver fitted. They should not be changed as the instrument may become inoperative if the wrong values are entered!

RCVR1-MODE   Set to either survey or fixed.
If set to survey, the number of averages to be used for a position fix must be entered
If fixed an accurate position (Latitude, Longitude, and Height) must be entered
RCVR1-AVGS   The number of averages to be used for a position fix
(must have a minimum of 4 satellites in view and tracked)

If RCVR1-MODE is set to fixed the position parameters (Latitude, Longitude, and Height) must be set as follows:
RCVR1-LAT   Entered as a position in degrees. North of the Equator is +ve and South is –ve
e.g. +42.517149 = 42.517149 deg North   -42.517149 = 42.517149 deg South
RCVR1-LON   Entered as a position in degrees. East of Greenwich Meridian is +ve and West is –ve
e.g. + 71.045549= 71.045549 deg East   -71.045549 = 71.045549 deg West
RCVR1-HGT   Entered as a height value in meters above mean see level (MSL)
e.g. +20.540000

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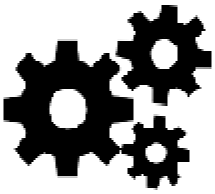
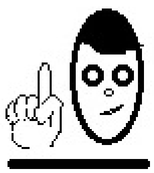
Antenna Cable Length



When using either receiver 1 or receiver 2 as the input source, the cable length from the antenna to the instrument should be specified in order to compensate for the time delay due to the cable. Entering the cable length has the effect of shifting the position of the 1PPS, and to provide additional flexibility both positive and negative values (up to +/- 100000) can be entered to allow the user to advance or retard the position of the 1PPS relative to UTC if desired. Cable length is entered as follows:

RCVR1-CAB	Cable length for receiver 1 in meters e.g. 15.00
RCVR2-CAB	Cable length for receiver 2 in meters e.g. 15.00



When operating from receiver 1 or receiver 2, the time and date cannot be manually entered as they are automatically set by the receiver. This is indicated by a –L appearing after the value displayed on the menu (`TIME   A13   19:17:01-L`).

If manual entry is attempted, an error message will be returned:

```
A13 11:22:00
Error - command locked
```

Other Signal Inputs

10MHz, 13dBm, 50 Ohm RF Sine Input

In certain cases, for example where the user has access to a very stable source such as a cesium atomic standard, it may be desired to discipline the instrument from an external RF input. To use this capability simply set the 1PPS input source to ExtRF as follows:

1PPS-SRCE   ExtRF where the actual command is AXX[SPACE]ExtRF<ENTER>

In this mode it is possible to set the time and date manually. To set to the nearest second, it is recommended to set the time a few seconds ahead without hitting the <ENTER> key, and then hit enter on the desired second mark.

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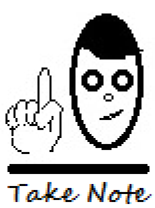
1PPS, 5V TTL/CMOS, 50 Ohm Pulse Input

Again, in certain cases, for example where the user has access to a very stable source such as a cesium atomic standard, it may be desired to discipline the instrument from an external 1PPS input. To use this capability simply set the 1PPS input source to ExtPPS as follows:

1PPS-SRCE ExtPPS where the actual command is AXX[SPACE]ExtRF<ENTER>
Also in this mode it is possible to set the time and date manually. To set to the nearest second, it is recommended to set the time a few seconds ahead without hitting the <ENTER> key, and then hit enter on the desired second mark.

IRIG B Time Code Inputs

Some applications wish to synchronize the instrument to an IRIG B time code input, or maybe translate from IRIG B into another type of time code (the instrument supports IRIG A, B, G, H, and NASA 36 outputs).



There are separate input connectors for 1kHz sine wave amplitude modulated (am) IRIG B signals and TTL Phase Modulated IRIG B DCLS (DC level shifted) input signals. Whilst the IRIG B (am) input is a dedicated input, the IRIG B DCLS input can be selected between being an IRIG B DCLS time code or a 1PPS input by use of the menu command.

At a minimum, IRIG time codes contain information on the time, (hours : minutes : seconds) and the day of the year (DOY). There a many different versions of IRIG B time code, both modulated and DCLS, some include additional control codes (IEEE 1344) whilst others do not. The instrument will accept most of the recognized formats, however wherever possible it is recommended to use the IRIG B 120 or IRIG B 000 formats described below

The most common IRIG B formats are IRIG B 120, the 1kHz modulated version with control code designation as defined by IEEE 1344 standard, and IRIG B 000 which again complies with IEEE 1344 but is an un-modulated (DCLS) version.

Both of these versions contain information on the year (tens and units only) and so when present, this is used within the instrument to automatically set the date (year).

If the location of the year information within the IRIG message is zero, then a special feature within the instrument allows the year to be manually entered, and this manually entered year information will be then be used within the instrument, and for the IRIG time code outputs (see further on) that contain year information.

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Values for the year can be manually entered using the DATE command:

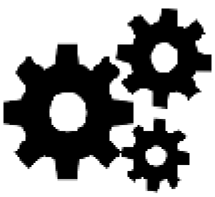
e.g. DATE[SPACE]03/23/2016<ENTER>

Although when entering the date it is necessary to enter month/day/year information, the month and day WILL be over-written by the information derived from the time code input, while the year will remain as set.

Similarly it is possible to enter the time information:

e.g. TIME[SPACE]11:53:00<ENTER>

However this will immediately be overwritten upon receipt of the next time code input message.



Time transmitted by IRIG is always local time, with additional characters within the message indicating the time offset from UTC. As the instrument always refers time information to UTC, when the time is received from and IRIG input, it is adjusted by the offset information before being loaded into the system time structures.

A summary of the different IRIG codes with their designations as defined within the IRIG Standard 200 – 2004 is shown below:

Serial Time Code Formats.
The family of rate-scaled serial time code formats is designated A, B, D, E, G, and H. Various combinations of sub-words and signal forms make up a time code word. All formats do not contain each standard coded expression, and various signal forms are possible. To differentiate between these forms, signal identification numbers are assigned to each permissible combination as shown in the table below:

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Format:

Format A	1 k pps
Format B	100 pps
Format D	1 ppm
Format E	10 pps
Format G	10 k pps
Format H	1 pps

Modulation Frequency:

0	Pulse width code
1	Sine wave, amplitude modulated
2	Manchester modulated

Frequency/Resolution:

0	No carrier/index count interval
1	100 Hz/10 ms
2	1 kHz/1 ms
3	10 kHz/0.1 ms
4	100 kHz/10 ms
5	1 MHz/1ms

Coded Expressions:

0	BCD_{TOY}, CF, SBS
1	BCD_{TOY}, CF
2	BCD_{TOY}
3	BCD_{TOY}, SBS
4	BCD_{TOY}, BCD_{YEAR}, CF, SBS
5	BCD_{TOY}, BCD_{YEAR}, CF
6	BCD_{TOY}, BCD_{YEAR}
7	BCD_{TOY}, BCD_{YEAR}, SBS

A 1 3 7

The signal designated as A137 is deciphered as follows: Format A, Sine wave (amplitude modulated), 10 kHz carrier/0.1 ms resolution, and Coded expressions BCD_{TOY}, BCD_{YEAR}, and SBS.

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Signal Outputs

In addition to the signal outputs generated by the main board within the instrument, there are many hardware options and variations available to precisely configure the instrument to an application.

The additional options are listed alongside the individual outputs.

10MHz, 13dBm, 50 Ohm, RF sine output.

The RF sine output is a fixed frequency, 10MHz signal that generated from a high quality internal oscillator, and disciplined by the external input. The stability and phase noise characteristics of the signal are determined by the oscillator selection. The table below shows the differences between the different oscillator types.

Single Side Band (SSB) Phase Noise Characteristics for 10MHz Carrier			
Offset from carrier	Standard OCXO	Ultra Low Noise OCXO	Rubidium
1Hz	-96dBc	-108dBc	-90dBc
10Hz	-130dBc	-125dBc	-130dBc
100Hz	-155dBc	-150dBc	-145dBc
1000Hz	-162dBc	-160dBc	-150dBc
10kHz	-162dBc	-165dBc	-150dBc

The signal can be used “as is”, appearing on a female BNC connector on the instrument rear panel, or subject to further conditioning can provide one, some, or all of the following options:

Option Designation	Description	Maximum Quantity (dependent upon other options fitted)		Comments
		1U Chassis	2U Chassis	
RF10	4x10MHz RF sine outputs	2 x RF10	9 x RF10	1U= 8, 2U=36, outputs total
MMOP	2x1MHz, 5MHz or 10MHz	4 x MMOP	18 x MMOP	1U= 8, 2U=36, outputs total

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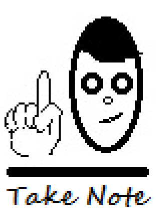
Digital 5V TTL/CMOS into 50 Ohm Outputs

There are a total of four individual digital outputs designated by the menu short descriptions as DIGO-1, DIGO-2, DIGO-3, and DIGO-4. Each of these outputs provides a 5V, TTL/CMOS compatible signal into a 50 ohm load, and can be separately programmed through the menu system.

Each of these outputs can drive multiple distributed outputs, expanding the number of total outputs from each of the DIGO ports.

Normally at least one of the DIGO outputs is set to provide 1PPS for external equipment synchronization (standard configuration is DIGO-1), but this is by no means mandatory. Each output can be set by the firmware to one of the following output functions:

Digital Output Selections		
Menu Designation	Description	Comments
1PPS	One pulse per second. *See note 1 below	Synchronized to UTC one second rollover
1PPM	One pulse per minute. * See note 1 below	Synchronized to UTC minute rollover
1PHH	One pulse per half hour. * See note 1 below	Synchronized to UTC half hour rollover
1PPH	One pulse per hour. * See note 1 below	Synchronized to UTC hourly rollover
PCLK	Programmable Clock	*See note 2 below
IRIG-A	IRIG A DCLS	
IRIG-B	IRIG B DCLS	
IRIG-G	IRIG G DCLS	
IRIG-H	IRIG H DCLS	
NASA36	NASA 36 DCLS	



*Note 1: 1PPS, 1PPM, 1PHH, 1PPH Pulse Width
The default pulse width for these pulses is set to 25 micro seconds, however it is settable from the menus in 100 nano second steps from a minimum of 0 (no pulse) to a maximum of just over 8 milli seconds.

The menu selections are DIGPW-1, DIGPW-2, DIGPW-3, DIGPW-4

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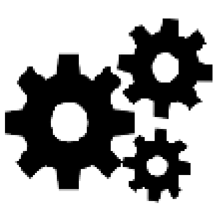

*Note 2: PCLK

The programmable clock output is a highly flexible digital output that can be set in frequency from a high of 10MHz to a low of 10MHz / 16777215, i.e. 0.5960 Hz. The 16,777,215 comes the maximum value of a 24 bit binary number.

The output frequency can be programmed to any frequency that is the result of 10MHz (10,000,000) divided by any integer between 1 and 16,777,215. To calculate the divisor required simply execute the equation :

10,000,000 / Desired Frequency = Divisor
e.g. for an output of 50 Hz >>>>> 10,000,000 / 50 = 200,000

In addition, the PCLK output can be set to be either a square wave, or a pulse output with a pulse width (mark) of 100 nano seconds (for longer pulse widths use the PPSS option shown below)

In addition to the firmware selections above, hardware options are also available to add additional signal conditioning. These additional hardware options provide special interfacing either in terms of output quantities (distribution), voltage levels, pulse widths, single ended versus differential and many more.

The additional hardware options are listed below. If you don't see the particular feature you need, please ask, as we are continually updating the list of available options:

Digital Output Options			
Option Designation	Description	Function(s)	Comments
OPLB	Output level booster	Increase the pulse (high) voltage to a maximum of 24V	Single channel pcb.
PPSS	Pulse Stretcher	Increase the output pulse width of the PCLK pulse when set to PULSE	Applicable to PCLK. Maximum of 3 milli seconds
OPTO	Optical digital output converter	Converts the digital output to an optical output on an ST connector	Specify either multi mode or single mode fiber
PULS	4 channel digital distribution	Provide 4 digital outputs from one digital input.	Broadband, e.g. could be 1PPS or IRIG B DCLS, or up to 10MHz (PCLK)
PPSD	TTL to Differential +/-5V	Converts to differential +/- 5V output	Uses a triaxial output connector
DO42	Convert TTL to 4 xRS422	Converts a standard 5V TTL pulse output to 4 x RS 422 differential ouputs	
P485	TTL to 8 x RS 485	Converts to 8 x RS 485 outputs	Outputs are provided on 1 x 25 pin 'D' connector

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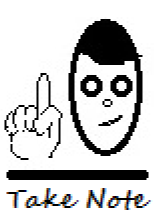
Time Code Outputs



In addition to the RF (10MHz) and Digital outputs described above, the instrument provides an amplitude modulated time code output. Due to the nature of the 1kHz modulation, the amplitude modulated output hardware is dedicated to the amplitude modulated time code, however there are two possible selections for the time code output type, either IRIG B 120 (default) or NASA 36

Selection of the desired type of time code is by means of the menu, short description TIME-AMOUT

Miscellaneous Outputs

The final group of outputs is a mixture of special serial type outputs, relay alarm outputs, and software protocols

Serial Time Print Output

The default set on the serial output menu selection (short description NMEA-OUT) is set to off. In this mode the instrument provides a specially formatted single line of ASCII characters representing the time and day of year, and output once per second. This output is mainly used in some older legacy systems. The hardware configuration is:

Data Bits:	8
Parity:	none
Stop Bits:	1
Harware handshaking:	None
Baud rate:	same as serial monitor/control port. Menu short description BAUD-RATE (default 57600)

Format of Time Print Output
<SOH>DDD:HH:MM:SSQ<CR><LF>

where:
<SOH> Hex 01 The start bit of the <SOH> character is transmitted on time.
Q Time quality indicator. Represented by:
space (ASCII 0x20, Locked, maximum accuracy)
? (ASCII 0x3F, reference source unavailable)

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NMEA 0183 Serial Output

As an alternative to the time print output, the instrument may be configured to provide standard NMEA 0183 messages by using menu selection (short description) NMEA-OUT set to On. In this mode the instrument will output four standard NMEA messages, namely:

$XRMC, $XGGA, $XZDA, $XGLL where the X represents the particular constellation being monitored according to the received selected and the menu setup.

Insure that if operating in this mode, the device you are using to receive the messages is configured for 4800 baud, as in this mode, the serial out baud of the instrument rate is automatically set to the NMEA standard of 4800.

Serial port configuration is again: 8,n,1,no hanshaking

Summary Fault Alarm Relay

The instrument contains an alarm relay, used to indicate if a fault condition exists. The output is on “clean”, change-over contacts, and the alarm is energized when there is NO fault.

The alarm system is designed this way so that if power is lost (or removed) from the unit, the alarm will de-energize and a fault will be indicated, i.e. the alarm is “Fail Safe”.

Front Panel LEDs.

There are three high brightness LEDs on the front panel.

Power : Illuminates GREEN when power is applied to the unit
Lock : Illuminates GREEN when the internal oscillator is “locked” to the external disciplining source
Flashes GREEN/OFF when the internal oscillator is in the process of locking
OR
Flashes GREEN/OFF whe a selected receiver is attempting to “track” satellites (Fault LED will also be ORANGE)
Fault : Extinguished in normal operation
: Fast flashing GREEN / OFF during initialization
: Illuminates ORANGE to indicate a “soft” fault (e.g. not tracking satellites)
: Flashes GREEN/RED if a selected input is not present. E.g. PPS-SRCE set to EXTCAM but no external time code is connected
: Illuminated RED if there is a hard fault with the system

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Network Time Protocol (NTP)

The instrument can be used as an NTP server, to provide accurate time over an Ethernet connection to one or multiple devices that have NTP clients.

The unit can respond to individual requests from NTP clients, or broadcast to any client on a network.

Simple Network Management Protocol (SNMP)

The instrument also includes SNMP version 1, 2, and 3 to provide summary status information to a network manager.

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