CTBT: SCIENCE AND TECHNOLOGY 2017 CONFERENCE

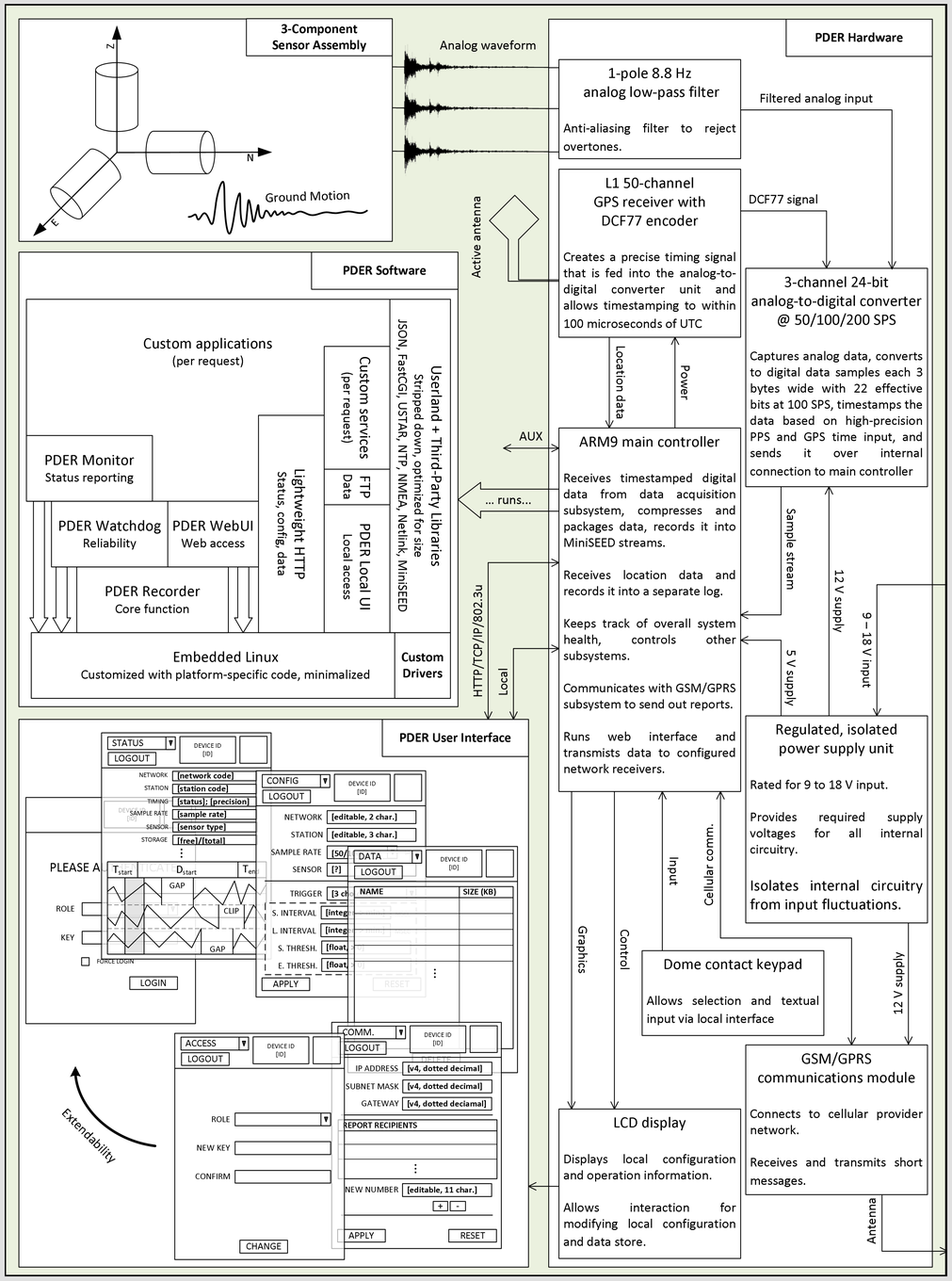
T3.1-P16

Developing a Low Cost Shut Down MEMS Base Accelerometer Suitable for Rapid Response and Structural Applications

Vahid Gholami, Ali Safepour
Geopersian Co., Tehran, Iran. www.Geopersian.com
Va.Gholami@gmail.com

Mega-cities, specially when located in a high potential seismic region, are always threaten by huge damage because of earthquake. Decreasing the earthquake side effects is the main target of our developed low cost MEMS base accelerometer unit. There are more than 300 CGS gas stations distributed all over the Tehran city which can act like a bomb when an earthquake happens. There are lots of hospitals which needs to switch on emergency electricity state before by an earthquake the system crashed. Lots of general structural ideas are predicted on the software and various relay switch are considered for the system such as elevator stop at the nearest floor, industrial machinery switch off, schools and organizations alarm, CGS controlling and auto shout down, power lines switching off, metro stop alarm, toy city alarms and stops, trains speed control and etc. The system exactly monitor the noise level of the installed place and based on CAV algorithm discard the transient peaks and shocks to reach the minimum level of false detection.

Channels	**3; can be configured for differential or single-ended input upon request**
Input voltage	+/- 1 V; customizable between +/- 0.25 to +/- 2.5 upon request
Sampling	50, 100, 200 SPS field configurable; zero skew
Bit depth	Sigma-delta method with 24-bit ENOB at 1 Hz nominal quality; better than 22 bit for all regional and local applications
AA filter	1-pole 8.8 Hz low-pass; customizable upon request
Oscillator	10 ppm stable quartz
Operating temperature	-20 °C to +50 °C
Dynamic range	> 130 dB at 100 SPS
Sensitivity	119 nV/count nominal
Sensor	MS1000.A ±2g
Timing	GPS-based; synced to better than 100 µs



Output format	**MiniSEED for wave data** **Proprietary text-based for extra channels**
Data container	FAT32 filesystem; ext2/ext3 upon request (higher read/write performance) Raw waveform channel streams; one per channel Text-based extra channel streams; one per channel
Data access	On-device storage Remote download via web interface
Data channels	3x digitized waveform 1x GPS status including timestamp, fix quality, location
Audit	Internal operation and error log (for vendor diagnostics)

Processor	**ARM9 400 MHz core; 2x ARM7 communications blocks**
Device Storage	SD card; up to 32 GB
Communications	Ethernet Short message (SMS) status report over cellular network Telemetric option with central data collection facility over any IP-capable medium including cellular data services
Operating system	Customized embedded Linux
Configuration	On-device touch-sensitive LCD ; rugged five-button keypad Remote web interface