



NWF 6500 Operations Manual



VERIZON

NWF 6500 Operations Manual



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A1	6/20/16	Tom Kees	Add required MPE comment for FCC

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1. Scope

This document describes the specifications of hardware/firmware/RF/mechanical of the NWF 6500 Board and Unit. The NWF 6500 is a multi-board unit.

2. Reference Documents

SAE J1850	Class B Data Communications Network Interface
SAE J1708	Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications.
ISO 11898-2	Road Vehicles – Controller Area Network Part 2 : High speed medium access unit
SAE J2411	Single Wire CAN Network for Vehicle Applications



3. In-Drive NWF 6500 Design Requirements

General Specifications

Size	76mm x 44mm x 26mm (or smaller)	
Weight	100 grams (or less)	
Input Voltage	+6 to +60Vdc, 60V transient voltage spikes	
Power Consumption	Normal (Key On)	<500mA @ 12Vdc
	Idle (Key Off)	<16mA @ 12Vdc
	Sleep (Key off > 3 days)	<500uA @ 12Vdc
Average Max Power (GSM Xmit)	1.50A @ 12Vdc	
Fault Protection	Reversed battery, over voltage, loss of ground	
Debug Interface	RS-232	
Temperature Range	Operating	-40 to +85C
	Storage	-40 to +105C
Relative Humidity	95% Non-condensing	

GPS Specifications

Receiver	Jupiter SE880
Accuracy	< 2 m accuracy in open sky
Acquisition	Cold Start <5 seconds @ -153dBm sensitivity
	Hot Start < 3 second @ -155dBm
Antenna	TBD -> target for best performance.

Modem Specifications

Modem	Telit LE910, CE910 Dual or UE910 Quad
Antenna	Wide band antenna for LTE/HSPA/1xRTT

850/1900 Band	824~894MHz	1850~1990MHz
Peak Gain	-1.1dBi	-0.1dBi

Regulatory Approvals ¹	PTCRB, Verizon, AT&T, Rogers, Telus
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¹ RF exposure compliance is demonstrated by MPE calculation at 20 cm separation distance.



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Bluetooth Specifications

Transceiver	Internal Bluetooth Transceiver Bluetooth v2.1 + EDR (or better) Class 2
Range	Up to 10m
Antenna	Internal Chip Antenna
Regulatory Approvals	Bluetooth, FCC, Industry Canada

OBD Diagnostic Specifications

OBD2 Physical Layers	SAE J1850PWM (41.6Kbps) SAE J1850 VPW (10.4Kbps) ISO 9141-2 (10.4Kbps) ISO 14230 (KWP 2000 Fast and Slow) ISO 15765 (CAN 250 and 500Kbps, 11 & 29 bit) SAE J2411 Single Wire CAN Network
Heavy duty	SAE J1708 SAE J1939
Connector	SAE J1962 Compliant OBD2 Dongle
Safety	Switchable CAN2 and CAN3 signals for supporting any automobile

Sensors

Accelerometer	3-axis +/-16G
Gyroscope	3-axis

Driver Feedback

LED	RGB LED
Buzzer	80dBA (or better)

Power reserve

Loss of power alert	SMS alert(1500bytes) after power loss detection, 5 seconds minimum.
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Expansion

Interface	Serial interface with hardware flow control (TTL levels)
External power	12V @ 1.5A max



Mechanical

Tampering protection

Additional Features

Scan tool detection

Embedded only with harness

Harness detection

Multiple harness types (8+)

4. NWF 6500 HW Design Overview

The NWF 6500's main goals are:

- 1) Linux Processor
- 2) Telit Cellular Module, supporting CDMA/GSM
- 3) GPS
- 4) Buzzer
- 5) OBD interface supporting 2nd and 3rd CAN buses
- 6) Scan Tool Detection
- 7) Last Gasp power back-up.
- 8) Side Serial Port for peripherals

4.1 Topology

4.1.1 NWF 6500 Topology

The NWF 6500 contains 2 main boards and 2 daughter boards.

- CPU board
 - o Linux Processor and Memory
 - o Bluetooth Radio
 - o GPS Receiver
 - o Side serial port
- Cell Board
 - o Cellular module
 - o OBD Interfaces
 - o Main Switching regulators
 - o Super caps to support last gasp
- Buzzer Board
 - o Just contains a buzzer



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- GPS Antenna board
 - o Contains a GPS patch antenna

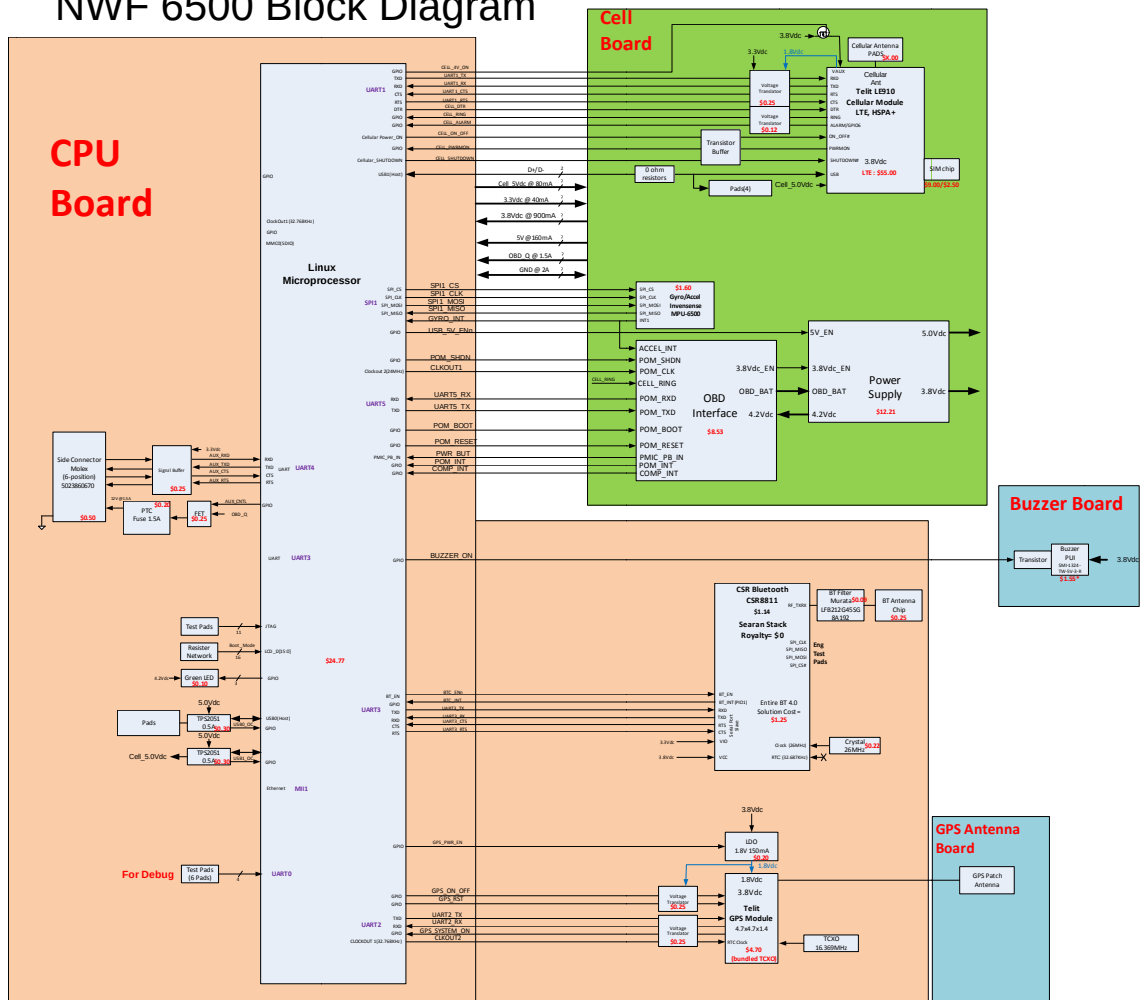
4.2 Mechanical Housing

- The housing shall be ABS plastic.

4.3 Block Diagram

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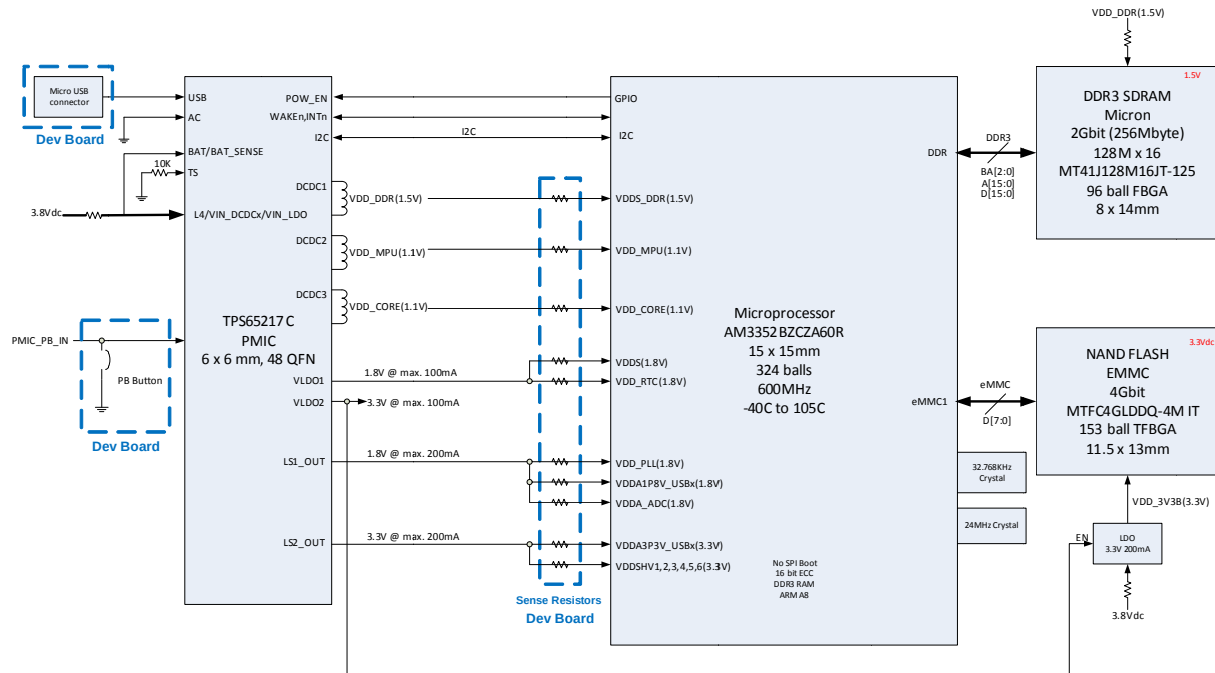
NWF 6500 Block Diagram





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NWF 6500 Linux Processor Block Diagram





4.4 PCB Organization

The NWF 6500 will contain several PCBs, with the cellular and CPU PCBs with the following stack-up.

Stack-up

