SpectraPulse®

Ultra Wideband (UWB) Wireless Microphone System

Features

- **Ultra Wideband (UWB) operation**
- **Immune from the "white space" issues**
- **Easy to set up and operate**
- **Interference-free performance**
- **No problems in crowded RF environments**
- **No frequency hunting or coordination**
- **Immune to multipath interference**
- **Inherent security (TRANSEC: Transmission Security)**
- **AES 128-bit encryption available (COMSEC: Communication security)**
- **Excellent audio quality**
- **Universal interface**
- **External contact closure inputs and outputs**
- **Single rack space mounting**
- **Optional rechargeable batteries and charging/encryption station**

Description

SpectraPulse® is a wireless microphone system utilizing ultra wideband (UWB) pulse technology to deliver clear, intelligible audio without the performance and set-up issues associated with conventional carrier-based RF wireless microphones. Operating in the 6 GHz band, SpectraPulse® systems are unaffected by the "white space" legislation that makes portions of the TV channel spectrum available for a variety of RF devices.

Easy to set up and operate, each SpectraPulse® system operates without the need for frequency scanning, hunting or other frequency coordination processes. Channel selection is accomplished by simply setting an address selector on each microphone transmitter to a unique address. SpectraPulse® operates using a carrier-free completely digital signal path with imperceptible latency and no companders or compression, providing excellent audio quality. The RF signal is time-based, rather than frequency-based, making a SpectraPulse® system immune from multipath issues, dropouts and sputters.

A SpectraPulse® system consists of a Digital Receiver Module (drm141), up to 14 Microphone Transmitter Units (mtu101 or mtu201) and up to two Audio Control Interfaces (aci707). The mtu201 Desk Stand Transmitter paired with any Engineered Sound® gooseneck condenser microphone may be used in conjunction with (or instead of) mtu101 microphone transmitter units. An optional seven-space Charging Encryption Station (cei007) comes with rechargeable NiMH batteries. System Encryption Package (sep128) software is also available for digitally encrypting the microphone output.

Designed for permanent installation or portable use, a single drm141

functions as both the UWB receiver and antenna supporting up to 14 microphone transmitters. The unit connects to the aci707 with a single Cat 5 shielded cable. Each single-rack-space aci707 supports up to seven audio channels; it provides the connection point to the audio system, and a control platform to set the system functions. External contact closure outputs and force-mute closure inputs are provided for each channel. Selectable mic/line level outputs are designed for interface with a wide range of equipment, including teleconference systems, videoconference systems, PA/local sound systems and other audio hardware. Each mtu101 and mtu201 offers a soft-touch button that can be globally configured for push on/off, push-to-mute or push-to-talk operation. All muting is silent.

Each SpectraPulse® system is inherently secure in operation, since the UWB data is transmitted in extremely short-duration pulses sent in a timed sequence over a very wide (500 MHz) frequency spectrum. To decode the pulse streams, the system must know exactly when, where and how to listen for them, providing a very low probability of detection. For applications requiring additional levels of security, A-T offers an optional encryption package that meets the AES 128-bit encryption standard developed by the U.S. government for securing sensitive material.

Architect's and Engineer's Specifications

The wireless microphone system shall operate in the 6 GHz band using Ultra Wideband timed pulse technology with a pulse duration of 2 nanoseconds and a UWB rate of 8 mbps. Systems using conventional carrier-based RF or spread-spectrum methods of transmission shall be unacceptable. The system shall be capable of supporting multiple (up to 14) microphone transmitters without the need for frequency coordination, scanning, or preset frequency groupings. Average RF power shall be 40 nanowatts. The system shall operate using TDMA methodology with a 1 ms frame length and a 15 time slots per frame. The audio path shall be entirely digital with no compression or companders, and the overall latency shall be less than 1.2 ms. Audio response shall be from 100 Hz to 12,000 Hz, with a sampling rate of 24 KHz and 16-bit AD/DA converters.

The system shall be inherently secure with a very low probability of transmission detection. For increased security, and AES level 3, 128-bit digital encryption software with a user-controlled, programmable key shall be available. The digital receiver module shall be designed for permanent installation or portable use and shall be able to be remotely located from the audio control interface unit. Interconnection between the digital receiver module/antenna array and the audio control interface shall be via single shielded Cat 5 cable. This cable shall supply power as well as a signal path to the digital receiver module. A single rack space audio control interface will support up to 7 mtu and it shall be possible to daisy chain a second audio control interface to expand the system to 14 mtu. The audio control interface shall provide visual indication of power, link status, mute, contact closure status and mtu low battery. Connections to the audio control interface shall be via Phoenix-type connectors. Control input and output connections shall be provided to interface the system to other equipment. It shall be possible to isolate the microphone audio from the mute/closure function for use with AEC and other systems without rewiring. An RS232 encryption port shall be provided on the front panel of the audio control interface. The interface shall operate on 100-240V, 50/60 Hz AC power with an internal power supply. The microphone transmitter units (mtu) shall be RF-shielded. They shall operate for 9 hours using NiMH rechargeable batteries. Each mtu shall be equipped with a configurable soft-touch button, and indicators for: power, low battery, link and mic active. Each mtu shall have an address/channel selector switch for setting its individual address. A recharging/encryption station shall be provided for charging and encrypting the mtu. This station shall be an intelligent charger capable of charging up to 7 mtu. It shall be provided with protection circuitry to prevent mischarging or overcharging. All components shall comply with RoHs standards.

The system shall be an Audio-Technica SpectraPulse® ultra wideband wireless microphone system or equivalent.
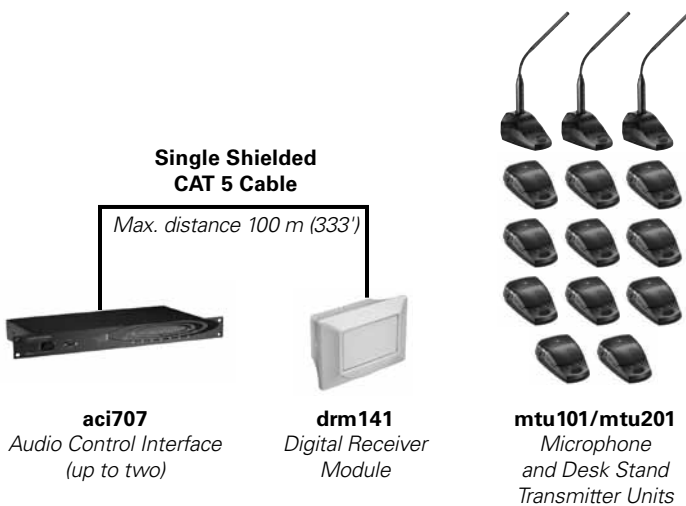
Specifications

Overall system

Frequency range	6.100 GHz–6.600 GHz
Center frequency	6.350 GHz
AD/DA	16 bits
Clock	24.576 MHz
Sampling rate	24 kHz
Pulse duration	2 nanoseconds
Frame length	1 ms
Time slots per frame	15
UWB rate	8 mbps
Compression	None
Companding	None
Latency	1.1 ms
Average RF power	40 nanowatts
Sync/Re-acquisition time	<3 ms
Range	23 m (75')
Simultaneous channels	14
Mains (aci707)	100–240V, 50/60 Hz RoHs-compliant power supply

Transmitter units

Microphone element	Fixed-charge back plate, permanently polarized condenser (mtu101)
Polar pattern	Unidirectional (mtu101)
Battery life	Approximately 9 hours (mtu101, mtu201), depending on battery type and use pattern
Current consumption	135 mA
Frequency response	100 – 12,000 Hz (mtu101)
Optional encryption	AES level 3, 128 bit

Specifications are subject to change without notice.

System Block Diagram

Single Shielded CAT 5 Cable

Max. distance 100 m (333')

aci707
*Audio Control Interface
(up to two)*

drm141
*Digital Receiver
Module*

mtu101/mtu201
*Microphone
and Desk Stand
Transmitter Units*

Each aci707 provides up to seven audio outputs.

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