



Using M-Link[®] H.264 over BGAN

Video delivery from Livewire Digital Ltd

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1. M-Link overview

M-Link is a suite of cross-platform software-based mobile newsgathering products developed by Livewire Digital for use over IP networks such as Inmarsat BGAN. Trusted by mainstream broadcasters across the globe, M-Link offers tried and tested, robust solutions for live and file based HD and SD video delivery. M-Link media solutions are cost effective, network efficient, and are being continually developed in response to customer feedback. M-Link provides news organisations, government and military services, with a comprehensive end-to-end video delivery service optimised for mobile and IP communications.

1.1 Product range

- > **M-Link Live X** - offers a highly mobile, reliable and compact live news-gathering solution, which can be deployed and operated by a single reporter. M-Link Live X delivers low latency, high quality live audio and video at data rates from 128Kbps upwards direct to an M-Link Exchange receiver where it is output as HD or SD SDI or component with embedded or analogue audio. Even with data rates as low as 256 kbps M-Link Live X can deliver PAL/NTSC native frame rates at SIF resolution. Live X is now available for live HD contribution where network conditions allow streaming at 2Mbps to 4Mbps. As well as capture from Firewire cameras, Live X will accept HD-SDI and HDMI camera sources to suitably equipped Thunderbolt or USB3 computers via a range of supported interface devices.

- > **M-Link Newscaster** - M-Link Newscaster is the professional solution for the delivery of HD and SD news and documentary video wherever the action is taking place. M-Link Newscaster offers a highly mobile, reliable and compact file-based SNG/ENG/LNG solution, which can be deployed and operated by a single reporter in remote and hostile locations.

M-Link Newscaster supports interlaced PAL and NTSC Standard Definition formats, with High Definition support up to 1080p. MXF source encoding removes the need to render edited video from the timeline thus greatly improving workflow efficiency and preserving image quality.

- > **M-Link Newscaster Mobile** - Journalists caught in the heart of the action with no news crew to hand can now film breaking news footage on their iPhone and post it directly to their broadcaster's newsroom using the new M-Link Newscaster Mobile app from Livewire Digital. Received video can be played-out or ingested in the same way as video received from laptops.

- > **M-Link Exchange** - is the broadcast video receiver for M-Link Live X and M-Link Newscaster, offering a professional integrated solution for video contribution from news crews and journalists as well as ad-hoc contributions from the public.

This comprehensive receiver system is available as a rack mount server designed for integration into a news-room with professional SDI & HD-SDI interfaces as well as analogue video & audio presentation.

- > **Media Services Rack (MSR)** - The Media Services Rack is at the heart of the M-Link Bridge service. The MSR provides an integrated infrastructure to manage live video and audio contribution from remote journalists, extreme sports competitors and other field operators for the provision of managed links to sponsors, broadcasters, radio stations and web streaming. M-Link Live X live feeds can be connected with standard corporate video conferencing systems for live links to sponsors, schools, broadcasters and other display platforms.

1.2 Typical users

- > Broadcasters
- > Freelance Correspondents/Stringers
- > Military, Government And Surveillance
- > Expeditions and Special Interest Groups
- > Sports events including yacht racing
- > NGO's

1.3 About H.264/AVC

H.264 Advanced Video Coding (AVC) is an industry standard video codec that has seen a steady increase in use by companies such as Apple, Sony, Intel, Motorola and Tandberg. This is as a result of the major increases in efficiency over competitive codec technology and older H.264 derivatives. H.264 AVC is key to the delivery of high definition TV and offers stunning performance over limited bandwidth connections.

H.264 AVC is developed by the joint video team of ITU-T Q.6/SG16 VCEG and ISO/IEC MPEG.

2. Key Features

- > M-Link offers the following main features over the BGAN network:
- > High quality, low latency video
- > Client software available for Mac OSX and Windows platforms.
- > Industry standard H.264/AVC codec
- > Direct control of the BGAN terminal call set-up procedures, providing simple 'one click' operation through a single M-Link user interface.
- > Highly optimized transmission protocols: M-Link can utilize the full capacity of BGAN and other IP connections (Livewire optimized IP – Level 1 and Level 2). FEC and LAM modes also supported.
- > Customised compression profiles: M-Link offers a range of simple to understand profiles for both 'live' and 'store and forward' workflows to be used over Standard IP and Streaming IP connections.
- > Integral BGAN and IP diagnostic tools: M-Link features valuable tools for both direct use by the operator and for remote support. These include IP and BGAN specific diagnostics to support users in the field.

3. Benefits to BGAN users

- > Designed for use over BGAN with proven performance.
- > Unrivalled compression speeds – imperative for 'live' and highly beneficial for 'store and forward' applications.
- > Very low latency – a key factor for conducting interviews, videoconferencing and situation awareness.
- > Exceptional picture quality and motion handling across a range of compression rates from 64kbps to 20mbps.
- > Full support for interlaced and progressive video.
- > Support for standard definition (SD) and high definition (HD) 720p and 1080i.
- > Ability to operate 'live' over BGAN at native frames rates (PAL – 25fps, NTSC – 29.9fps)
- > An industry standard video codec with a clear development path.
- > Very high quality AAC audio.
- > Return audio (IFB) over the data connection

4. Set-up

This section describes how to set up BGAN for use with M-Link, and gives an example of an M-Link configuration.

4.1 Setting up BGAN

To set up your computer and BGAN terminal for M-Link:

- a. Install M-Link on to your computer.
- b. The M-Link interface detects your BGAN terminal and will automatically register the terminal on the network.

For **M-Link Newscaster** store and forward:

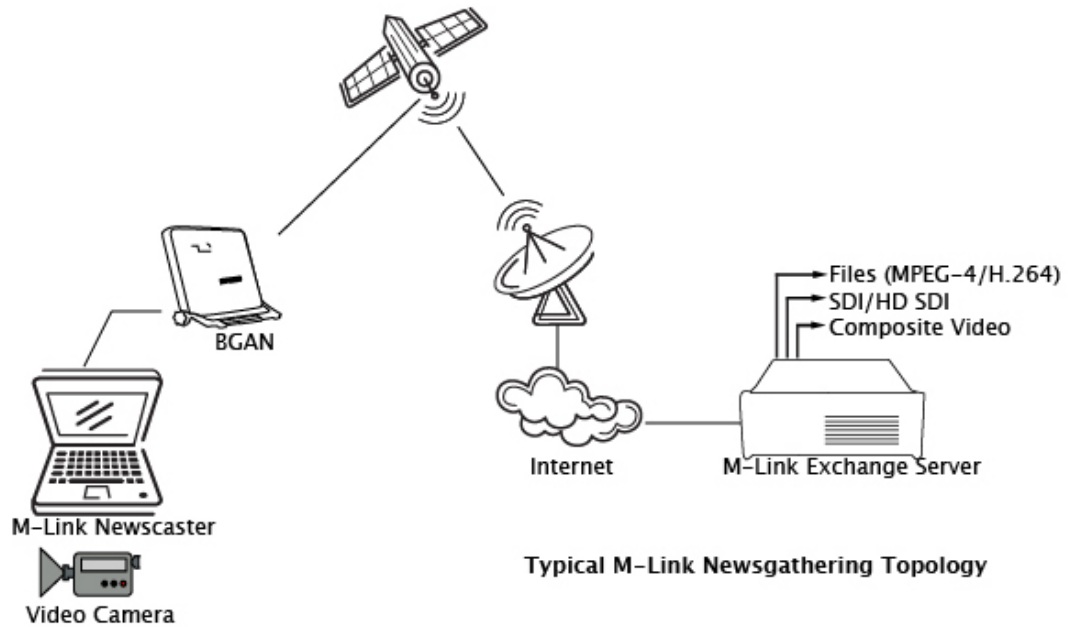
- a. Drag and drop your edited or captured video into the Newscaster interface, Newscaster checks the file for correct characteristics.
- b. Click on **Encode** (make sure you select the correct encoding rate for the transmission speed).
- c. Select the BGAN service required and then click on **Transmit**.

For **M-Link Live-X** Live transmissions:

- a. Use a Firewire, HD-SDI* or HDMI* cable to connect your camera to your computer running M-Link Live-X.
- b. Select your destination
- c. Select the encoding profile and the Streaming IP service at one of the following data rates: 128kbps, 256kbps or 384kbps. (The available data rates depend on the terminal you are using)

*HDSI and HDMI require a compatible Thunderbolt or USB3 converter box from Blackmagic-Design.

4.2 M-Link configuration



M-Link can be used for a wide range of applications requiring the transmission of video and audio media either live for immediate viewing, or as files for onward workflow integration.

The configuration is largely dependent on your specifications and preferences, as well as the intended use of the media at the receiver end. Livewire offer a full range of M-Link systems from very cost-effective, software-only solutions to a fully integrated system for integration into a broadcast newsroom. Our 20 years of experience in working alongside broadcasters, news agencies, government agencies and special interest groups has enabled us to advise on solutions for a wide range of challenging newsgathering environments.

4.3 Hints and Tips

Best practice hints and tips to ensure you get the most from M-Link over BGAN:

- > Test your solution before taking it out into the field.
- > Point the terminal accurately for error free transmission – make sure that your terminal has unobstructed line of sight and that the terminal has the maximum possible signal strength before network registration. (Our free iOS BGAN Pointer App available from the Apple App Store helps to avoid line of sight and pointing errors.)
- > Use the Ethernet interface to achieve high transmission speed.
- > Make sure that you switch off any Windows or MAC automatic downloads during a live broadcast.
- > Use a higher data rate for a Streaming IP connection when higher quality video is required.
- > Use a Streaming IP connection with a dedicated 'last mile' link to ensure end-to-end quality of service.
- > Use the correct format camera (although M-Link supports both PAL and NTSC).
- > Make sure your studio network can provide a static IP address (required by your decoder).
- > Inmarsat recommends that you do not use a VPN connection for live broadcast as it can add an extra overhead of between 10% - 40% depending on your VPN application.

5. Technical summary

The M-Link feature sets are summarized below:

Feature	M-Link Newscaster	M-Link Live X	M-Link Exchange
Integral BGAN support	Yes	Yes	Yes
H.264 AVC codec	Yes	Yes	Yes
H.264 AVC high definition	Option	Option	Option
H.264 AVC live	No	Yes	Yes
Livewire optimized IP	Level 1 & Level 2	Level 1	Level 1 & Level 2
FTP/store and forward	Yes	Yes	Yes
Livewire support	Yes	Yes	Yes
Hardware solution	Optional	No	Yes
Software solution	Yes	Yes	Yes
Operating systems/platform supported	Windows: XP Pro, Vista, Windows 7 OSX: 10.6 (Snow Leopard), 10.7 (Lion) 10.8 (Mountain Lion)	Windows: XP Pro, Vista, Windows 7 OSX: 10.6 (Snow Leopard), 10.7 (Lion) 10.8 (Mountain Lion)	Windows XP Professional and Windows Server 2003
PAL and NTSC support	Yes	Yes	Yes
Decoder output	On screen	On screen	HD-SDI, SDI Composite. MPEG-2 PS
Return audio feed using BGAN forward channel	N/A	Yes	Yes
BGAN IP addressing requirement	None	None	Static Public IP Address
Feature	M-Link Newscaster	M-Link Live X	M-Link Exchange
Simultaneous live and store and forward support using BGAN TFT (secondary PDP context only)	Yes	Yes	N/A

6. Customisation required

M-Link has been designed for use with Inmarsat BGAN. No customisation is required.

7. Further details and support

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