

Approaching train alert system for gangmen

License free RF based portable system with 4G GPRS backup



Continuous track maintenance is key for rail safety. Thousands of maintenance staff/workers are involved and their safety in turn is real challenge. This system provides a safer alternative by providing advance warning to the way workers, track maintenance team/gang-men or any other maintenance staff about incoming rail.

Despite work procedures, flagmen, signal systems etc. Railway Workers (constructors, signalmen, technicians) continue to experience life threatening accidents with trains on track. Gang men are not always aware of approaching vehicles and hence prone to life threat or serious accidents. They need an effective alerting system of incoming rail traffic. This system provides an additional level of protection to them with its audio, visual and vibrating warning functions.

RF based wireless system is employed in this system and this RF based communication enables mobility, where users carry and fix the units on track. Individual system units are simple to install and low weight to carry. The Train Detector auto detects the train and transmits the signal to the Alarm Unit using Mesh based RF communication. Parallely the attendant of the Train Detector can also send signal using the same RF network manually with the help of his Hand-held Alerting Device, if needed (Optional).

Components of the System:

- Portable Train Tracker
- Portable Alarm Unit
- Range extender

Auto detects the train and signals alarm to the alarm unit using mesh based RF communication.




PORTABLE TRAIN TRACKER (SW16BU001)

- Will be fixed/clamped on to the track and detects the arriving train. Transmits signals to the alarm unit for audio and visual warning though alarm unit. Simultaneously communicates to handset for audio and vibrator warning to individual person.
- Operates on battery which is capable of supporting up to 24 hours.
- Built in antenna.
- IP 65 Casing suitable for outdoor deployment
- Easy to carry and fix or remove from the track.
- Tracker is placed 1-2 KM ahead of the work area of the railway gang men.
- It detects incoming train with the help of the sensor. It can distinguish between train and other objects.
- The information is transmitted over the RF network to the nearest Repeater/Alarm unit/hand-held device.
- Lock & Key for tracker safety

Specifications:

Dimensions	345 x 237 x 104 mm (LxWxH)
Weight	7 Kg
Indicators & Controls	1. Power On/Off 2. LED Indicator – Alarm/Communication 3. LED Indicator – Working Status
Color of LED	Amber
Buzzer sound level	100 dbA
Working voltage	22.2 V
Battery Type	Li-Ion
Battery Rating	20000 mAh 112x72x23 mm, 900 grams
Power Consumption	Operation Mode: 130 mA Standby Mode: < 100 mA
Backup time on standby mode	72 hours


Battery time Normal working mode	24 hours
Charger	230 V AC to 7.4 V DC though external adaptor
RF frequency band	865 MHz to 867 MHz
Safe Backup Plan	4G GPRS modem compatible with 2G/3G/4G compatible. Will provide a parallel network, where ever the GPRS Cellular network is available, it will send the data though both RF and Mobile network, making the unit more reliable.
Image	

PORTABLE ALARM UNIT (SW16AU001)

- Receives information from base unit/repeaters.
- Will be placed at the location of gang men work area.
- Fitted with Siren/Hooter (high db > 100 db) and Flash light
- Can reset siren and Flash light using reset button.
- Shows network communication based on LEDs.
- Built in Antenna.
- ON/OFF buttons
- Works on Battery for easy portability.
- IP 65 based casing for outdoor use
- Compact and Light Weight, Easy to carry.

Specifications:

Dimensions	220x 315 x 108 mm (LxWxH)
Weight	3.5 Kg
Indicators & Controls	<ol style="list-style-type: none"> 1. Power On/Off 2. Hotter, Amber Flash Light for warning 3. LED Indicator – Alarm 4. LED Indicator – Working Status
Color of LED	Amber
Buzzer sound level	100 dbA
Working voltage	14.8 V
Battery Type	Li-Ion
Battery Rating	8000 mAh 147x70.5x39 mm, 800 grams
Power Consumption	Operation Mode: 360 mA Standby Mode: < 100 mA Flash Light and Siren : 10V DC, <312 mA on operational and 1 mA on standby
Backup time on standby mode	72 hours
Battery time Normal working mode	38 hours

Charger	230 V AC to 7.4 V DC through external adaptor
RF frequency band	865 MHz to 867 MHz
Safe Backup Plan	4G GPRS modem compatible with 2G/3G/4G compatible. Will provide a parallel network, where ever the GPRS Cellular network is available, it will send the data through both RF and Mobile network, making the unit more reliable.
Images	

RANGE EXTENDER (REPEATER) (SW16RE001)

- Used for extending the range of the RF network
- The nearest first repeater is just 50 meters away from the tracker
- Others are placed between work area and tracker with a distance of 100 meters to 300 meters apart, based on field conditions.
- Each repeater, gets signal from pervious repeater or tracker (first) and transfer the same to next repeater or alarm (last) or the Individual Hand held unit.
- Assembled over a tripod unit for safety in the field.
- Operates on built in Battery power.
- ON/OFF Switch with LED Indicators for Battery/System ON/OFF.
- Communication indicator LED
- IP 65 Casing for outdoor operation.

Specification:

Dimensions	160 x 75 x 85 mm (LxWxH)
Weight	507 grams
Indicators & Controls	1. Power On/Off 2. LED Indicator – Alarm 3. LED Indicator – Working Status
Color of LED	Amber
Buzzer sound level	82 dbA (2-4 volts)
Working voltage	7.4 V
Battery Type	Li-Ion
Battery Rating	1100 mAh 54x42.5x15.5 mm, 70 grams
Power Consumption	Unit Operation Mode: 120 mA Standby Mode: < 100 mA
Backup time on standby mode	72 hours
Battery time Normal working mode	28 hours

Charger	230 V AC to 7.4 V DC though external adaptor
RF frequency band	865 MHz to 867 MHz
Images	 The image shows two views of a white rectangular electronic device. On the left, the device is partially inside a black fabric carrying case with a handle. On the right, the device is shown fully. The front panel features a 'CHARGING' port at the top, a 'BATTERY STATUS' indicator with three green LEDs, and two orange buttons labeled 'COM' and 'POWER'. A small black knob is visible on the top edge of the device.

User Instructions:

One System is combination of following components:

PORTABLE TRAIN TRACKER (SW16BU001) - 1 unit

PORTABLE ALARM UNIT (SW16AU001) – 1 unit

PORTABLE RANGE EXTENDER (REPEATER) (SW16RE001) – 8 units

Basic notes:

1. Tracker unit has to be fixed to rail track about 1.5-1.7 KM ahead of the gang men work area.
2. At the gang men work area, alarm unit will be placed at about 1 meter away from track.
3. Range Extenders are to be placed every 200 meters between tracker and alarm unit and can be fasted to the electrical poles.
4. All three-unit types will have two LED lights that indicates the communication and power. If both are blinking at a rapid rate, the communication is established.
5. All three units are provided with internal battery and battery level is shown using the three yellow LEDs as shown.
6. Unit can be switched on/off using the key.
7. In case of the Range extenders, there is additional beeper, which will be on if the communication is not established. If the communication is established, beeper will be off.



Installation:

1. First the tracker unit need to be installed on the track
2. Each repeater should be installed
 - a. First unit should be placed within 50 meters of the tracker unit
 - b. Other units should be placed at a distance of 200 meters between each repeater.
3. Alarm unit should be placed after the last repeater unit within 100 meters of the last repeater unit.
4. While installing the units, they should be un-locked and Power indicator should be on.
5. While installing each repeater unit and alarm unit, ensure that both COM and Power LEDs are indicated.

Charging:

1. Each unit should be charged at least for 4 hours before usage.

2. Ensure that all three power indicators are ON before installing them in the site. With all three indicators, we will have 8-9 working hours for each unit. With only 1 LED indicator ON, it will support maximum of 2 working hours.
3. Always ensure that units are charged at least every week even if the unit is not used. To ensure proper battery life and maintained.
4. Batteries used in the system are made specific for the application and cannot be used in any other application and may also damage the circuit if used in other application.
5. Never take the unit near fire.

Advantages of the unit:

Approaching train alert system	Other systems
<p>Communication Channel:</p> <p>Has two alternative channels of communication:</p> <ol style="list-style-type: none"> 1. RF 2. GPRS <p>If the first RF communication fails, it will use backup communication to ensure that the data is always available between tracker and alarm unit.</p> <p>*Note it is important to manually check the unit after installation is completed for the communication between Tracker and Alarm units.</p> <p>More reliable and dependable.</p>	<p>Manual communication: Not reliable and has dependency on additional persons to track train and alert the work force.</p> <p>Other automated systems: System like Rakshak need to be installed permanently at the site and can be used to alert between a fixed point and has only one RF based communication network without alternative channel.</p>
<p>License:</p> <p>System work on a RF band width 865 MHz to 867 MHz and alternative channel is regular telecom network. Power used by the unit is <4 watts in nominal conditions.</p> <p>Does NOT Required License.</p>	<p>Required license before installation. Have time consuming procedure for license and expensive. Need annual renewal of license as they use VHF band</p>
<p>Installation:</p> <p>Dynamic and Portable, can be moved and installed at the work space just before working.</p>	<p>Need fixed installation and works within the specific range and not portable.</p>
<p>Costing:</p> <p>More affordable than any other solution. System comes with default of 2 years GPRS network and Server access. Even from the 3rd year the GPRS and server network will cost less than the license cost.</p>	<p>Expensive in terms of the communication license, equipment and fixed installation. Costs 5-6 time higher Every year will cost additionally for license and procedure to renewal of license.</p>

Return of Investment: Can eliminate at-least 2 gangmen in the field to track and alert workers and the return of the investment is released within 10-12 months.	Need 4-5 years to recover the investment.
Light weight: Unit is light weight and portable. Can be carried using Back-pack.	Fixed and not portable.

Optional Components:

Hand Held Receiver	SW16HS001
Manual Transmitter	SW16AU001

Hand held Receiver: Optional hand-held portable receiver, which enables each gang men receive personal notification though audio alarm and vibration.

#	Handheld	Quantity	Location	Description
1	Led (Status)	2	External	Communication and charging (SMD)
2	Led (Alarm)	1	External	Power on/off status 3mm
3	Switch (ON/OFF)	1	External	
4	Charging connector	1	External	5.5 x 2.1mm DC Power Supply Female Jack Socket 3 Legs PCB Mount Connector
5	Tripod screw	1	External	Bottom side
6	Belt and Clamp	1	External	Back side
7	Buzzer	1	External	Fixed in box, through the connector
8	PCB	1	Internal	
9	Vibrator	1	Internal	
11	Battery Clamp	1	Internal	To Fix the Battery
12	Battery	1	Internal	2S1P7AWB,Li-ion, 7.4V, 1050-1150mAh, 54.0X42.5X15.5MM 70 grams
13	Antenna	1	Internal	
14	Buzzer (Beep type)	1	External	To find device is with in the range or not
15	SMD (LED strip)	1	External	to know the Battery charging Status

Manual Transmitter: Optional hand-held portable transmitter with a button, which can, also raise manual alarm and also enables each gang men receive personal notification though audio alarm and vibration.

#	Handheld	Quantity	Location	Description
1	Led (Status)	2	External	Communication and charging (SMD)
2	Led (Alarm)	1	External	Power on/off status 3mm
3	Switch (ON/OFF)	1	External	
4	Charging connector	1	External	5.5 x 2.1mm DC Power Supply Female Jack Socket 3 Legs PCB Mount Connector

5	Tripod screw	1	External	Bottom side
6	Belt and Clamp	1	External	Back side
7	Buzzer	1	External	Fixed in box, through the connector
8	PCB	1	Internal	
9	Vibrator	1	Internal	
11	Battery Clamp	1	Internal	To Fix the Battery
12	Battery	1	Internal	2S1P7AWB,Li-ion, 7.4V, 1050-1150mAh, 54.0X42.5X15.5MM 70 grams
13	Antenna	1	Internal	
14	Switch	1	External	For command to generate manual Alarm
15	Buzzer (Beep type)	1	External	To find device is within the range or not
16	SMD (LED strip)	1	External	to know the Battery charging Status



Note:

Warranty: 1 year, and Data and server charges are for 1 year.

Data Pack (GPRS) and Server Access: 2 years.

Bapayya M

+91-(0)984-802-2772

bapayyac@gmail.com



SPIME Innovations Private Limited.

3rd Floor, #1-8-12-20-A/NR, Apyaya, Street No.8, Habsiguda, Hyderabad, 500007