



AZDEC INFRA-COM SPECIFICATION

Azdec's stealthy Infra-Com is a short range two way voice communications system using infra red(IR) to give secure, wireless, interference free communication for use in commercial and military applications. There are a number of different variants available, all are compliant to EMC Def Stan and Mil Std while military versions can be compliant to Def Stan 59-41 NEMP survivability.

The main advantages of infra red communications are security and safety. Short range infra red is virtually impossible to intercept or jam and not susceptible to electromagnetic interference.

The mobile user wears a headset with a belt mounted battery pack containing the controls. Voice is encoded within a transceiver module mounted on the headset then transmitted using infra red to an antenna. The user can freely walk within an area covered by IR and have full duplex voice with another user in the area or to a remote location such as a control room. Large areas can be covered by using multiple antenna daisy chained from a base station.

The area of coverage can be quite clearly defined as an antenna has a very predictable coverage pattern.

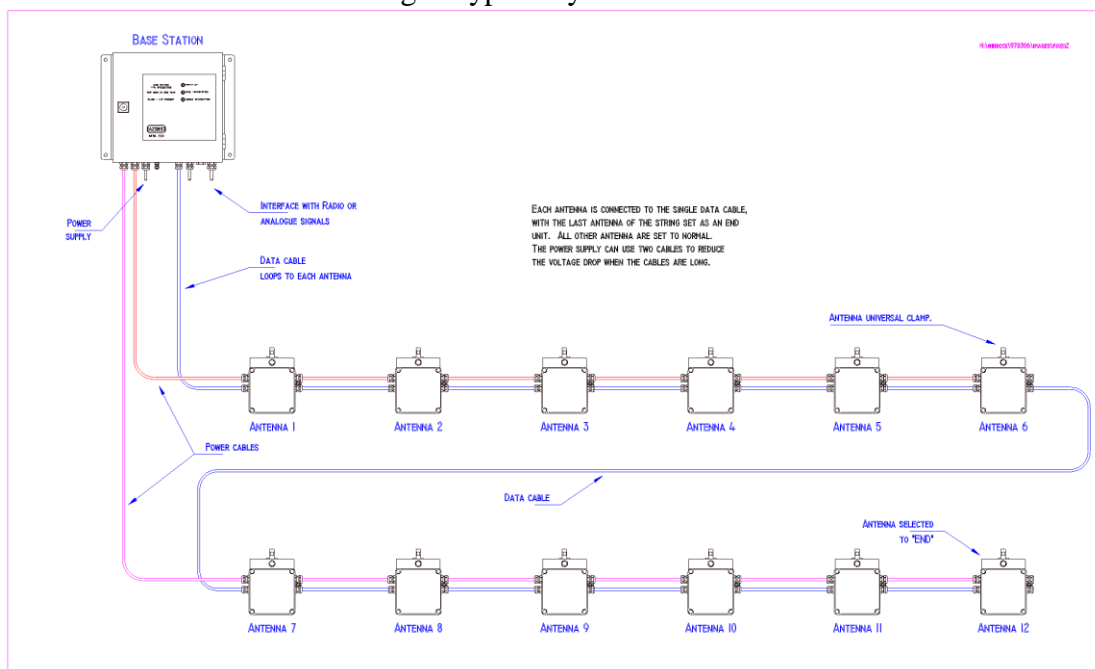
The use of digital encoding ensures that the infra red power being transmitted is very low with the system being given a Class 1 LED Product designation posing no health hazards to users.

System Architecture

All system variants are configured as below. A base station acts as the interface between the analogue voice circuits and system's serial bus as well as the system power supply. Multiple antennas are daisy chained from the base station to cover the given area. This is achieved using two types of cable, a data cable and a power supply cable. Each cable has a screen which is terminated at base station and antenna to ensure EMC performance.

DC power and voice data interface (if applicable) are the only external requirements for the system. It is otherwise completely self contained needing no user intervention for setup. The system self calibrates to ensure optimum performance.

Fig.1 Typical system install



Systems have been EMC tested and qualified to Def Stan 59-41 and Mil Std 461D. Military standard systems are additionally qualified to Def Stan 59-41 DCS05. See later EMC section for specific tests.

A single base station can drive up to 16 antennas from its power supply and with additional auxiliary power supply units can drive up to 48 antennas dependent on the length of the cable runs. The maximum number of antennas will be defined on a case by case basis dependent on the specific installation.

The mobile user's voice is digitally encoded using components with a bandwidth up to 3.4kHz, the coding being similar to the recommendations of CCITT.

System Types

1. Baseline – basic, one channel system allowing multiple users to communicate on the same channel within the area of coverage. The system has an output that can be used to monitor the area or talk into the area.
2. Baseline Enhanced – a single channel system with an additional external input that can interface with other communications systems such as radios, telephone exchanges or a tannoy system. The user simply selects ‘External’ to use this facility. Normal coms, or ‘Internal’, is heard in the left earpiece of the headset while ‘External’ is heard in the right hand earpiece.
3. Multi Channel – 2 to 8 channel system allowing multiple users to have individual, dedicated channels to talk on within the area of coverage.
4. Multi Channel Enhanced – a multi channel system with additional external input that can interface with other communications systems such as radios, telephone exchanges or tannoy systems. The user simply selects ‘External’ to use this facility. Normal coms, or ‘Internal’, is heard in the left earpiece of the headset while ‘External’ is heard in the right hand earpiece.
5. NVG Compatible – a dedicated military system in development to allow use within areas where night vision goggles are used.

System Components

Base Station

Dimensions	: 30 x 18.5 x 30cm (w x d x h)
Weight	: 10kg
Electrical power	: 18 to 36V dc
Power rating	: 200W max input
Protection rating	: IP65
Operating temperature	: 1 to 55°C (extended range to +65°C available)
Storage temperature	: -10 to +70°C
Humidity	: 93% relative humidity at 38°C

The base station has up to 4 indicator LEDs on the front panel. Power On shows power is applied, Base Transmitting that the base station is transmitting, External Selected (only if system is enhanced) all three will be lit when system is fully functioning. Mobile Transmitting will be lit when a mobile user has PTT button depressed and is using the system. Fig.2 shows a Baseline Enhanced unit.

The base station has a high level of power supply conditioning to ensure that the 48V output is very clean.

The base station has a number of audio interfaces, number dependent on type of system. The levels are set at 775mV balanced line with a termination impedance of 600Ω. Type and use are normally case specific and to be defined for each customer.

Fig.2 Base Station



Auxiliary Power Supply

Dimensions	: 30 x 18.5 x 30cm (w x d x h)
Weight	: 10kg
Electrical power	: 18 to 36V dc
Power rating	: 200W max input
Protection rating	: IP65
Operating temperature	: 1 to 55°C (extended range to +65°C available)
Storage temperature	: -10 to +70°C
Humidity	: 93% relative humidity at 38°C

The auxiliary power supply has an indicator LED on the front panel to show Power On and as with the base station has a high level of power supply conditioning to ensure that the 48V output is very clean. The same type of enclosure is used for the auxiliary power supply as the base station so Fig.2 is representative of the unit.

Switching Power Supply

Dimensions	: 47 x 12.5 x 50cm (w x d x h)
Weight	: 23kg
Electrical power	: 18 to 36V dc & 230V ac +/- 10%
Power rating	: 600W max input
Protection rating	: IP65
Operating temperature	: 1 to 55°C (extended range to +65°C available)
Storage temperature	: -10 to +70°C
Humidity	: 93% relative humidity at 38°C

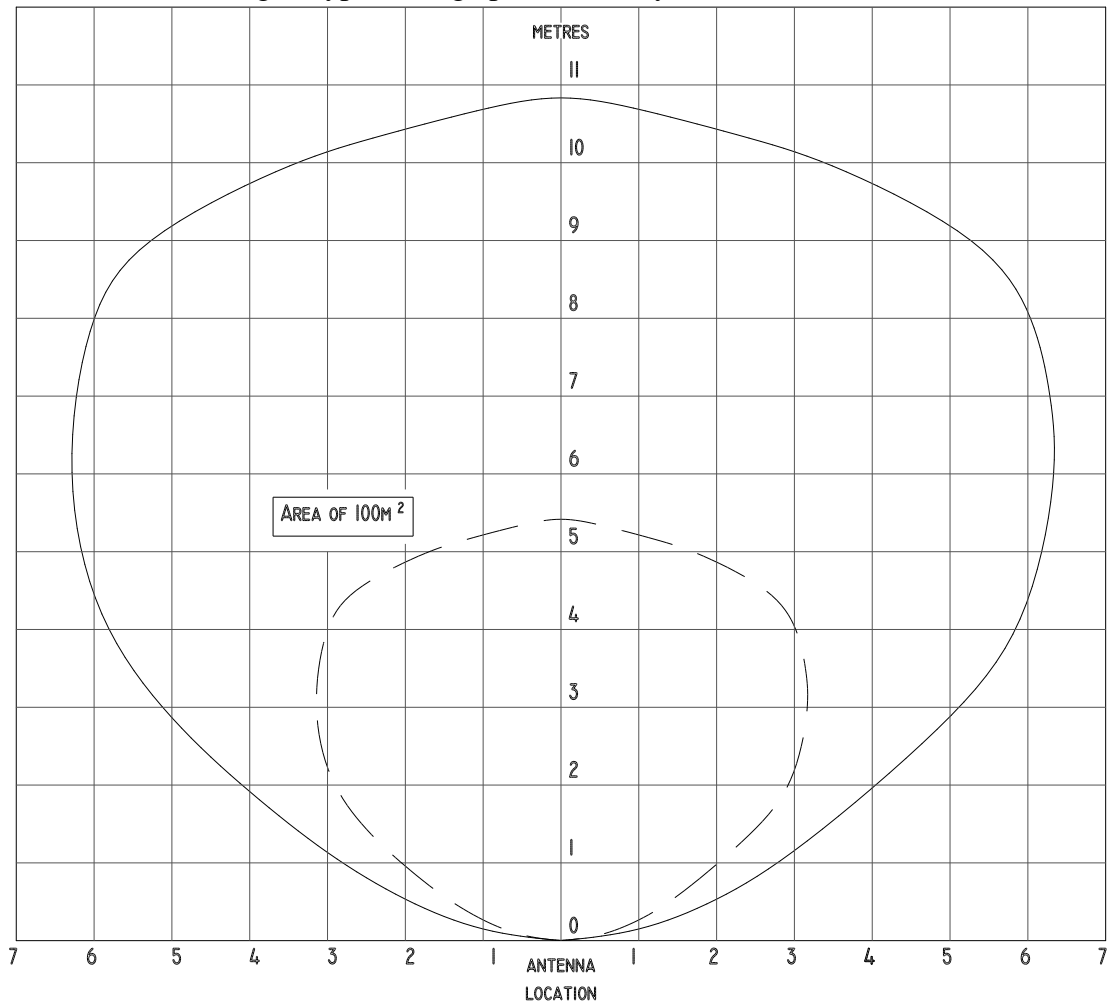
The switching power supply has been designed to take both 240V ac and a nominal 24V dc and supply the 24V dc required for the base station. If one of the inputs is interrupted the other will take over automatically.

Antenna

Dimensions	: 15.5 x 21 x 17cm (w x d x h)
Weight	: 2kg
Electrical power	: 48V (supplied by base station)
Power dissipation	: 7W (naturally air cooled by integrated heat sink)
Protection rating	: IP66
Operating temperature	: 1 to 55°C (extended range -20 to +65°C available)
Storage temperature	: -10 to +70°C
Humidity	: 93% relative humidity at 38°C
Mounting height	: 2.1 to 2.3m above floor level.

Performance, two way communications indoors is typically 10m between antenna and mobile user. The range is reduced in direct, very bright sunlight to 5m. The polar plot in Fig 3 gives a typical result. Use of multiple antennas in external applications compensates for the reduced range.

Fig.3 Typical range plot for 2 way communication



Solid line : typical range indoors
Broken line : typical range in direct sunlight

Headsets

Multiple types including single sided, double sided, double sided high noise attenuating, light weight types and cordless (in development). The type required is dependent on the application. Fig.4 shows an example of double sided headset.

Single sided headsets are used in air traffic control applications, control rooms and ships' bridges. These are used with baseline or standard multi channel systems.

Double sided headsets are used with enhanced systems or in moderately noisy environments.

Double sided high noise attenuating headsets are used in high noise environments such as engineering spaces on ships.

Light weight headsets can be used for air traffic control or control rooms, a custom option.

Cordless headset is a double sided headset that has the battery and all controls within the headset. Currently under development and available as an option.

Weight is dependent on type but headset shown in Fig.4 is 0.65kg.

Fig.4 Mobile Unit



Mobile unit showing double sided headset and battery pack with telephone interface.

Battery Pack

Dimensions	: 10.5 x 3.5 x 17.5cm (w x d x h)
Weight	: 0.5kg
Endurance between charging	: 4hrs but typically up to 8hrs
Battery type	: Re-chargeable nickel-metal hydride
Battery life	: Minimum of 500 re-charging cycles

Controls : ON/OFF, PUSH TO TALK, VOLUME, CHANNEL SELECT (DEPENDENT ON OPTION), INT/EXT SELECT (DEPENDENT ON OPTION), Telephone keypad interface (DEPENDENT ON OPTION).

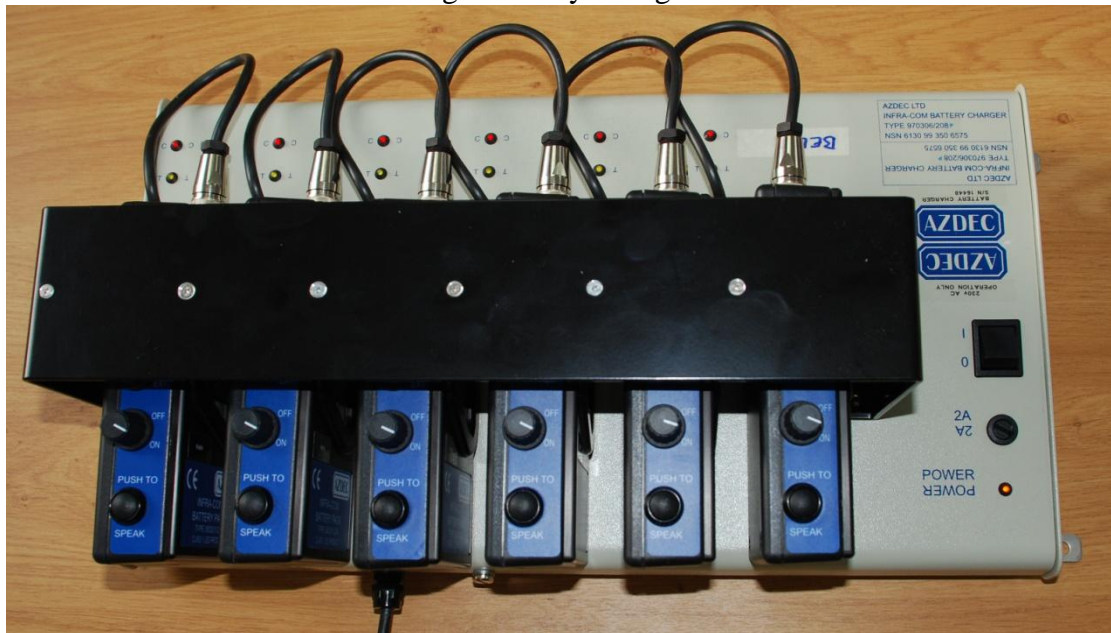
Fig.4 shows a mobile unit with a baseline enhanced battery pack and optional keypad.

Multiple Battery Charger

Dimensions	: 54 x 29 x 17cm (w x d x h)
Weight	: 5kg
Electrical power	: 110/240V ac, 50/60Hz, 5amp rated.

Wall or bench mounted unit to charge up to 6 battery packs at a time. A battery pack is charged to 85% in approximately 2 hours then continues trickle charging for as long as plugged in. Batteries can be left trickle charging with no damage for unlimited time. Fig. 5 shows a charger unit fully loaded with battery packs.

Fig.5 Battery Charger



Ocular Hazard

The Azdec Infra-Com system has been assessed to EN 60825-1 1994 with amendments 1 and 2.

Cable Lengths.

The maximum data cable length is 1km, each antenna reduces the maximum cable length by 11 metres. (i.e. 24 antennas, maximum cable length 800 metres.) Power supply cables must have the voltage drops calculated and cannot exceed a length of 1km.

EMC Testing

The equipment has been tested as appropriate to Def Stan 59-41 and Mil Std 461D by an independent accredited test house.

Def Stan 59-41 tested to DCE01, DEC02, DEC03, DRE01, DRE02, DCS01, DCS02, DCS03, *DCS05, DRS01, DRS02 & DMFS01.

Mil Std 461D tested to CE 101, CE 102, CS 101, CS 114, *CS 116, RE 101, RE 102, RS 101, RS 103.

* Marked tests are for NEMP compliance. The equipment supplied will not meet these test requirements unless specifically ordered.

MTBF

The failure rates for each of the system elements are either based on values supplied by the manufacture of the component or on the failure rates for the component type as identified in MIL-HDBK-217F.

Typical systems consisting of 1 Basestation, 12 antennas and 5 mobiles available would, using the method defined in MIL-HDBK-217F, give an MTBF of 30,600 hours for the system.

NATO STOCK NUMBER REFERENCE

The following table provides a reference for some Azdec Parts and Nato Stock Numbers.

Description	Nato Stock Number
Noise Attenuating Headset & Mobile Unit	5965-99-6239442
Lightweight Headset & Mobile Unit	5965-99-8110364
Battery Pack - Baseline System	6130-99-5492371
Battery Pack - Enhanced System	6130-99-4539042
Basestation Baseline System	5850-99-2581044
Basestation Enhanced System	5850-99-5776281
Battery Charger	6130-99-3506575
Antenna - Long Cable	5985-99-5492809
Auxiliary Power Supply Unit	6130-99-5174710
Enhanced Headset and Mobile Unit	5965-99-5735140
Head pad - Noise Attenuating Headset	5965-99-5492812
Ear pads - Noise Attenuating Headset	5965-99-5624784
Gland Kit (PG9)	5975-99-5642923
Gland Kit (PG11)	5975-99-0007264
Gland Kit (PG13.5)	5975-99-1513187
Basestation to Antenna power cable	6145-99-0962821
Basestation to Antenna data cable	6145-99-2775732

Fig.6 Multi channel system on RN Ship's Bridge



A division of Link Microtek Ltd.

For further information contact:
Link Microtek Ltd.
High Point
Church Road
Basingstoke
Hants RG21 7QN
United Kingdom
Phone: +44 (0)1256 355771
Fax: +44 (0)1256 355118
E-mail: sales@linkmicrotek.com
www.linkmicrotek.com