NETWORK TECHNOLOGY

The essence of the Radio Network installed by Safe Link is the sophisticated radio repeaters used in the system and the proprietary software which controls the network.

The network consists of one Main Database Site (ACCES Link) from which the network can be controlled and "managed," and multiple repeater sites (SECUR Links) as required to cover the topographical area defined by the company. Networks normally operate in the 440-470 MHz band* utilizing dual frequency "channels," one for communication from subscriber units (Subscriber Frequency) and one for communication between repeater sites or Links (Network Frequency). When an alarm signal is transmitted from a protected premise, the signal is received by multiple sites in the Safe Link network, typically from two to five sites. This combined with multiple random transmission attempts, provides a high level of redundancy. The Link determines the proper destination for the signal, as well as the optimum path. Complete two-way communication with error checking assures the signal will be delivered to the proper central station.

A benefit of this redundancy is the ease of installation. Alarm installers can normally mount the transmitter inside the premise quickly, and be able to hit at least two repeater sites.

Should a Network Frequency Radio fail at a Link, other Link sites can handle the traffic. In addition the site is designed to deliver signals via standard dial-up phone line to the Main Database Site. The network delivers signals from any subscriber transmitter to any monitoring station equipped with an ACCES Link (Accelerated Central Station Link) or TELICS Link (Telephone Line Central Station Link).

The central station need not be located within the coverage area as the network is capable of delivering signals to a properly equipped monitoring center via dial-up or dedicated line.

When the network is serving multiple central stations, the SECUR Link sites are central station receivers communication with the software automation system as well as repeater sites operating transparently within the network. Therefore the more central stations operating the system, the less repeater sites are needed to provide coverage.

*440-470 MHZ band necessary to utilize the new DSC Links 2450 subscriber transmitters. Other frequencies may be utilized with DSC Links 2150 transmitters or Safe Link slave radios (available mid-1998).

THE SAFE LINK INTELLIGENT SECURITY NETWORK

For years our industry has relied on telephone lines as the primary means of receiving signals from subscribers' alarm systems. Until recently, only high risk subscribers could afford to supervise these lines, but even this is not a good solution for the industry since even a supervised line that goes out of service only lets the central station know it is out of service. Few want to dispatch police because of an unknown service problem on a subscriber's phone line. In addition, burglars today have become increasingly aware of the alarm system's reliance on the phone line and phone service continues to get disrupted due to weather, construction mishaps and other causes.

Now, with Safe Link radio networks you have an alternative that will give all of our subscribers, not just a select few, a reliable and economical signal path to your monitoring center. For the past several years Safe Link Corporation has operated radio networks for use by the security industry as an alternative to telephone lines. Through Safe Link's experience, its partnership with Digital Security Controls Ltd. and other leading edge technology companies, we have developed what we believe to be a radio network ideally suited to the alarm companies' needs. This new technoloogy meets not only the demands of the customer's security requirements but the demands of the competitive marketplace as well.

Safe Link's philosophy is to provide a system which is easy and economical to use so that the alarm company may offer a reliable signal path to all of its subscribers. We accomplished this by designing a system which offers extensive overlap in coverage area, and places most of the intelligence in the repeater Links, not in the subscriber radio, thus keeping the cost of the subscriber radio low and installation and programming simple and fast. In addition, Safe Link gives you the flexibility to purchase your subscriber radios from multiple manufacturers so that you are not locked into a particular brand.

The essential components of the Safe Link network are computer based repeater Links. The Heart of the network is a Windows based traffic management program that ensures delivery of the alarm signal. A typical sequence of events may be as follows:

Two SECUR Link repeater Links receive a signal from a subscriber radio.

One Link will be designated as primary and it determines, by account number, where the signal is to be routed and, by a dynamic mapping scheme, the best path by which to send the signal.

The system must have positive confirmation of the complete message from the receiving Link.

If positive confirmation is not received alternative paths are used including dial-up phone line or other land based lines if necessary.

The path may take many multiple hops if necessary in larger networks.

A dynamic timing method which synchronizes each Link via radio ensures optimum performance and fast signal transmission.

Once the signal is received at the central station it is transmitted to the automation system in the same manner as other receivers.

A FEW FEATURES OF THE SAFE LINK NETWORK

- Intelligent Links mean that you can overlap coverage areas without fear of clashes

- Network is dynamic and, for the most part, self-configuring. No complicated programming is required to install or add repeater Links.

- Windows based software is easy to use and gives you complete control.

- The traffic management software is designed to handle signals with the least amount of airtime, meeting FCC requirements and ensuring optimum use of the spectrum.

- Remote Links have many supervisory features that alert you at the first sign of trouble.

- A variety of available configurations give you the package to fit your specific needs.

- Multiple routing paths from each Link, combined with positive information that the signal was received each step of the way, means that the signal can't get 'lost' as with other less powerful systems.

- The network can deliver signals to multiple alarm companies or monitoring centers across town or across the country.

- Because the network can be managed and controlled remotely, you can maintain networks for branch offices from a central location.

- Links are designed to be serviced quickly and easily, often with no special equipment.

- Subscriber radios available from multiple manufacturers give you control and flexibility.

- Network based intelligence means no complicated programming of subscriber radios. Fast and easy installation keeps your cost low.

- Complete end user marketing material and programs available to take best advantage of your investment.

- Turn-key packages equipment only packages and everything between makes Safe Link easy to work with and fits your needs and budget.

- A variety of service agreements ensure your network remains in top shape with the latest technology.

SAFE LINK'S SECUR LINK 2P

The Safe Link SECUR Link 2P is a basic component of the Safe Link intelligent security network. The SECUR Link 2P functions as a decision making repeater site, receiving and routing signals either from subscriber radios or other Safe Link repeater sites, to the appropriate central monitoring station. It provides you with all of the features in an economical package designed to be used in a temperature and security controlled environment.

The SECUR Link 2P wall-mount enclosure comes ready to connect to 110VAC or 220VAC. At its heart is an SLC486S processor and two packet encoder/decoders. Two BNC connectors provide the connection to the subscriber and network UHF frequency antennas. A modular telephone connector provides for connection between a standard dial-up line as a backup to radio transmission if desired. Keyboard, monitor and printer connectors are also provided. In remote applications these are normally not used except to setup and service the site.

As with all of the Safe Link SECUR Links and ACCES Links the 2P comes with Safe Link Windows® software. This will automatically reconfigure the site at least twice per day to give it the optimum routing information for alarm signals. It also provides for a variety of traffic logging or viewing functions. The 2P, can report a number of supervisory functions and allows you to dial in (if you provide a dial-up phone line) to check on certain performance features and provide certain maintenance functions. As with the other SECUR and ACCES Links, the 2P communicates with the rest of the network via high-speed two-way communication, requiring positive acknowledgment of the entire transmitted message until it is successfully received at the monitoring center.

SAFE LINK'S SECUR LINK RM

The Safe Link SECUR Link RM is a basic component of the Safe Link intelligent security network. The SECUR Link RM functions as a decision making repeater site, receiving and routing signals, either from subscriber radios or other Safe Link repeater sites, to the appropriate central monitoring station. It provides you with all of the features that make Safe Link your best choice, in a rugged rack-mount enclosure designed to mount it standard 18" rack enclosures provided by Safe Link or you. Safe Link's enclosures are available to use in secure or less secure environments.

The SECUR Link RM rack-mount enclosure is designed to connect to 110VAC or 220VAC. At the heart is an SLC 486S processor and two packet encoder/decoders. Two BNC connectors provide the connection to the subscriber and network UHF frequency antennas. A modular telephone connector provides for connection to a standard dial-up line as a backup to radio transmission is desired. Keyboard, monitor and printer connectors are also provided. In remote applications these are normally not used except to setup and service the site.

As with all of the Safe Link SECUR Links and ACCES Links, the RM comes with Safe Link Windows® software. This will automatically reconfigure the site at least twice per day to give it the optimum routing information for alarm signals. It also provides for a variety of traffic logging or viewing functions. The RM can report a number of supervisory functions and allows you to dial in (if you provide a dial-up phone line)to check on certain performance features and provide certain maintenance functions. As with the other SECUR and ACCES Links, the RM communicates with the rest of the network via high-speed two-way communication, requiring positive acknowledgment of the entire transmitted message until it is successfully received at the monitoring center.

SECUR LINK RM-EU

This unit is identical to the SECUR Link RM with a network radio that meets EU standards. Available in VHF an UHF 2 watt versions.

SAFE LINK'S ACCES LINK MRM

The Safe Link MRM is your ultimate connection to the Safe Link intelligent security network. The ACCES Link MRM functions as a decision making repeater site, receiving signals, either from subscriber radios or other Safe Link repeater sites In addition, however, it functions as a central station receiver. It provides you with all of the features that make Safe Link your best choice, in a rugged rack-mount enclosure which has an integrated VGA monitor. The ACCES Link MRM is ideal where space and aesthetics are issues.

The ACCES Link MRM rack-mount enclosure comes ready to connect to 110VAC or 220VAC. At the heart is an SLC 486S processor and two packet encoder/decoders. Two BNC connectors provide the connection to the subscriber and network UHF frequency antennas. A modular telephone connector provides for connection to a standard dial-up line as a backup to radio transmission or to receive signals from any Safe Link network located outside of your coverage area. Keyboard and logging printer connectors are also provided. These are available from Safe Link in desktop or rack-mount versions.

As with all of the Safe Link SECUR Links and ACCES Links, the MRM comes with Safe Link Windows® software. This will automatically reconfigure the site at least twice per day to give it the optimum routing information for alarm signals. It also provides for a variety of traffic logging or viewing functions. The MRM can report a number of supervisory functions and allows you to dial in (if you provide a dial-up phone line)to check on certain performance features and provide certain maintenance functions. As with the other SECUR and ACCES Links, the MRM communicates with the rest of the network via high-speed two-way communication, requiring positive acknowledgment of the entire transmitted message until it is successfully received at the monitoring center.

ACCES LINK MRM.MONO

MRM now available with a monochrome monitor at a lower price.

SAFE LINK'S ACCES LINK-1SAFE LINK'S ACCES LINK-1

The Safe Link ACCES Link-I is a single-site system that includes many of the features of the Safe Link intelligent security network in a very economical package. The ACCES Link-I functions as a receiver site, receiving signals from Links 2150 and Links 2450 subscriber radios*. It functions as a central station receiver, providing user configurable signal suppression and delivering formatted signals to an automation system in the SurGard SIA format. This is an ideal choice for an industrial complex with a proprietary monitoring system, or for those wanting to offer radio monitoring in a limited area.
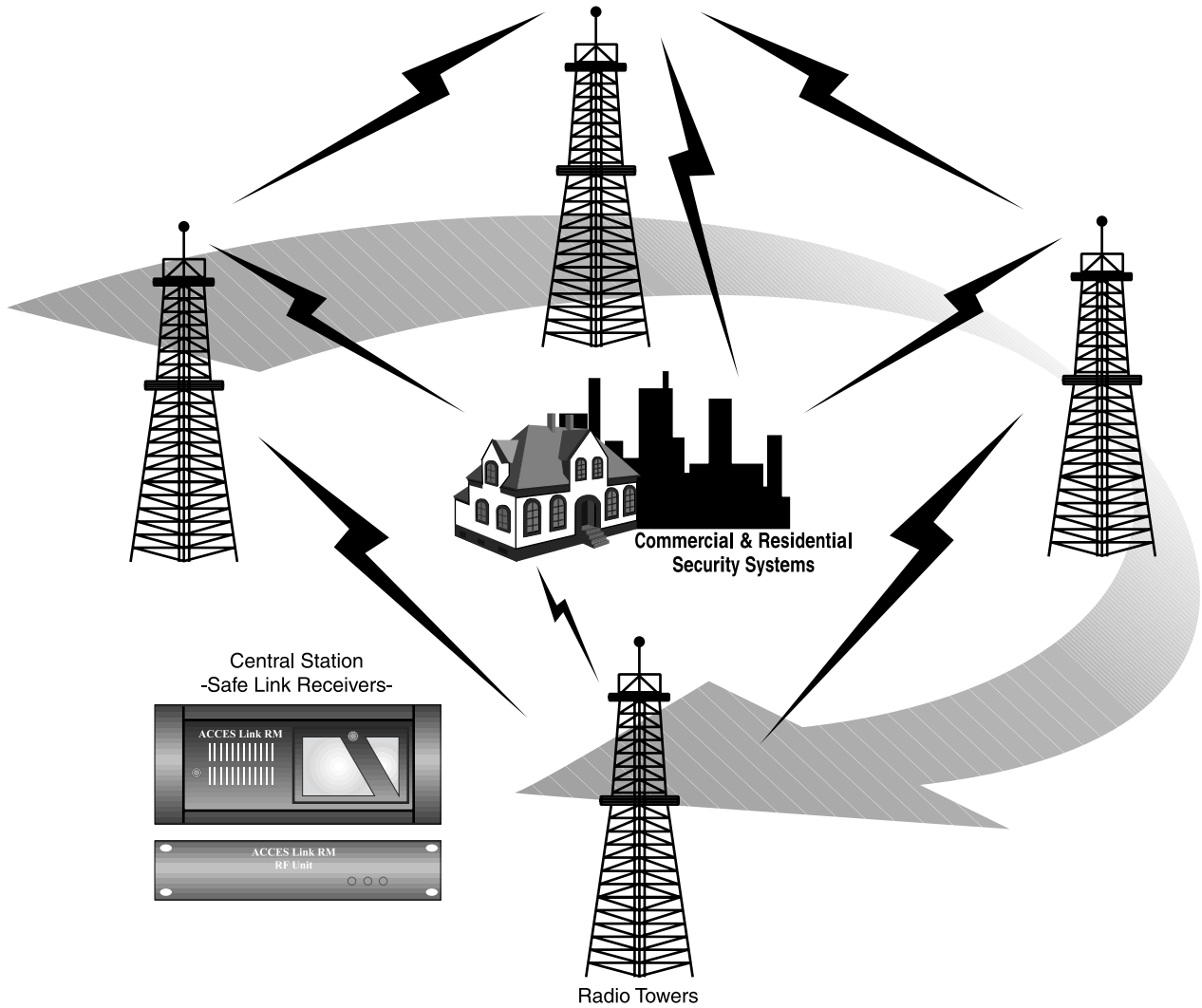
The ACCES Link -I rack-mount enclosure comes ready to connect to 110VAC or 220VAC. At the heart is an SLC 486S processor and two packet encoder/decoders. An 'N' connector provides the connection to the subscriber antenna. Keyboard, monitor and logging printer connectors are also provided. These are available from Safe Link in desktop or rack-mount versions.

As with all of the Safe Link ACCES Links and SECUR Links, the ACCES Link-I comes with Safe Link Windows® software. It provides for a variety of traffic logging or viewing functions. The Link-I can report a number of supervisory functions and allows you to dial in (with optional "Remote Access" if you provide a dial-up phone line)to check on certain performance features and provide certain maintenance functions. The ACCES Link-I can be upgraded at a later date to make it an ACCES Link RM. (The upgrade package requires the purchase of additional hardware and software, as well as access to a second frequency.)

*Links 2150 and Links 2450 subscriber radios are normally available in UHF versions. Other versions of Links 2150 are available. Pricing varies.

HOW THE SAFE LINK LONG RANGE RADIO NETWORK WORKS

Commercial & Residential
Security Systems

Central Station
-Safe Link Receivers-

ACCES Link RM

ACCES Link RM
RF Unit

Radio Towers

LONG RANGE RADIO
The alarm transmission can be received simultaneously by any or all network receivers within the coverage area. The transmission though, is not specific to any one receiver. Network receivers are typically set up with overlapping cells (RF coverage). This type of network configuration greatly enhances the level of system integrity by providing receiver backup and signal redundancy.

PERFORMANCE SPECIFICATIONS

GENERAL	ACCES Link MRM	ACCES Link RM/ SECUR Link RM	SECUR Link 2P	SECUR Link WM
Size	8.75"Hx23.7"Dx 19.0"W	7"(180mm)Hx 18"(455mm)Dx 19"(482.6mm)W	7"(180mm)Hx 17"(430mm)Dx 9.75"(250mm)W	28"(711mm)Hx 8"(203mm)Dx 20"(508mm)W
Input Voltage	115/220 VAC, 50/60Hz	115 or 230 VAC 47 to 63Hz	115 or 230 VAC 47 to 63Hz	115 or 230 VAC 47 to 63Hz
Operating Temp	10ºC to 40ºC	0ºC to 50ºC	0ºC to 50ºC	0ºC to 50ºC
Humidity	30-80% RH Max	10% to 90% RH	10% to 90% RH	10% to 90% RH
Frequency Range	450-470MHz(std) 150-174;370-390; 406-512; 928-960 MHz(optional)	450-470MHz(std) 150-174;370-390; 406-512; 928-960 MHz(optional)	450-470MHz(std) 150-174;370-390; 406-512; 928-960 MHz(optional)	450-470MHz(std) 150-174;370-390; 406-512; 928-960 MHz(optional)
Channels	2	2	2	2
Emission	F2, F3	F2, F3	F2, F3	F2, F3
Approx. Weight	53 Pounds	46 Pounds	41 Pounds	113 Pounds
Case Material	Heavy Guage Aluminum	Heavy Duty Steel	Heavy Duty Steel	NEMA Epoxy Pntd Cold-Rolled Steel
Power	220 Watts Max	220 Watts Max	220 Watts Max	220 Watts Max
RF Output	2 watts(std), 5 watts	2 watts(std), 5 watts	2 watts(std), 5 watts	2 watts(std), 5 watts
Stability	± 5 PPM over full operating temp. range	± 5 PPM over full operating temp. range	± 5 PPM over full operating temp. range	± 5 PPM over full operating temp. range
Spurious Emissions	Less than -60db	Less than -60db	Less than -60db	Less than -60db
Sensitivity	.25 μ V 12db SINAD	.25 μ V 12db SINAD	.25 μ V 12db SINAD	.25 μ V 12db SINAD
Selectivity	6db @ 7.5kHz Min.;60db@ ±25kHz Max.	6db @ 7.5kHz Min.;60db@ ±25kHz Max.	6db @ 7.5kHz Min.;60db@ ±25kHz Max.	6db @ 7.5kHz Min.;60db@ ±25kHz Max.
Intermod	-23 dBm typical 3rd order intercept	-23 dBm typical 3rd order intercept	-23 dBm typical 3rd order intercept	-23 dBm typical 3rd order intercept
Modulation Dev.	± 5 KHz with 2.0V P-P at data input	± 5 KHz with 2.0V P-P at data input	± 5 KHz with 2.0V P-P at data input	± 5 KHz with 2.0V P-P at data input

SAFE LINK
Long Range Radio Networks

SG WIRELESS COMMUNICATIONS
A Division of the SafeLink Corporation

Introduction and Overview
For Long Range Radio