Palert + Manual

Contents

Published Date

6/01/2017

Version History

0.1	08/12/2016	B Hollins	First draft translated from Chinese
1.0	21/12/2016	B Hollins	Full release
2.0	06/01/2017	B Hollins	Updated Modbus register details
3.0	10/10/2017	V Gautam	Updated Parameters, Web interface images.

Introduction

Product Description

Palert+, as the name suggests, is an Advanced Type Acceleration Seismograph Sensor. Providing the full functionality of traditional Seismic Sensors (Palerts), it comes with additional features such as greater sensitivity up to 100dB, four sensors and a dust-proof and waterproof IP67 enclosure. It provides data storage of Real-Time waveforms and Seismic events.

The Palert+ is another member of the Palert family of Seismic Sensors and Alarms. In effect, it is a combination of Palert and PX-01 with some modifications plus additional features.

Developed by Prof. Yih-Min Wu, Palert and Palert+ can detect the P Wave from an earthquake and uses this data to issue early warning about the size of the S Wave (Shock Wave) and related information instantly.

Palert+ offers four trigger algorithms for detecting earthquakes

1. Pd,
2. PGA,
3. STA/LTA.

Seismic intensity standards for various agencies like CWB (Central Weather Bureau, Taiwan), China GB/T-17742-2008 and MMI Classification are available. Earthquake information can be stored onsite and accessed remotely. This includes earthquake trigger time, maximum intensity, maximum acceleration for each axis component and instantaneous Triaxial acceleration vector. The unit is equipped with a choice of 10Hz, 20Hz and 40Hz low-pass filters, for the high frequency of seismic signals. The networking capability allows streaming real-time data to hosts; automatically connecting with up to 2 servers; NTP (Network Time Protocol) time calibration and the ability to be remotely queried. With these networking functions, Palert+ also acts as a front-end device for an EEW (Earthquake Early Warning) System or for local SCADA servers.

Palert+ supports the Modbus TCP/RTU communication standard which makes it an ideal product for earthquake safety control in numerous situations.

Specification

Features

- Built-in web user interface, simple and convenient settings.
- 3 Digital Output (Relay Outputs) for external trigger.
- Providing earthquake early warning audio output (Optional)
- Seismic event data recording function.
- Built-in standby power, with safe shutdown protection.
- Supports MQTT Emergency push message service.
- LCD System status display.
- Supports network (NTP) Server-side and client-side functionality.

Benefits

- Palert+ with a UPS, can act as a local earthquake warning system to protect staff and infrastructure.
- Palert+ stores the waveforms and earthquake event data onsite as well as sending it real-time to the server. This can provide important data to engineers for any event.
- Palert+ web interface makes configuration and operation simple and easy to use.
- Palert+ is not just a seismic sensor as it can interface with a variety of applications via the digital and audio output that can trigger various alarms onsite. This allows for protection of assets by automatically turning on/off devices and triggering messages/alerts/alarms
- Dust and Water protection (IP67) for even the harshest environments.

Technical

- CPU: ARM1176JZF-S 700MHz
- Data Storage Type: 8GB MircroSD
- Ethernet Controller: 10/100 Base-TX
- LCD display: 2-line x 20 character
- Watchdog Timer: 10 seconds
- RTC Accuracy: ±60 seconds/year, adjustable by NTP
- Tri-axial **MEMS** (Accelerometer) 18 bit, Analogue output
  - Range: ± 2 g
  - Dynamic Range: 100dB
  - Accuracy: ± 2 % (0.8 to 20 Hz)
  - Resolution: 0.015 gal

- Internal Velocity Sensor Type: **Geophone** Analogue output - optional

Full scale:	± 100 mm/s
Resolution:	0.00016 mm/s
Frequency range:	4.5 to 315 Hz
	0.1 to 315 Hz (compensated)
Dynamic range:	> 130 dB
Case to Coil Motion P-P:	4 mm
Moving Mass:	11.0 ±0.1 gram
Sensitivity:	> 25 Vm/s
Spurious Frequencies:	> 240 Hz

- AD Resolution: 4 Channel, 24-bit data
- Sampling rate: 50 sps, 100 sps, 200 sps (optional)

- Operation Temperature: -10℃ ~ +60℃
- Operation Relative Humidity: 10 ~ 98% RH
- Dimension(mm):   205 x 160 x 80 Nominal
- Weight: 2.1KG
- Supply Voltage: 9~30 VDC
- System Power Consumption: 3 W
- Waterproof Rating: IP67

MODBUS

The Palert+ is a merger of the Palert and PX-01 units. These both have Modbus accessible registries. The details are in the relevant manuals.

- **PX-01 Modbus AO Address Mapping Table (40XXX)**
- **PX-01 Modbus AI Address Mapping Table (300XXX)**
- **Palert Modbus Address Mapping Table (400XXX)**

Hardware

Pack Components

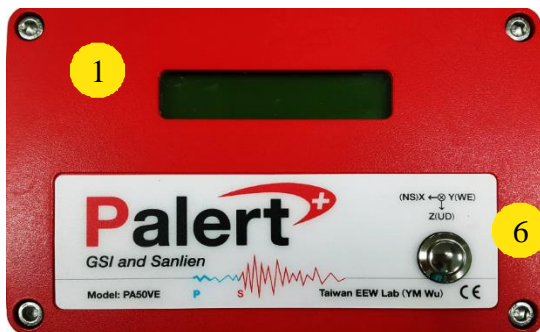PALERT + (Palert + Host Computer)

Ethernet Cable

Power Cable with M22 water proof connector

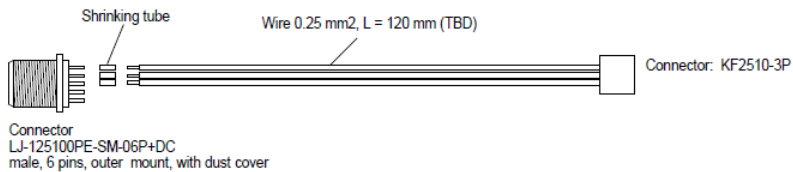## Palert+ Overview

1) LCD Screen Display: System Status Display

2) Geophone: Vertical axis external sensor

3) AUX Port – Relay control, output audio

4) Power Port: Power input 9 to 30VDC
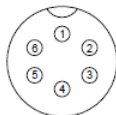
5) Network Port RJ45

6) Function button

Connectors

POWER

Shrinking tube

Wire 0.25 mm2, L = 120 mm (TBD)

Connector: KF2510-3P

Connector
LJ-125100PE-SM-06P+DC
male, 6 pins, outer mount, with dust cover

Pin	Signal	Colour
1	GND	White
2	PWR	Brown
3		
4		
5		
6	PE	green-yellow

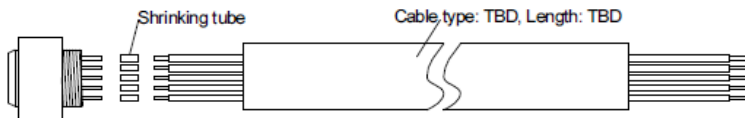| Pin	Signal	Colour
1	GND	White
2	PWR IN	Brown
3	PE	green-yellow

Arrangement of contacts, soldering side view

Arrangement of contacts in KF2510 connector:
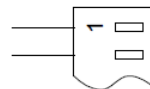
AUX

Connector
LJ-125075AS-PF-14P+DC
female, 14 pins, cable mount, IP67/IP68, with dust cover

Pin	Signal	Colour
1	GND	White
2	PWR OUT	Brown
3	AL1	Green
4	N.C.	
5	AL2	Grey
6	N.C.	
7	AL3	Blue
8	N.C.	
9	GPS PWR	Black
10	GPS RX	violet
11	GPS PPS	grey-pink
12	AUDIO CTRL	red-blue
13	AUDIO OUT	white-green
14	PE	Cable shield

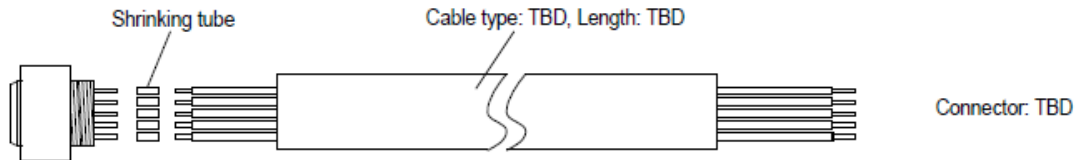Arrangement of contacts, front side view
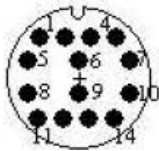
AL1 is triggered by either PD_WATCH_THRESHOLD or PGA_WATCH_THRESHOLD being met

AL2 is triggered by either PD_WARNING_THRESHOLD or PGA_WARNING_THRESHOLD being met

AL3 is triggered by only PGA_ACTION_THRESHOLD being met

Sensor

Shrinking tube

Cable type: TBD, Length: TBD

Connector: TBD

Connector
LJ-125075AS-PF-12P+DC
female, 12 pins, cable mount, IP67, with dust cover

Geophone

Pin	Signal	Colour
1	GND	White
2	PWR	Brown
3	X+	
4	X-	
5	n.c.	
6	n.c.	
7	n.c.	
8	n.c.	
9	n.c.	
10	n.c.	
11	n.c.	
12	PE	Cable shield

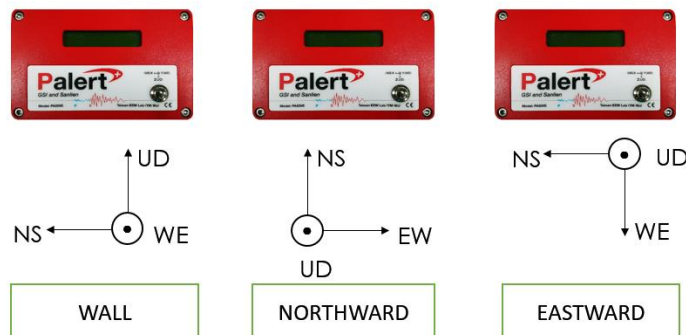| Pin	Signal	Colour
1	+	White
2	-	Brown
3	PE	Cable shield

Arrangement of contacts, soldering side view

Installation

The Palert+ has 3 modes of installation – Wall Mounted or Flat. But since most sites will be sending data to a central server that will include Palert as well as Palert+ as per diagram only use the 2 settings.

MOUNT_MODE (in [PALERT_LOCAL_MODE])

If you are using the same server to receive the data from Palert and Palert⁺，please use WALL or EASTWARD.