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Voicestar™ T100 Series

Specifications for Solar Powered Highway Advisory Radio
032110

1.0 SCOPE

This specification defines the characteristics and features of a highway advisory radio system mounted on a towable trailer. This system allows the user to transmit an audible message over AM radio. The system is battery powered with both solar and 110 VAC charging systems. This device can also be outfitted with numerous Intelligent Transportation System (ITS) devices.

2.0 HIGHWAY ADVISORY RADIO SYSTEM

2.1 Description: The Voicestar unit comes equipped with an AM transmitter, digital recorder/player, antenna, and ground system allowing the user to record and broadcast an audible message over the AM band. Frequency shall be determined by frequency analysis and be set at the factory within the FCC licensed band of AM 530 kHz to AM 1700 kHz.

2.2 Transmitter: The transmitter shall meet or exceed all FCC rules 90.242. The transmitter shall be of solid-state construction, with a minimum of Class D modulation having 80% or better for energy efficiency. The transmitter shall provide for low band pass filter roll-off between 3 kHz and 20 kHz per FCC Rules. The transmitter shall have a switching power supply such that each site, as required, can accommodate 110 VAC, 220 VAC, or DC operation. To prevent interference to other broadcast radio stations, as required in FCC 90.242, RF output power shall be adjustable from 1-10 Watts with steps no more than one half Watt (1/2W) per step and frequency adjustable from 530-1700kHz. Frequency stability is maintained within a range of plus or minus 20 Hz. The transmitter is capable of audio distortion less than 1.2 percent for an audio frequency response of 100 Hz to 3 kHz. The maximum power consumption is 1.9 Amps with matched ground system and antenna. The unit includes a built in 3000 volt isolation and has an operating range

of –35ºC - +85ºC with 95% non-condensing humidity range. This unit is to have a no load/overload protection. Integrated LED wattage and VU reference meters with continuously adjustable power and audio modulation are externally accessible on transmitters' front panel. In the event the ground is disconnected the unit will remain in standby. To prevent damage due to a shorted, open or mistuned antenna, the unit shall withstand any voltage standing wave ratio (VSWR) for an extended time period without harm.

2.3 Digital Data Recorder/Player: The recorder shall be password protected with access through a remote cellular connection with voice prompts, local control, browser based interface, or optional central software. Record time is based on the amount of memory available and can be varied in length. Memory upgrades are available to increase number of messages recorded. Standard is 256 MB, which yields approximately four (4) hours of record time. Unit is capable of recording unlimited number of messages based on available space. Messages can be stored in any number of playlists to be activated at any time or via a day, date, or time of day scheduled program. Playlists are capable of storing settings to open/ close up to 4 relays for control of ancillary equipment. Recorded messages shall be generated via dynamic microphone, control telephone, telephone line, or audio dub. Remote control via cellular or dial-up telephone connection allows for messages to be stored and uploaded to the sign without having to overwrite and delete messages. Capable of full remote control via telephone line, locally or remotely, with identical control protocols. Messages shall be capable of automatic activation through schedule programming by minute, hour, day, or date. The recorder shall have an Internal Clock that maintains setting even without external power. The recorder shall be password protected, including a 10-digit security code, prompted or silent.

Components

- 40° to 70°C operating temperature
- National GX-1 CPU, 300 MHz, 16K L1 write back cache
- Up to 512 MB, SDRAMM, SODIMM
- 512K Flash with Phoenix BIOS and utilities
- Up to 2 GB Compact Flash, EIDE Interface with imbedded Linux
- CRT/TFT flat panel support: 1280 x 1024 with 4 MB of video memory
- Two 10/100 Base-TX Ethernet

- Two USB ports with UHCI support
- Four serial ports, 16C550 compatible
  - Two ports RS-232, latch-up protection
  - Two ports RS-232/422/485, latch-up protection
- Bi-directional parallel port, ECP/EPP modes

- Three EIDE ports
  - Primary is the Compact Flash socket
  - Secondary port supports two HDD/CD-ROM drives
- 16-bit AC97 audio compatible interface
  - Mic and Line in
  - Line and speaker out
- 8 channels, 12-bit analog input, optional
- AT speaker, keyboard, and mouse ports
- Live "On Air" pass through audio feed
- Message preview without interruption

Power: 5V +/- 5% at 1.8A
Shock: 40g shock, 11 mS, half sine
Vibration: 5g random vibration, 10-500 Hz

2.4 Antenna Assembly: Unit shall be provided with an antenna tuned to the same frequency as the transmitter. The antenna shall be a center-loaded monopole constructed of anodized aluminum with a stainless steel self-supporting tip. The antenna is able to withstand 80-Mph winds with ½ inch ice load. In the event of a lightning strike rendering the antenna useless, the transmitter assembly will remain in standby.

2.5 System Power Description: The station shall utilize a 12 VDC power source for the system shall be a battery pack charged primarily by a solar array that provides virtual autonomy for the system. A 110 VAC charging system is also standard on all units and available for landline operation of the system. Control of the sign power supply shall be provided by a power management system that shall regulate the charging of the batteries by the solar charging system, and shall provide for temperature compensation, regulation, and distribution of power to the various sign functions. The charging of the 12 VDC power source batteries shall be independent of the position of any switch on the control panel. The system shall automatically charge the battery back-up system while operating on AC power. No additional equipment shall be needed to charge the back-up battery power source.

2.6 Battery Pack: The battery pack shall consist of a sufficient number of 6VDC deep cycle golf cart type lead /acid batteries (BCI Group GC-2) that when in a fully charged condition shall provide sufficient electrical energy for the continuous and proper operation of the sign system for a nominal period of twenty days without the necessity of recharging. The batteries are wired in parallel to provide 12 VDC and nominal 220 Ah per pair of 6 VDC batteries.

2.7 Solar Charging System: The solar charging system shall consist of a photovoltaic array mounted at the top of the sign case and a power management system. The system shall provide regulated, "on demand" charging consistent with battery condition, with the ambient solar luminance at the photovoltaic array, and with net power consumption within the sign system. Charging of the batteries shall be independent of the position of any switch on the control panel. Initiation of 110 VAC charging service shall completely disconnect the solar array from the charging circuit.

2.8 110 VAC Charging System: The 110 VAC charging system, supplied as standard equipment, shall consist of a temperature compensating, 110 VAC input battery trickle charger, an ammeter for monitoring the charging process, and an electrical receptacle mounted on the control pedestal. The system shall be configured so as to initiate charging of the power supply batteries when the 110 VAC service is connected without the necessity of operator intervention, and shall be capable of completely charging the battery pack within a 24 to 48 hour time period. The actual charging time will vary depending upon conditions and state of charge/discharge of the batteries.

2.9 Grounding System: The VoiceStar™ system shall be grounded by use of the flexible ground plane as provided with the unit. Other optional grounding systems may be offered to be best suited for the application.

2.10 Licensing & Training: Throughout the process of the installation, American Signal Company will provide all licensing and application administration necessary for the user to obtain an FCC license for system operation. A training class can be conducted on system operation & maintenance after completion of installation.

3.0 TRAILER

3.1 Description: The trailer shall be nominally 197 inches in length with the removable tongue in place and 79.2 inches in width; shall be constructed of 3"x3" and 3"x 5" steel tube (ASTM A36) with 3/16 " wall thickness, and shall be welded in accordance with applicable American Welding Society (AWS) standards. The trailer shall have a lockable, internally illuminated, weatherproof equipment cabinet housing the control panel. The trailer shall also have two lockable battery boxes (front/rear) for the power source batteries. The trailer shall have a single axle with dual axles as an option, and a fixed height ball hitch (fixed height tow ring and adjustable height ball or tow ring hitches optional).

3.2 Rating: The trailer and springs and axle shall be rated for 3500 pounds. The removable tongue assembly with hydraulic surge brakes shall be constructed from 3" x 3" steel tube (ASTM A 36) with 3/8" wall thickness, rated for 6000 pounds, and fitted with a 2" ball hitch. Wheels shall be 15" steel with 5 lug bolts per wheel and fitted with P 205-75-15 B rated tires.

3.3 Removable Tongue: The removable tongue shall have safety chains attached. No tools shall be required for removal or remounting of the tongue; it shall not be necessary to disconnect any hydraulic brake lines to effect complete removal, and it shall not be necessary to bleed the brake system upon re-installation of the tongue.

3.4 Leveling Jacks: The trailer chassis shall have at each corner a 2000 pound leveling jack affixed in such a manner that the jacks may be readily placed and locked in a horizontal position for traveling without necessitating the use of any tools. The trailer and sign assembly, when stationary and supported properly with the leveling jacks shall withstand AASHTO rated 100 MPH wind gusts.

OPTIONAL EQUIPMENT:

Dual Frequency: The trailer may include an additional transmitter and antenna combination for broadcast on two different AM frequencies.

Remote Communications: The HAR system shall be equipped so as to provide for host computer interaction through either a landline telecommunication or modem link.

Audio Synchronization: Multiple HAR systems can have broadcast transmissions synchronized for seamless audio through a work zone.

Hitch Types: Multiple sizes of Ball, Pintle, and Bulldog hitches. Adjustable height options of each hitch are available.

Flashing Beacons: Trailer-mounted flashing safety beacons to be installed at pre-determined points along the frame so as to provide notification of active broadcast message and/or awareness of trailer positioning (up to 8x).