



IDL Corp.
Connecting Local Systems to the World

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The MXU 2000R

Connecting Local Systems to Iridium Satellite
for Reliable Communications



Introduction

The MXU is the best solution for reliable backup communications from the desktop

Recent events have forced organizations to focus on improving security and emergency response preparedness. Key lessons learned are that traditional communications networks may not be adequate to handle critical communications needs. At times, entire regions may be isolated because the communications infrastructure is incapacitated or overloaded.

After disasters, emergency response and government teams need to coordinate the movement of resources to assist the victims; and civilians attempt to contact relatives and friends about their well-being. Traditional communications systems such as cellular or public switched telephone networks can become overloaded or incapacitated due to damage or destruction of facilities.

As a result, entire regions may not be able to communicate, hampering recovery efforts. The solution is satellite communications.

The Iridium Satellite System is the only provider of mobile satellite voice and data solutions with global coverage (including oceans, airways and Polar Regions). Through a constellation of 66 low-earth orbiting (LEO) satellites operated by The Boeing Company, Iridium delivers essential communications services to and from anywhere in the world. Iridium launched service for the United States Department of Defense in December 2000 and launched commercial service in March 2001.

In 1998, Motorola, Inc. designed a four channel base unit to provide satellite communications to private exchanges and public switch telephone networks. IDL Corp. obtained the technology as part of an agreement with Iridium Satellite, LLC in October, 2000. The MXU 2000R, allows you to connect via a standard analog phone to anyone on the Iridium Satellite network and to normal landline or cellular phones.

Capabilities

In order to use satellite communications, the user is typically required to be outside with a clear line of site to the satellite. This is a significant inconvenience when the weather is bad outside or you have to leave your building to make a satellite call. In the midst of a disaster, a hostile environment could preclude you from leaving your building or place of refuge.

The MXU is the solution to these problems. The MXU is the ideal global platform for replacing PSTN lines that are faulty or do not exist. It can be used to connect to groups of users in fixed or isolated locations such as buildings, hotels, islands, villages, construction sites, oil and gas fields or mines. The MXU can be used as a backup or emergency system or as an alternative form of communications. Additionally, the MXU's data capability allows it to be used for collecting information, monitoring and controlling assets in remote or hazardous areas.

The MXU has both voice and data capabilities. The MXU provides four channels for simultaneous inbound or outbound calls to the Iridium satellite network. The echo cancellation capability of the MXU provides superior voice quality by eliminating echo.

Capabilities (cont)

The MXU can be connected to a variety of phones, phone systems and terrestrial communications equipment. The MXU interface to the Private Branch eXchange (PBX) or Public Switched Telephone Network (PSTN) complies with FCC Part 68 (USA) and CRT21 (Europe). The MXU directly supports analog PBXs and digital PBXs using a digital to analog adapter. The MXU can also be connected to standard and wireless analog phones using a line emulator.

The MXU is capable of inbound and outbound data calls. Using the standard Hayes AT command set, a computer connected via an RS-232 cable to the MXU can connect to other modems and services. It supports Iridium Direct Internet, allowing users to browse the internet, send/receive email or send Short Message Service (SMS) messages to anywhere in the world. Standard data connections support up to 2.4Kb per channel data transfer rate or up to 9.6Kb via the Iridium Direct Internet connection.

The MXU uses four SIMs that store information about each satellite channel, including the channel's assigned voice and data numbers. The SIMs can be configured so that the first three channels can "rotary" to the first available channel. This allows the organization to give out just one Iridium number.

Connection to Private Branch eXchanges (PBX)

Most PBXs manufactured today support the connection of analog devices, such as fax machines. The MXU is connected directly to analog ports on the PBX using an RJ-11 cable, in the same manner as a fax machine.

Note: You do not have to hook all RJ-11 ports to a PBX. You can use any number and combination of connections described in this article.

Note: If a channel on the MXU is to be dedicated for data services, do not connect the corresponding RJ-11 port. The MXU does not support data through the PBX. Data can only be used through the RS-232 port on the MXU. If the RJ-11 port is connected, a voice call could interrupt a data call in progress.

In the event that the PBX does not support analog devices, an analog to digital interface must be used. Most PBXs have as an option, a digital to analog converter. Check with your PBX manufacturer for more information about the converter.

IDL Corp, offers as an option, the Konexx DWI adapter which supports the following PBXs:

- ATT/Lucent – Supports any Lucent digital port that supports the 6400, 7400 and 8400 series phones
- Nortel Meridian, Meridian1, SL-1, SL-100 and Norstar systems
- Siemens ROLM CBX 9751 Digital Telephone lines

The MXU is connected to the digital to analog converter. The Digital to analog converter is then connected to the digital channels of the PBX.

Connection to Private Branch eXchanges (PBX) (cont)

NOTE: The MXU RJ-11 ports must not be connected directly to any digital ports. Connecting the MXU RJ-11 ports to a digital port could damage the unit and invalidate the MXU's warranty.

Once the MXU is connected to a PBX, it is accessed by dialing from a PBX extension, the assigned number of the MXU. When the MXU answers, the caller will hear a second dial tone. If a user PIN is required, the caller will enter it at this point. After receiving the MXU dial tone, the user will enter 00 + country code + area code + number. If the number is accepted, the MXU will attempt to connect to the number.

To access the MXU from outside the internal phone network, the user dials the assigned phone number (MSISDN) of the MXU. If calling from a PSTN, the user dials 011 + the MSISDN number. If calling from an Iridium Satellite Unit (ISU), the user dials 00 + the MSISDN number. After the MXU answers the call, the user is presented a dial tone by the PBX. The caller can enter either an extension number to connect to or perform any other authorized function as a PBX user.

Connection to Public Switched Telephone Networks (PSTN)

The MXU can be connected to PSTNs. The MXU complies with FCC part 68 (USA), ACA approval (Australia) and CRT 21 (Europe). One or more lines can be connected to the MXU via the RJ-11 ports.

NOTE: It is recommended that phone line surge suppressors be used to prevent damage to the MXU.

To access the MXU via the PSTN, dial the PSTN number that the MXU is connected to. When the MXU answers, the caller will hear a second dial tone. If a user PIN is required, the caller will enter it at this point. After receiving the MXU dial tone, the user enters 00 + country code + area code + number. If the number is accepted, the MXU will attempt to connect to the number.

To access the MXU from the Iridium Satellite Network, the user dials 00 + the MSISDN number. After the MXU answers the call, the user is presented a dial tone on the PSTN. The caller then places a call as they normally would on the PSTN.

Connection to fixed or cordless analog phones

Analog phones can be connected to the MXU using a telephone line emulator (TLE). IDL provides as an option, the Viking Telephone Line Emulator, DLE-300B. The TLE provides "dial tone" to the MXU and the analog phone. This allows the connection of any voice device including desktop telephones, speaker phones and cordless phones, including the new 2.4 Ghz phones which offer a range of up to one mile from the base station.

To use the MXU, the user picks up the hand set. The user will then hear a dial-tone. The user enters 00 + country code + area code + number. If the number is accepted, the MXU will connect to the number.

Connection to fixed or cordless analog phones (cont)

To access the MXU from the Iridium Satellite Network, the user dials 00 + the MSISDN number. After the MXU answers the call, the handset connected to the MXU via the TLE will begin to ring. The caller is connected when the handset is lifted.

Using Data

The MXU supports inbound or outbound data with data rates of up to 2.4 KBps per channel through standard dial-up. The dial-up modem uses the standard Hayes AT command set and can connect to any standard or Iridium modem. The MXU also supports the Iridium Direct Internet service with an effective throughput of up to 9.6 KBps per channel.

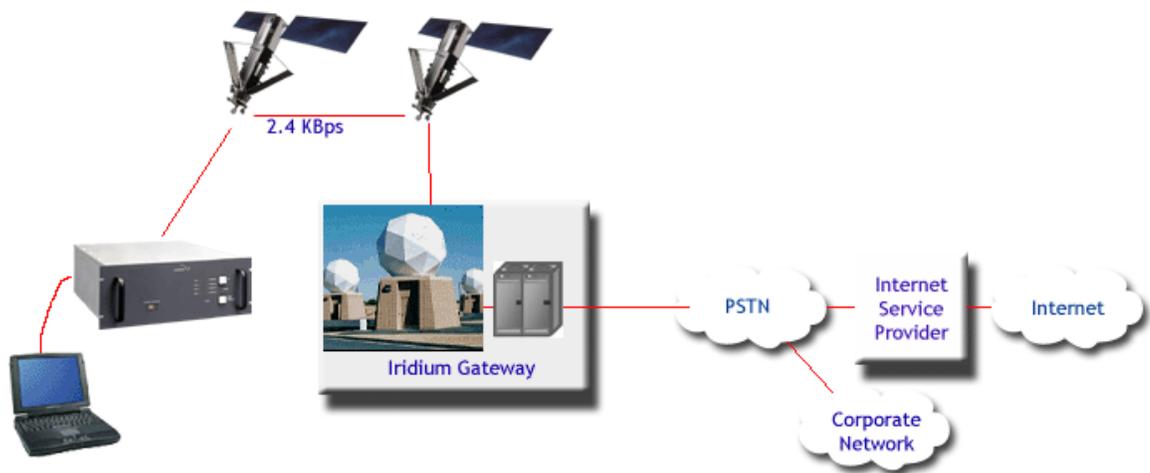


Figure 1: Iridium Direct Data Diagram

Figure 1 illustrates the Iridium Direct Data, the functional equivalent of a standard landline dial-up service. Data calls are placed and received by a computer connected to the RS-232 port on the MXU. The MXU will switch through the satellites to the Iridium gateway and connects the calls to the destination on the PSTN. If the destination call is to another Iridium Satellite Unit (ISU), then the call is routed directly to the ISU and not through the Iridium Gateway.

Using Data (cont)



Figure 2: Iridium Direct Internet

Figure 2 illustrates the Iridium Direct Internet capabilities of the MXU. When a Direct Internet connection is setup, the MXU routes the call through the satellites to the Iridium gateway which, in turn, connects the calls to the Direct Internet Server. Because of the compression of the Direct Internet software, throughput speeds of 9.6KBps are possible.

Specifications

Dimensions:	Rack: 19.0 W x 20.0 L x 7.0 D (in) 48.3 W x 50.8 L x 17.8 D (cm)
Weight:	25 lbs / 11.33 kg (Unit Only)
Operating Temperature:	32°F (0°C) to 113°F (45°C)
Storage Temperature:	-4°F (-20°C) to 140°F (60°C)
Humidity:	80% Relative Humidity at 104°F (40°C)
Power:	115/230 VAC, 50-60 Hz 115 Watts
Interface to PBX/PSTN:	MXU complies w/CRT21 (Europe); FCC part 68 (USA), ACA Approval (Australia)
Operating (transmit and receive):	1616-1626.5 MHz
Link Margin (w/external antenna):	12.5 dB average
Average Power	.6 Watts
Multiplexing Method:	TDMA/FDMA
Sensitivity:	-117.9 dBm
TX Spurs General EIRP:	-71 dBc
TX Spurs GNSS 1559-1605 MHz EIRP:	-91 dBc
TX Noise GNSS 1559-1605 MHz EIRP:	-81 dBc/MHz
Minimum distance between antennas:	3 ft. / .9144m
Maximum loss between MXU/antennas:	3 dB loss