

NJIAL200

EXHIBIT 7

“Users Manual”

**This exhibit is submitted to comply in part with
FCC 47CFR section 2.1033 part b item 3:
“ A copy of the installation and operating instructions to be
furnished the user. A draft copy of the instructions may be
submitted if the actual document is not available. The actual
document shall be furnished when it becomes available.”**

**This exhibit is submitted to comply with
FCC 47CFR section 2.1033 part c item 3:
“A copy of the installation and operating instruction to be
furnished the user. A draft copy of the instructions may be
submitted if the actual document is not available. The actual
document shall be furnished to the FCC when it becomes
available.”**

Submission examination in detail on FCC 47CFR section 2.1033 part b item 3:

Whereas the “Installation and Operating Instructions” is shown below, and the reference in section 2.1033 for the same document is the “installation and operation instructions”, and the Form 731 equivalent reference is the “User Manual”, the “Installation and Operating Instructions” document is used as a submission for this requirement and is evidenced.

Submission examination on FCC 47CFR section 2.1033 part c item 3:

Whereas the “Installation and Operating Instructions” is shown below, and the reference in section 2.1033 for the same document is the “installation and operation instructions”, and the Form 731 equivalent reference is the “User Manual”, the “Installation and Operating Instructions” document is used as a submission for this requirement and is evidenced.

CSI-Wireless Wireless-Link

AssetLink 200 Installation and Operating Instructions

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Acronyms and Abbreviations

bps	Bits per Second
AMPS	American Mobile Phone System
Cellular Section	Cellular Data Modem for AMPS
DAC	Digital to Analog Converter
DGPS	Differential Global Positioning System
DSP	Digital Signal Processor
EEPROM	Electronic Erasable Programmable Read Only Memory
ESD	Electrostatic Discharge
ESN	Electronic Serial Number
FCP	Function Control Processor
GPS	Global Positioning System
ID	Identification (Numeric or alpha value)
I/O	Inputs and/or outputs
MIN	Mobile Identification Number
NCC	Network Control Center
PPM	Parts per Million
RAM	Random Access Memory
RF	Radio Frequency
RSSI	Received Signal Strength Indicator
RTC	Real Time Clock
RX	Receiver or Receive
SAT	Supervisory Audio Tone
SID	System Identification Number (Cellular switch identifier)
ST	Signaling Tone
TX	Transmitter or Transmit
UTC	Universal Time Coordinated
VSWR	Voltage Standing Wave Ratio

Definitions

Action	A programmed response to an exception.
Aeris	Company that invented MicroBurst
Almanac	A subset of orbital parameters from the GPS satellite ephemeris used to calculate approximate satellite positions and velocities.
Baud	A unit of measurement specifying the signaling rate (Signals/Sec).
Control Channel	A specific cellular communications channel designated for use by the cellular system to set up a voice telephone call between the PSTN and a cellular user
Ephemeris	A set of GPS satellite parameters used to calculate precise satellite positions and velocities.
Exception	A predefined event or condition that causes a programmed response (Action).
Immobilizer	Type of vehicle security alarm that has the capability to immobilize the vehicle by interrupting the fuel line or ignition
MicroBurst	Data communications specification using telephone signaling protocol of the Analog Cellular Telephone system
Page	The event of receiving a cellular telephone call. Also known as an incoming call or cellular page.

1 Introduction

1.1 Operational Overview

The AssetLink 200 vehicle unit provides a specific set of features for vehicle security and vehicle tracking through the integration of Cellular Control Channel data communications, Cellular Voice Channel data communications, Global Positioning System (GPS) technology, and an intelligent power management.

System Features

The AssetLink 200 unit incorporates the following major features:

- Integrated Microburst radio,
- Integrated Cellular Audio Modem
- GPS receiver
- Power management modules.
- Real Time Clock for scheduling and power management.
- Low power mode.
- Event schedules & triggers
- Protected automotive power supply.

1.2 Operating Modes

The AssetLink 200 unit offers three operating modes.

- Power Off Mode
- Armed Mode
- Active Mode

2 AssetLink 200 Internal Components

2.1 Twelve Channel GPS Receiver.

The AssetLink 200 unit incorporates an integrated twelve-channel GPS receiver.

2.1.1 GPS Position/Velocity Fix.

The GPS receiver establishes a position fix as shown in Table 1.

Time for Fix	Certainty	Conditions
< 1min.	90%	GPS receiver powered on 6 –24 hrs. without a current almanac, satellite ephemeris, initial position or time.
< 30 sec.	90%	“Warm Start”, GPS receiver powered on 1 – 6 hrs. with a current almanac, satellite ephemeris, initial position and time.
< 10 sec.	90%	“Hot Start”, GPS receiver powered off for less than 60 minutes with a valid almanac, satellite ephemeris, position and time.

Table 1 - Establishment of Position Fix

The GPS almanac is updated continuously as pages of the almanac are received during Active Mode state. During the Active Mode the GPS receiver is always powered on and attempting position fixes.

The GPS receiver can be configured during the Armed Mode to specify the “maximum time to fix” interval allowed for the GPS receiver to get a fix before powering off the GPS. This mode is necessary in situations where the GPS antenna is completely hidden from the sky and cannot get an updated position fix during its Armed Mode ‘wake-up/status check’ cycle.

During the Armed mode the GPS receiver is immediately powered off after getting a valid fix and determining that the vehicle has not moved. However, the cellular transceiver will remain on for the duration of the ‘wake-up/status check’ cycle to listen for messages from the NCC.

2.1.2 Geo-fences

At the time of the installation the AssetLink 200 may be factory programmed with 3 Geo-fences, and defaulted to the first 0-25 mile fence as follows:

1. ID # 1, 0 to 1 miles radius
2. ID # 2, 0 to 25 miles radius
3. ID # 3, 0 to 50 miles radius

Users can change these by contacting the NCC where commands can be sent to the device to change the geo-fence. Alternatively they can execute these commands via the web page interface. A geo-fence defines a boundary or a geographic area calculated as a radius from a central point. Only one geo-fence can be enabled at a time. The AssetLink 200 will send a Status message to the NCC in the event that the vehicle crosses outside the fence selected.

Each Geo-fence is defined by the following parameters:

- ID (1-3) used to identify a particular constraint region. This value is created and stored by the host, not by the AssetLink 200.
- Type (out of only)
- Boundary — circle with radius. Center of circle is Home Origin.
- Trigger - The AssetLink 200 will generate an exception, when it has a valid GPS fix, based on:
 1. The vehicle crossing the geo-fence,
 2. When the unit powers up outside a geo-fence.

2.1.3 Distance and Home Origin

One Latitude-Longitude position, referred to as Home Origin, can be kept in the FCP EEPROM configuration memory. This data point is used to calculate the radii of the selected geo-fence, and subsequently the distance from the center of the circle. In the event that the vehicle exits this circle a trigger can be generated and sent to the NCC.

2.2 System Timing

The AssetLink 200 maintains accurate system time necessary to support the Armed Mode of operation. When the GPS receiver is active and can see at least one GPS satellite the AssetLink 200 system time is synchronized to the GPS time.

2.3 External I/O

The seven I/O connections of the AssetLink 200 are configured as follows:

Line #	Designation	Type	Function	Signal Characteristics
1	Output	Relay Driver	Doors Unlock Relay	Pulse active low, 1 second maximum
2	Output	Relay Driver	Starter Enable/disable Relay	Level, stays high or low as determined by MIN3 / MIN4
3	Input	Digital	Crash Sensor, Low Impact	Active low, minimum 1 second. Rise time less than 150 microseconds
4	Input	Digital	Crash Sensor, High Impact	Active low, minimum 1 second. Rise time less than 150 microseconds
5	Output	Digital	Future Assignment	
6	Output	Digital	Future Assignment	
7	Input	Analogue	Future Assignment	

Table 3 – I/O Port Configuration

2.4 Event Monitor and Exception Handler

The AssetLink 200 unit is programmed to recognize a number of events as exceptions and use these events to trigger action(s).

Some examples of events are:

- Excessive speed.
- Door lock open/close
- Geo-fence violation
- The GPS antenna disconnected.
- Vehicle alarm violated

2.5 On Board Diagnostics

The AssetLink 200 incorporates on board diagnostics and troubleshooting support that is accessible by connection to the asynchronous communications port. The following will be displayed in the Asset Vision Link test software, connected to the AssetLink 200 via the RS232 serial port.

- GPS fix attained (Yes/No)
- Antenna Status (Connected/disconnected)
- Cellular RSSI
- Asset voltage
- Asset ID
- Internal phone number (MIN)

- System Identification (SID)
- ESN

2.6 Power Consumption Profile

The AssetLink 200 unit has three major operating modes:

Power Off	This is the lowest consumption mode to maintain the RTC, relay outputd digital outputs and monitor external digital inputs. The current draw from the supply lines in this mode is less than 30 microamperes at 12 volts.
Armed	In this mode the unit checks for scheduled events), external analog and digital inputs. Any unused modules are powered down. When processing is not required the unit runs in the power off state. The current draw from the supply lines in this mode is nominally 150 milliamperes at 12 volts.
Active	This is the full operating mode with both the GPS and the Cellular Section powered on continuously. The unit monitors exceptions, receives GPS position fixes and the Cellular Section is in the standby mode ready to receive any messages. The Cellular Section transmitter is turned on as required. The current draw from the supply lines in this mode is nominally 150 milliamperes with periods at 600 milliamperes at 12 volts when the cellular unit is in full power transmit.

3 Performance Specifications

3.1 Cellular Transceiver

Parameter	Specification	Units
Frequency Range (Tx)	824.010 – 848.970	MHz
Frequency Range (Rx)	869.010 – 893.970	MHz
Channel Spacing	30	KHz
Deviation	± 12	KHz Max.
Number of Channels	832	
Antenna Impedance	50	Ohms
Receiver Sensitivity	-116	dBm typical
Transmitter Power Output	0.6	Watts nominal
Peak Deviation	+/- 8	KHz
Frequency Stability	+/- 2.5	ppm maximum
Carrier Switching Time	2	ms
Channel Switching Time	40	ms maximum

Table 6– Cellular Transceiver Performance Characteristics

3.2 GPS Receiver

Parameter	Specification
Receiver	L1, C/A code
Channels	12
Max Solution Update rate	1/second
Satellite Reacquisition Time	100 ms
Snap Start	< 2 seconds
Hot Start	< 8 seconds

Warm Start	< 38 seconds
Cold Start	< 45 seconds
Minimum Signal Tracked	-175 dBW
Maximum Velocity	< 1,000 knots
Consumption	150 mA
Voltage	3.15 to 5.5 VDC
Protocols	NMEA v2.2, SiRF Binary
Position Accuracy	100 meter 2d RMS SA On 10 meter 2d RMS

Table 7 – GPS Receiver Specifications

3.3 AssetLink 200 Antenna Specifications

The AssetLink 200 unit requires two separate antennas, Cellular and GPS.

3.3.1 Warning on use of cellular antennas

The cellular antenna supplied with this unit must be used for installation and operation. Substitution of other antennas must be approved by the manufacturer for compliance to radiation safety limits.

The mounting of this unit and antenna must be done by professional installers to ensure that the user or nearby persons will maintain at least 20 cm from the cellular antenna in normal use.

3.3.2 Cellular Antenna Specifications

Parameter	Specification
Frequency	824 – 894 MHz
Gain	3dBd maximum
VSWR	Max 2:1 over range
Max Power	2 watts
Nominal Impedance	50 Ohms
Connector	TNC
Cable	15 feet maximum 50 ohm low loss

Table 8 – Cellular Antenna Specification

3.3.3 GPS Antenna Specifications

Parameter	Specification
Type	Low Noise with Active Amplifier
Frequency	1,575.42 MHz, ± 2 MHz
Gain	5 dBiC typical antenna, 24 dB active amp
Noise Figure	1.5 dB Max
Operating Temp	-30 to + 60 C
Nominal Impedance	50 ohms
Amplifier Bias Voltage	3.3 VDC, $\pm 10\%$
Connector	SMA
Cable	15 feet maximum 50 ohm low loss
Antenna current supplied by AssetLink 200	20 mA max

Table 9 – GPS Antenna Specification

3.4 Environmental Requirements

3.4.1 Temperature and Humidity

Parameter	Minimum	Maximum
Operating Temperature Range	-30 °C	+60 °C
Storage Temperature Range	-50 °C	+80 °C
Operating Humidity @ -30°C to +60 °C, %RH non condensing	0 %	90 %

Table 10 – Temperature & Humidity Specification

3.4.2 Vibration

The AssetLink 200 is designed for mounting in the passenger compartment, which is a non-frame area of a car or truck.

3.5 I/O LINES

3.5.1 Serial Data Port

The AssetLink 200 unit has 1 serial data port for general-purpose use, unit configuration and diagnostics. It is a 9600-baud ASCII, full duplex, 8 bits, no parity, asynchronous serial interface. The electrical characteristics are:

Parameter	Min	Max
Input Voltage High	3.5V	5.5V
Input Voltage Low	-0.6V	1.0V
Output Voltage High	4.0 V	5.5V
Output Voltage Low	-0.6V	0.6V
Input Impedance	40 KOhm	75 KOhm
Output Impedance	1.5 KOhm	4.0 KOhm

Table 12 – Serial Data Port Specifications

3.5.2 Analogue & Digital I/O Lines

The AssetLink 200 has 7 I/O Lines, 2 digital inputs, 2 digital outputs, 1 analogue input and 2 relay driver outputs. The electrical characteristics are:

Parameter	Min	Max
GENERAL:		
Input Impedance	40 KOhm	75 KOhm
Output Impedance	1.5 KOhm	4.0 KOhm
DIGITAL:		
Input Logic High	3.5V	5.5V
Input Logic Low	-0.6V	0.6V
Output Logic High	4.0 V	5.5V
Output Logic Low	-0.6V	0.6V
ANALOGUE:		
Input Impedance	20 KOhm	40 KOhm
Input High Voltage	6.5V	7.5V
Input Low Voltage	-0.3V	-0.6V

RELAY DRIVER:		
Output Impedance	0 ohm	3 ohm
Input High Voltage for less than 1 mA draw	0V	32V
Reverse Voltage at 1 mA draw	0V	-2V

Table 13 – Analogue & Digital Lines Specifications**3.5.3 External Connector Pin Assignments**

Connector on AssetLink 200: Molex 53259-1310 or equivalent

Mating connector, for customer-supplied cable harness: Molex 51067-1300 or equivalent

The external I/O connector pin assignments are as follows:

Pin	Description	Notes
1	Relay Driver 1	Connects relay coil to ground, other side of relay coil goes to supply positive.
2	Relay Driver 2	Connects relay coil to ground, other side of relay coil goes to supply positive.
3	Digital Output 1	0 and 5 volt logic signal with 2 KOhm series impedance driven from AssetLink 200
4	Digital Output 2	0 and 5 volt logic signal with 2 KOhm series impedance driven from AssetLink 200
5	Digital Input 1	0 and 5 volt logic signal with 300 KOhm to ground as input to AssetLink 200
6	Digital Input 2	0 and 5 volt logic signal with 300 KOhm to ground as input to AssetLink 200
7	Analog Input	Input for measurement, 0 to 38 volts
8	Ground	Connects to chassis of AssetLink 200
9	Serial Output	Signal from AssetLink 200 to Computer
10	Serial Input	Signal from Computer to AssetLink 200
11	Reserved	Reserved for factory use
12	5 Volt Reference	5 volts with 2 KOhm series impedance, for reference use
13	Battery Voltage	For measurement only, 0 to 38 volts range.

Table 14 - External Signal Connector

Pin 1 is next to larger connector (TNC)

Pin 13 is next to 2 pin connector

3.5.4 Power Lead Assignments

Power Connector on AssetLink 200: Molex 53259-0210 or equivalent

Mating connector, for customer-supplied cable harness: Molex 51067-0200 or equivalent

The AssetLink 200 power lead assignments are as follows:

1	Supply Battery Voltage Positive	Power input to AssetLink 200, 8 to 36 volts, 2 amp fused externally, internally protected.
2	Supply Battery Voltage Negative	Power input to AssetLink 200, battery negative with protection for current to chassis, connected to chassis with low impedance.

Table 15 - Power Supply Lead Use.

Pin 1 is next to 13 pin connector

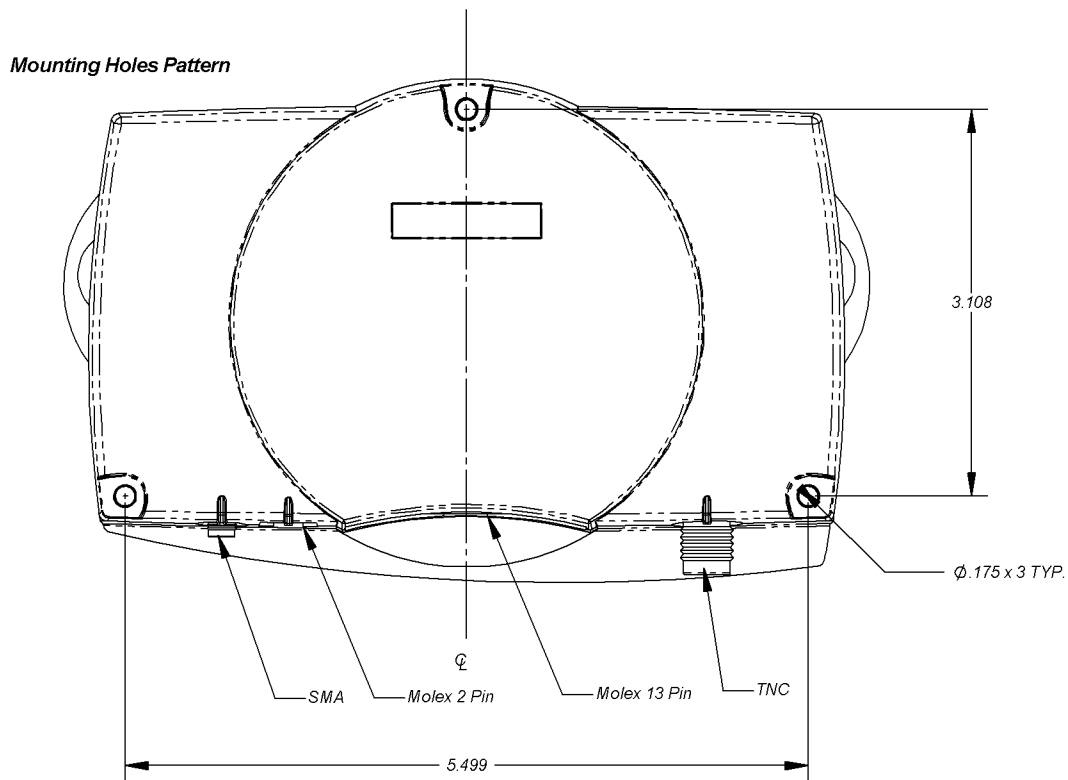
Pin 2 is next to smaller connector (SMA).

4 Mechanical and Physical

4.1 Housing

The AssetLink 200 consists of a PCB contained inside a housing. The approximate size of the AssetLink 200 is 156 mm (L) x 100 mm (W) x 25.4 mm (H).

1. The housing is cast aluminium,
2. Three mounting tabs will allow for use of a size 6 pan head screw,
3. The outside color of the housing is black.



AssetLink 200 mounting dimensions