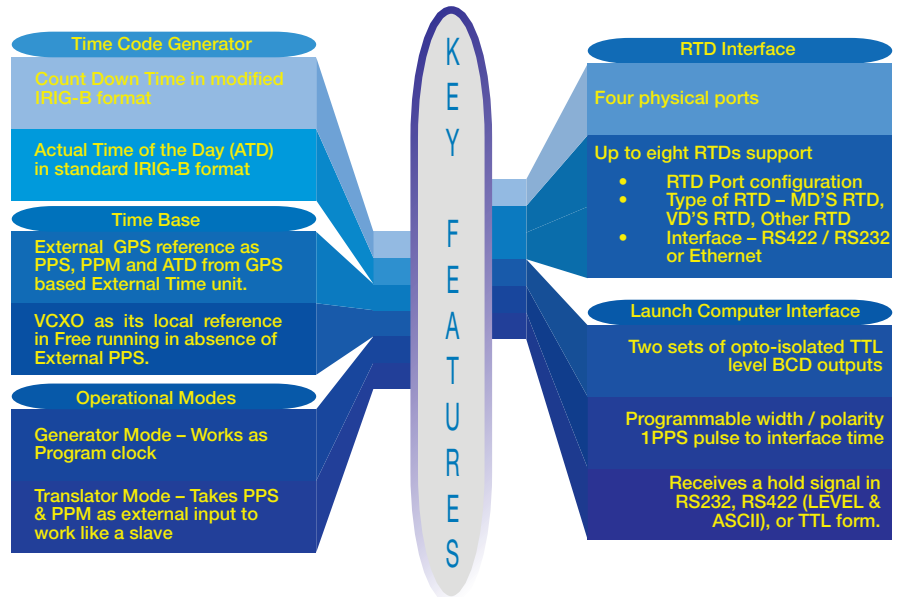


# PARK PGMCLK-20

## Compact Rugged Program Clock

### Overview

PARK PGMCLK-20 is a Portable, Compact and Rugged Count Down Timing 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 includes, a precision Count Down Time Generator and a Hold Interface Unit capable of handling up to eight Remote Time Displays (RTDs). The unit can also interface to a launch computer, and process the holds generated by it. PGMCLK-20 supports redundancy on RTD 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

#### Time Code Generator:

The built in Time code generator can generate time either Count Down Time in modified IRIG-B format or Actual Time of the Day (ATD) in standard IRIG-B format. It utilizes an internal very high stability VCXO as its local reference which can be phase locked to an external GPS reference, when one is available. In the absence of external reference (GPS) the VCXO itself acts as the Time base in free run mode.

#### RTD Interface:

RTDs are connected on Ethernet to the Program Clock. There are four physical ports (Two sets of two ports each). A maximum of eight RTDs can be connected on these ports.

#### RTD Port Configuration:

Each RTD can be configured from the front panel for (1) Type of RTD – MD'S RTD, VD'S RTD, Other RTD, (2) Interface – RS-422 / RS-232 or Ethernet, (3) Whether holds are allowed or not on that port; and (4) If holds are allowed, till what point of Count Down Time are they allowed.

# PARK PGMCLK-20

## Compact Rugged Program Clock

### Launch Computer Interface:

The Unit provides two sets of opto-isolated TTL level BCD outputs and a programmable width / polarity 1PPS pulse to interface time to the Launch computer. It can receive a hold signal from the launch computer in RS232, RS422 (LEVEL & ASCII), or TTL form.

### External GPS Interface:

The Program Clock can receive one 1PPS pulse, one 1PPM pulse and the Actual Time of Day (ATD) in IRIG-B modulated code format. These signals can be taken from a GPS based external timing unit to synchronize RUN and PRERUN operations.

### User Interface:

The Program clock has a 6-digit 1 inch 7-segment display and 5-line LCD display with 32 characters per line. It has a Keypad with 21 keys. The 7-segment display shows the time generated by Program Clock 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 Program Clock from the Management Ethernet Port.

### Operational Modes:

The unit can function in either Generator mode or Translator mode. In the Generator mode, the Program Clock will generate the Count Down Time. In this mode, it will work as a full fledged Program Clock. In Translator mode, the unit will take Count down time, 1PPS and 1PPM as external inputs and act like a slave.

### Connectivity Modes:

The unit can work in Local mode or Remote mode. In the local mode the Program Clock will function as a standalone unit. In the remote mode all operation such as HOLD, START and LAUNCH Authorization can be given through RTDs.

### Redundancy:

Program Clock supports redundancy on links to RTDs. The redundancy is provided at two levels – link level and unit level. Each RTD 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 that case, each RTD is connected to both the Program Clocks. This provides protection against Program Clock failure.

## 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

# PARK PGMCLK-20

## Compact Rugged Program Clock

- **Other front panel indicators:**
  - a. Remote / Local
  - b. Launch Authorization
  - c. Time code input for slave mode operation
  - d. Ethernet Tx / Rx activity of all Ethernet ports
  - e. RTD status in Ethernet mode (16 LEDs, 8 for Ready, 8 for Hold)

### LOCAL / REMOTE Key Lock:

This Key is provided to switch between the Local Mode and Remote Mode

### Launch Authorization Key Lock:

This key is used when the MDs RTD is not connected to the Program Clock. When the key position is in LAUNCH AUTHORIZATION mode the START command can be initiated from Program Clock itself.

**Note:** This key should be used only when the MDs RTD is not connected to the Program Clock in Remote mode

### HOLD/CLR HOLD Switch:

This is a Backlit Push button switch. On pressing this switch in REMOTE mode, HOLD is activated and the backlit indicator on the switch turns ON and holds the time at the current value. Pressing the switch once again clears hold and the backlit indicator 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.

### PRERUN Switch:

On pressing this switch PRERUN Command is issued and the clock will start Running after the next second of ATD.

### 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.

## Time Code Outputs (Modified IRIG-B):

### EIA Code: 8 Nos.

- 06 Nos. - RS232 LEVEL on BNC
- 02 Nos. - RS232 ASCII on DB9 connector

### RS-422 Outputs: 8 Nos. (3-pin MS Connectors)

- Output level: - 2 V differential without termination

### Modulated Output: 2 Nos. (BNC Connectors)

- Output level: - 1 to 5V peak to peak, (factory set)
- Modulation Ratio: 3 : 1

## Ethernet Outputs:

- RTD Connection:**
- 4 Nos. in unicast mode (Two main ports, Two ports for redundancy)
  - Support for 8 RTDs, each RTD is given a unique source ID for communication.
  - Time output at 40ms rate Unicast mode

- ASCII Output:**
- 2 Nos. in either Unitcast or Multicast mode
  - Each port can send either ASCII time in HH:MM:SS:D/U/H format @ 2Hz, or the status information including Ethernet connectivity for monitoring.

## Redundancy Management Interface:

- No. of Ports:** One proprietary serial link, for connecting two Program Clocks for redundancy

# PARK PGMCLK-20

## Compact Rugged Program Clock

### 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).
- PPS Pulse Width:** PPS pulse width can be selected through the keyboard on the front panel of Program Clock.  
The range is from 10 to 60000  $\mu$ Sec.
- PPS Polarity** : Active high or active low selectable from key board.

### External Hold Interface:

- HOLD Output** : Interface type: Potential free contact,  
RS-422 Connector: 6-pin MS Connector (1 No.)
- HOLD Inputs** : 8 Nos.  
6 Nos. for RS-422 ASCII hold interface (6-pin MS connector)  
2 Nos. 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.  
Code: Modified IRIG-B code,  
Level: RS-232 (1 No.) & RS-422 (1 No.),  
Connectors: BNC
- 1PPS Input** : TTL signal  
Active high or Active low selectable  
Pulse width: 1  $\mu$ s to 250ms.  
Connector: BNC
- 1PPM Input** : TTL signal  
Active high or Active low selectable  
Pulse width: 1 ms to 40s.  
Connector: BNC

### Operating Conditions:

- Power** : 230 V  $\pm$  20 V AC
- Frequency** : 50 Hz



# PARK PGMCLK-20

Compact Rugged Program Clock

## 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 <sup>2</sup> /Hz 50 Hz - 500 Hz : 0.001 g <sup>2</sup> /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

## Setting up the PARK PGMCLK-20

This unit is configured using Front Panel.

## Unit Information

SETUP DATA	CHOICE	DEFAULT	NOTES
Manufacture	PCC	PCC	Name of manufacturer
Part Reference	PARK PGMCLK-20	PARK PGMCLK-20	Unit variant part number for single input, Direct Input and output.
Serial Number	PGMCLK/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 PGMCLK

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.
COMP HOLD 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.

# PARK PGMCLK-20

## Compact Rugged Program Clock

BUTTON / SWITCH	EXPLANATION
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.

• RTD1 HOLD	• RTD1 READY
• RTD2 HOLD	• RTD2 READY
• RTD3 HOLD	• RTD3 READY
• RTD4 HOLD	• RTD4 READY
• RTD5 HOLD	• RTD5 READY
• RTD6 HOLD	• RTD6 READY
• RTD7 HOLD	• RTD7 READY
• RTD8 HOLD	• RTD8 READY

A HOLD LED glows when there the RTD is in HOLD. READY LED glows when the corresponding RTD is connected to the Program Clock. The right section has the following indicators

UP •	ETH1 RX •	ETH1 TX •
DOWN •	ETH2 RX •	ETH2 TX •
HOLD •	ETH3 RX •	ETH3 TX •
1Hz •	ETH4 RX •	ETH4 TX •
REMOTE •	ETH5 RX •	ETH5 TX •
LOCAL •	GENERATOR •	TRANSLATOR •
AUTO LAUNCH •	EIA INPUT •	MOD INPUT •

Following table explains these LED indicators

SL. NO.	LED	INDICATION
1	UP	Time has crossed 00:00:00 and counting up
2	DOWN	Time is counting down.
3	HOLD	The time is in hold
4	1Hz	Blinking LED, at 1Hz rate
5	REMOTE	The unit is working in remote mode of operation
6	LOCAL	The unit is working in local mode of operation
7	AUTO LAUNCH	Launch has been authorized from front panel
8	ETH1 RX	Data is being received from UC-1 Ethernet port
9	ETH2 RX	Data is being received from UC-2 Ethernet port
10	ETH3 RX	Data is being received from MGMT Ethernet port
11	ETH4 RX	Data is being received from MC-1 Ethernet port. In the current version, no data can be received on MC-1 port. So this is always OFF.
12	ETH5 RX	Data is being received from MC-2 Ethernet port. In the current version, no data can be received on MC-2 port. So this is always OFF.

# PARK PGMCLK-20

Compact Rugged Program Clock

SL. NO.	LED	INDICATION
13	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.
14	EIA INPUT	Recognized EIA input time code.
15	ETH1 TX	There are transmissions from UC-1 Ethernet port
16	ETH2 TX	There are transmissions from UC-2 Ethernet port
17	ETH3 TX	There are transmissions from MGMT Ethernet port
18	ETH4 TX	There are transmissions from MC-1 Ethernet port
19	ETH5 TX	There are transmissions from MC-2 Ethernet port
20	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.
21	MOD INPUT	Recognized Mod code input time.

## 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,



# PARK PGMCLK-20

Compact Rugged Program Clock

SL. NO.	INTERFACE TYPE	COUNT	DESCRIPTION
1	Ethernet Circular	5	<p>Controller Ports</p> <p>The unit has three controller ports</p> <ul style="list-style-type: none"> <li>▪ UC1</li> <li>▪ UC2</li> <li>▪ MGMT</li> </ul> <p>Slave Ports</p> <p>There are two slave ports</p> <ul style="list-style-type: none"> <li>▪ MC_1</li> <li>▪ MC_2</li> </ul> <p>UC1, UC2 and MGMT ports are controller ports. They can be used to send and receive data. MC1 and MC2 ports can be used only to receive data.</p>
2	BNC Female	6	EIA CODE OUTPUT
3	BNC Female	2	MODULATED CODE OUTPUT
4	BNC Female	1	MODIN (ATD) INPUT
5	BNC Female	1	EIAIN (CDT) INPUT
6	BNC Female	1	PPS INPUT
7	BNC Female	1	PPM INPUT
8	3 Pin Circular Male	1	Panel RS422 HOLD Opto Isolated output
9	3 Pin Circular Male	1	RS422 IN (CDT) WIRING (time input in translator mode)
10	3 Pin Circular Male	8	RS422 TIME CODE OUT (CDT)
11	6 Pin Circular Male	6	RS422 PROGRAM CLOCK INTERFACE
12	6 Pin Circular Male	2	RS232 RTD INTERFACE
13	6 Pin Circular Male	1	RS422 LEVEL HOLD
14	6 Pin Circular Male	1	RS422 ASCII HOLD
15	6 Pin Circular Male	1	RS232 ASCII HOLD
16	9 Pin Male	2	RS232 ASCII outputs
17	26 Pin Circular	2	OPTO ISOLATION BCD OUPUT

## Ordering Information

PART NUMBER	DESCRIPTION
PARK PGMCLK-20	The unit comes with all the options as specified in the datasheet.

