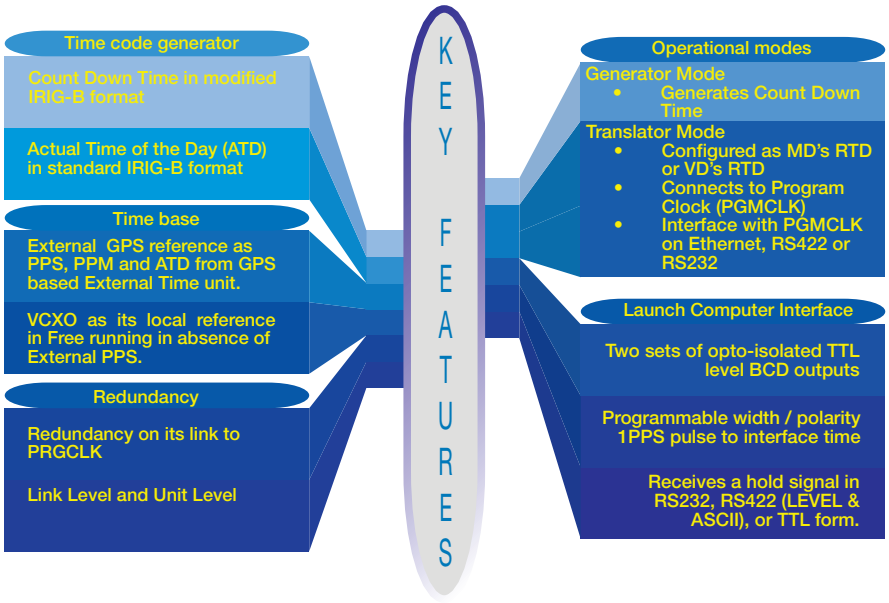
PARK RTDG-20

Compact Rugged Remote Time Display Hold Interface Unit (MD / VD)

Overview

PARK RTDG-20 is a Portable, Compact and Rugged Count Down Timing (MIRIG-B) System, suitable for land based or ship based launch applications and ground checkout applications. Its compactness and ruggedness make it highly suitable for applications, where the unit has to be carried to remote locations. It can work either as a generator or as a RTD. RTDG-20 supports redundancy when connected to Program Clock connections at two levels – unit level and link level.



Applications

- Count Down Time Generation for Launch application for Missiles
- Count Down Time Generation for Launch application for Rockets

System Features Description

Operational Mode:

The unit can function in either Generator mode or Translator mode. In the Generator mode, the unit will generate the Count Down Time. In the Translator mode, the unit will act like an RTD. In this mode, it takes Count Down Time and displays the time. In both the modes, the unit can take hold inputs and generate hold outputs.

Generator Mode:

In this mode, the unit can generate Count Down Time (CDT) in modified IRIG-B format. It utilizes a very high stability VCXO as its local reference. The time can be preset to a value and the unit will start counting down from that given time.

Translator Mode:

In this mode, the unit can be configured as MD's RTD or VD's RTD. It can connect to the Program Clock on Ethernet, RS-232 or RS-422 links.

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External Time Interface:

The unit can receive the Actual Time of Day (ATD) in IRIG-B modulated code format. If this signal is available, the internal VCXO is phase locked to it. The unit generates 1PPS and 1PPM signals from it internally, and uses them to synchronize the RUN (next full minute) and PRERUN (next second) commands in generator mode. In the absence of external reference, the internal VCXO itself acts as the Time base.

Hold Inputs:

When the time is counting down, the unit can take Hold Inputs from different sources like front panel switches, Level Holds, or ASCII Holds in RS-232 / RS-422 / Ethernet Interfaces.

Hold Outputs:

When there is a hold, the unit generates hold on its Hold Output Interfaces.

User Interface:

RTDG-20 has a 6-digit 1-inch 7-segment display, and a 5-line OLED display with 32 characters per line. It has a Keypad with 21 keys. The 7-segment display displays the time generated by the unit internally or the external time received. The unit also provides a Management Ethernet Port that can be connected to a PC. It is possible to monitor the status of the RTDG from the Management Ethernet Port.

Redundancy:

RTDG supports redundancy on its links to Program Clock. The redundancy is provided at two levels – link level and unit level. The RTDG can be connected to Program clock on two separate physical Ethernet ports. This provides link redundancy and offers protection from any single link failure. Two Program Clocks can be configured to act like a single unit in redundancy mode. In which case, the RTDG is connected to both the Program Clocks. This provides protection against Program Clock failure.

RTDG supports redundancy on its links with LCC also. RTDG has two physical links for connection to LCC. On each physical link it connects both the LCCs – main and standby, for redundancy.

General Specifications

User Interface:

- 21-key Keypad
- 256 x 64 pixel OLED, organized as 32 x 5 characters, for LOCAL configuration
- High Intensity 6-digit 1-inch 7-segment display for displaying time.
  - Front panel indicators to display the following clock status conditions:
    - HOLD
    - UP/DOWN
    - 1 Hz status indicator
- **Other front panel indicators include:**
  a. Generator mode / Translator mode
  b. Launch Authorization
  c. Presence of Time Code Input
  d. Ethernet Tx/Rx activity of all Ethernet ports
  e. Activity on RS-232 and RS-422 Interfaces
  f. Presence of time code on each Time Input Interface
- **Generator / Translator Key Lock:**
  This Key is provided to switch between Generator Mode and Translator Remote Mode.
- **Launch Authorization Key Lock:**
  This key is used authorize launch in the RTD mode, if the unit is configured as MD's RTD

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- **HOLD / CLRHOLD Switch:**
  This is a Back lighted Push button switch. On pressing this switch, HOLD is activated and the back light indicator on the switch turns ON and holds the time at the current value. Pressing the switch once again clears hold and the back light turns OFF indicating that HOLD is cleared.
- **RUN Switch:**
  On pressing this switch, RUN Command is issued and the clock will start Running in the next full Minute of ATD. This switch is disabled in Translator Mode.
- **PRERUN switch:**
  On pressing this switch, PRERUN Command is issued and the clock will start running after the next second of ATD. This switch is disabled in Translator Mode.
- **PRESET switch:**
  This Switch is used to preset the time in Count Up Mode. This Switch is recognized only when the time is counting UP and when the MODE is LOCAL. This switch is disabled in Translator Mode.

Time Code Outputs (Modified IRIG-B):

CDT : 1 No (MRIGI-B)
Code: Level
Connector: BNC

ATD : 1 No. (IRIG-B)
Code: Mod code
Modulation Ratio: 3:1
Connector: BNC

Ethernet Interfaces:

Management Port: 1 No. All status information including Ethernet connectivity can be monitored
LCC Ports : 2 Nos. (For Redundancy)
Program Clock : 2 Nos. (For redundancy) Time input at 40 ms rate

Serial Program Clock Interface:

RS-232 : 1 No. (3-pin MS connector)
RS-422 : 1 No. (6-pin MS connector)
Only one of the three interfaces to the Program Clock (Viz., Ethernet, RS-232 and RS-422) can be active at a time

Launch Computer Interface:

No. of Ports : Two identical, independently buffered, opto-isolated ports
BCD Outputs : TTL compatible
The Signals are : Seconds data: 7 Bits
Minutes data: 7 Bits
+5 Volts
Ground
One PPS output in TTL form with associated Ground return.
One PPS output as a differential pair (RS422).

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PPS Pulse Width: PPS pulse width is programmable using the front panel. The value can be set from 10 microseconds to 60 milliseconds.

PPS Polarity : Active high or active low selectable from key board.

Connectors : 26 pin MS connectors.

External Hold Interface:

HOLD Output : 3 Nos. (Level Holds)
Potential free contact (3-pin MS Connector) RS-422 (3-pin MS Connector)
TTL (3-pin MS Connector)

HOLD Inputs : 4 Nos.
2 Nos. Logic hold (Level) (3-pin MS connector)
1 No. for RS-422 ASCII hold interface (6-pin MS connector)
1 No. for RS-232 ASCII hold interface (3-pin MS connector)

External time Interface for Synchronization:

ATD Code Input: 1 No.
Code: IRIG-B Modulated code
Level: 0.5 to 10 volt peak to peak
Modulation ratio: 3:1
Connector: BNC

CDT Code Input: 2 Nos. (Input port is automatically switched depending on input)
Code: Modified IRIG-B (DC code)
Level: RS-232 (1 No.) & RS-422 (1 No.)
Connectors: BNC

Operating Conditions:

Power : 230 V ± 20 V AC

Frequency : 50 Hz

Environmental Specifications

PARAMETER	DESCRIPTION
Low temperature	-20°C -3°C for 8 hours (JSS 0256-01, Test No.2)
High temperature(dry heat)	55°C +3°C for 8 hours (JSS 0256-01, Test No.1)
Tropical Exposure	45°C + 2°C, 95% RH for 8 hours (JSS 0256-01, Test No.4)
Shock	30g for 11 milliseconds 2 shocks along six directions (JSS 0256-01, Test No.18)
Bump	400 Bumps (40g) 2-3 Bumps/sec (JSS 0256-01, Test No.21)
Radom Vibration	20 Hz -50 Hz : 0.02 g^2/Hz 50 Hz -500 Hz : 0.001 g^2/Hz Duration : 30 min cumulative No. of Axes : 3
EMC/EMI	MIL-STD 461C (CE03, RE02, CS06 & RS 03) MIL-STD 461E (CE101, RE102, CS101 & RS103) ESD: 8KV, 20 pulses

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Setting up the PARK RTDG-20

This unit is configured using Front Panel.

Unit Information

SETUP DATA	CHOICE	DEFAULT	NOTES
Manufacture	PCC	PCC	Name of manufacturer
Part Reference	PARK RTDG-20	PARK RTDG-20	Unit variant part number for single input, Direct Input and output.
Serial Number	RTDG/20-xxx/yy	--	Unique serial number for individual module xxx-Serial Number yy-Manufacturing Year

Interface Details

Front Panel Buttons and switches

Following are the Front Panel Buttons and switches of RTDG

BUTTON / SWITCH	EXPLANATION
HOLD button	Hold button has inbuilt LED lamp. Hold button is used to HOLD the time. The LED lights up when HOLD is recognized.
RUN button	Pressing the RUN time will make the clock to start the time at next full minute.
PRERUN button	Pressing the PRERUN time will make the clock to start the time at next full second.
PRESET button	Preset button can be pressed to preset the clock. This is effective only when the time is in HOLD or counting up.
COMPHOLD lamp	This is a button with inbuilt LED lamp. The button is not functional. It is used only as an indicator to show that there is a computer hold. This glows when there is a hold from one of the external hold interfaces.
Local/Remote Switch	This is a switch that is used to put the unit in Local or Remote mode. In Local mode of operation the unit takes all commands from the front panel switches. In remote mode it takes the commands from the RTDs connected.
Launch Authorization Switch	The two positions of the switch are marked LA and LNA to indicate “Launch Authorized” and “Launch Not Authorized”. This switch is used in local mode to authorize the launch. In remote mode, launch is authorized from the MD’s RTD
Generator / Translator Switch	This switch is used to configure the unit as Generator or Translator. In Generator mode, the time is generated by the unit, starting at preset time. In Translator mode, the unit receives time from an external source and regenerates the time.

Front panel LED indicators

There are two sections of the LED indicators on the unit. The left section indicates the RTD connections and Hold status of the RTDs.

• MOD INPUT	• RS422(A) HOLD
• DC INPUT 1	• RS232(A) HOLD
• DC INPUT 2	• RS422 PGM CLK
• RS422(L) HOLD1	• RS232 PGM CLK
• RS422(L) HOLD2	• ETH PGM CLK

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Following table explains these LED indicators

SL. NO.	LED	INDICATION
1	MOD INPUT	Time signal has been detected on MOD input (ATD) port
2	DC INPUT 1	Time signal has been detected on EIA1 (CDT) port
3	DC INPUT 2	Time signal has been detected on EIA2 (CDT) port
4	RS422(L) HOLD1	There is a hold on RS422 Level-1
5	RS422(L) HOLD2	There is a hold on RS422 Level-2
6	RS422(A) HOLD	There is a hold on RS422 ASCII port
7	RS232(A) HOLD	There is a hold on RS232 ASCII port
8	RS422 PGM CLK	Program Clock has been configured to use RS-422 interface
9	RS232 PGM CLK	Program Clock has been configured to use RS-232 interface
10	ETH PGM CLK	Program Clock has been configured to use Ethernet interface

The right side section has the following indicators

UP •	PGM CLK RX •	PGM CLK TX •
DOWN •	MGMT RX •	MGMT TX •
HOLD •	LCC RX •	LCC TX •
1Hz •	TRANSLATOR •	GENERATOR •
	AUTO LAUNCH •	

Following table explains these LED indicators

SL. NO.	LED	INDICATION
1	HOLD	The time is in hold
2	UP	Time has crossed 00:00:00 and counting up
3	DOWN	Time is counting down.
4	1Hz	Blinking LED, at 1Hz rate
5	AUTO LAUNCH	Launch has been authorized from front panel
6	GENERATOR	The unit is put in Generator Mode. Please note that changing the GEN/TRL switch when the unit is on, will not change this mode.
7	TRANSLATOR	The unit is put in Translator Mode. Please note that changing the GEN/TRL switch, when the unit is on, will not change this mode.
8	PCM CLK RX	Data is being received from Program Clock Ethernet port
9	MGMT RX	Data is being received from MGMT Ethernet port
10	LCC RX	Data is being received from LCC Ethernet port
11	PCM CLK TX	There are transmissions from Program Clock Ethernet port
12	MGMT TX	There are transmissions from MGMT Ethernet port
13	LCC TX	There are transmissions from LCC Ethernet port

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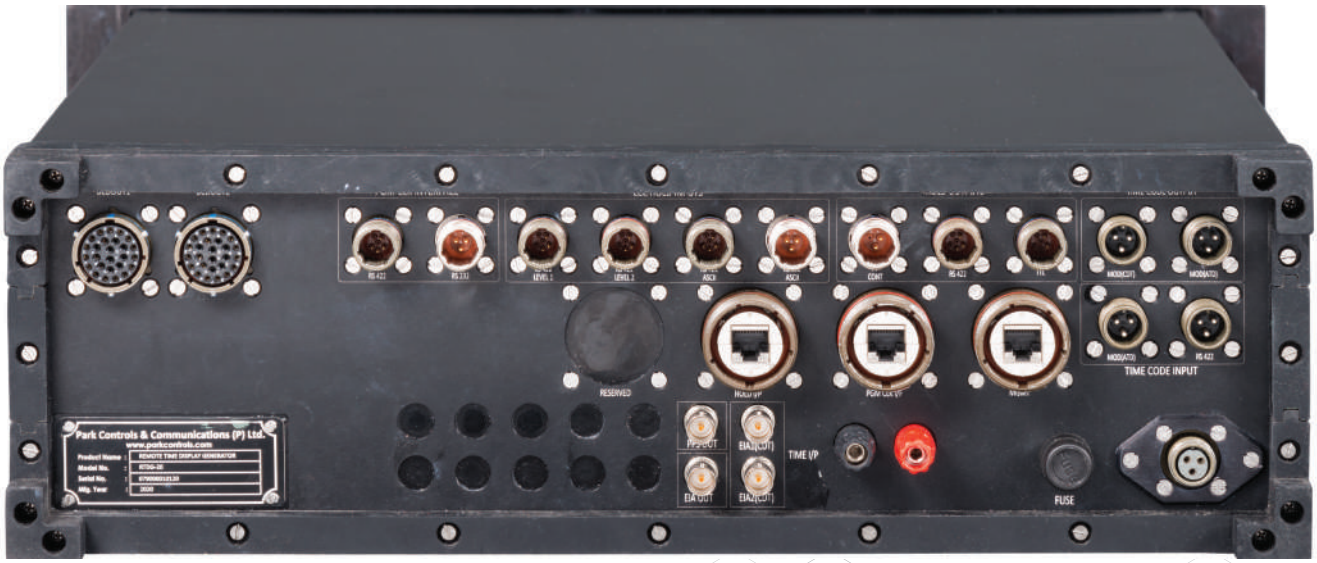
7-Segment Display

The unit has a 6-digit 1-inch 7-segment display that keeps showing the CDT being generated

Rear Panel connectors

The following table gives the details of the Input and output of the unit at the Rear panel,



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SL. NO.	INTERFACE TYPE	COUNT	DESCRIPTION
1	Ethernet Circular	3	They are labelled • PGM CLK I/P • HOLD I/P • MGMT Following are the links that can be configured • PGMCLK: Link for Program Clock interface • LCC-M1: Link for LCC-Main (1st port) • LCC-M2: Link for LCC-Main (2nd port) • LCC-S1: Link for LCC-Standby (1st port) • LCC-S2: Link for LCC-Standby (2nd port) • MGMT: Link for Management outputs
2	BNC Female	1	EIA CODE Output
3	BNC Female	2	EIA (CDT) Input
4	BNC Female	1	PPS Output
5	3 Pin Circular Male	1	MOD CDT Output
6	3 Pin Circular Male	1	MOD ATD Output
7	3 Pin Circular Male	1	MOD ATD Input
8	6 Pin Circular Male	1	RS422 HOLD Output
9	6 Pin Circular Male	1	TTL HOLD Output
10	3 Pin Circular Male	1	WIRING POTENTIAL FREE CONTACT HOLD OUTPUT
11	3 Pin Circular Male	1	RS232 IN (CDT)
12	6 Pin Circular Male	1	RS422 RTD INTERFACE CONNECTION
13	6 Pin Circular Male	2	RS422 LEVEL HOLD INPUT
14	6 Pin Circular Male	1	RS422 ASCII LEVEL HOLD INPUT
15	6 Pin Circular Male	1	RS232 ASCII LEVEL HOLD INPUT
16	26 Pin Circular	2	OPTO ISOLATION BCD OUPUT

Ordering Information

PART NUMBER	DESCRIPTION
PARK RTDG-20	The unit comes with all the options as specified in the datasheet. However usage of the unit either as MD or VD shall be specified at the time of ordering