

# Messenger 2 Transmitter (M2T)

**COBHAM**

The most important thing we build is trust.

## Applications

- Electronic News Gathering (ENG)
- Sports
- Point of View
- Helicopter Links
- UAV/UGV Applications
- Mobile and Portable AV Applications

## Key System Features

- Built-in AVC / h.264 Encoder
- SD and HD formats up to 1080p
- Low System Latency (~1 frame)
- Low Power Consumption (~15 Watts)
- Up to 4 Audio Channels
- User Data Support
- AES 128 Bit Security
- C-OFDM Modulation w/ Local Control
- Output Frequency: 1 to 7 GHz (In-Bands)
- High-Throughput option for maximum link performance
- Rugged and Compact Portable Design
- Companion COFDM Receiver with Maximal- Ratio Pre-Detect Diversity reception



The Messenger 2 Series (M2) product line incorporates many of the original “Messenger” product line capabilities with two major upgrades. The M2 series incorporates the AVC compression technology with one frame delay which replaces the MPEG-2 compression, and they cover all the SD and HD formats up to 1080P.

The Messenger 2 Transmitter (M2T) accepts Standard Definition (SD) or High Definition (HD) 4:2:2 digital video or analog SD video and analog stereo audio inputs (Mic or Line level) or optional Embedded Audio (Future option) (up to a total of 2 Stereo pairs or 4 Mono channels). The video is compressed according to the Advanced Video Compression (AVC) / h.264 specifications. The low-latency AVC Encoder supports the Baseline Profiles with resolutions from 480 to 1080 with support for either interlaced or progressive formats. The audio is compressed using MPEG Layer II compression. Low rate user data up to 38.4 kBaud can be optionally supported. The audio, video and user data packets PES streams are multiplexed with basic service data to indicate the service name. The stream can be scrambled with AES scrambling system to provide protection in sensitive applications

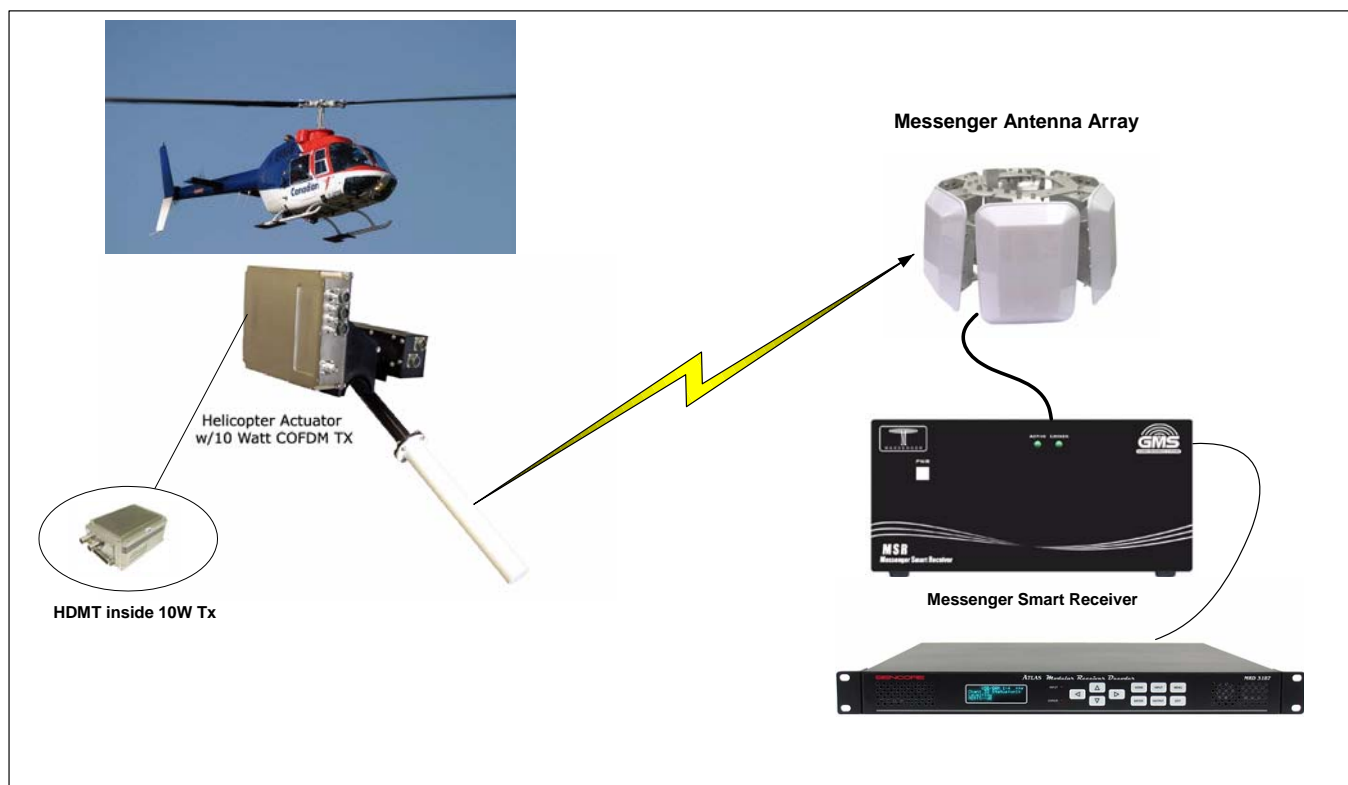
Specifications subject to change without prior notice  
Typical values shown unless min or max is specified  
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# Messenger 2 Transmitter (M2T)



The 4K HIGH-THROUGHPUT OPTION enables user-selectable options to set bandwidths from 6 MHz to 16 MHz and to double the throughput of our standard M2T (Up to 63 Mbps!). Using 4K carriers and the 16 MHz bandwidth, the link can support HD operation with >12 Mbps while running QPSK and 1/2 FEC. This increases link robustness and provides an additional 13.5 dB increase in link margin (>4.7 x increase in operating range!) for the same throughput rate in a standard HD MPEG-2 DVB-T system! With the 4K HIGH-THROUGHPUT OPTION you can run with fully DVB-T compliant 2K carriers and bandwidths of 6, 7, or 8 MHz.

When you switch to 4K carriers you can select 12, 14 or 16 MHz bandwidth. The 4K HIGH-THROUGHPUT OPTION is also useful when transmitting multiple video streams through one transmitter. This option requires a special receiver configuration. Please contact GMS Sales for additional information.



GMS' Messenger 2 Link (M2L) includes the Messenger 2 Transmitter (M2T), the Messenger Smart Receiver (MSR), HD AVC Decoder and several external Down-Converters. The M2T provides professional Audio/Video (A/V) interfaces and processing. All versions of the Messenger Link family use a robust digital modulation system known as Coded Orthogonal Frequency Division Multiplexed (COFDM) that provides frequency diversity and powerful Forward Error Correction (FEC) algorithms. The Messenger Smart

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Receiver (MSR) provides for Spatial Pre-Detect Maximal- Ratio Diversity Combining of up to six independent antennas per MSR to increase the Signal Strength, Signal to Noise Ratio and combat short delay spread multipath reflections found in indoor environments. There is a dramatic increase in the operating threshold when multiple high-gain antennas and Block Down-Converters are used with the MSR, which greatly enhances link robustness when operating at the high data rates required for HD transmission. The MSR outputs a transport stream simultaneously over ASI and SPI parallel interfaces. External Audio/Video/Data AVC Decoders are sold separately that support HD and SD AVC Decoding.

One of the biggest problems encountered in the transition from an analog to a digital A/V platform has been the inherent digital coding delay that in some digital systems are 1.5 seconds or more for HD. The M2T employs a specially designed 'Ultra-Low Delay' coding technology, which provides 44 mS (~ 1 frame) end-to-end system delay when using GMS's AVC Decoder with the M2T.

This ensures that the picture you see is what is happening *now!* Crucial for applications such as sports/news coverage

## Specifications

### COFDM RF Output

Output Frequency: 1 to 7 GHz (In-Bands)  
 Bandwidth: Selectable 6, 7, 8 MHz Standard  
 6, 7, 8, 12, 14, 16 MHz Optional\*  
 RF Output Power: Up to 200mW  
 Connector: SMA-F

### Video Encoding (HD)

Interfaces: HD-SDI  
 Standards: SMPTE-274M, -293M, -294M,  
 - 296M  
 Compression Standard: AVC / h.264  
 (Per ISO/IEC 14496-10)  
 Motion Est. Range: +/-192 Horiz., +/-128 Vert.  
 Video formats/resolutions supported:

Format	Resolution @ Frame Rate
1080i	1920x1080 @ 23.98/24/25/29.97/30 fps
1080PsF	1920x1080 @ 23.98/24/25/29.97/30 fps
1080p	1920x1080 @ 23.98/24/25/29.97/30 fps
720p	1280x720 @ 50/59.94/60 fps

Variable GOP Structure: I-only and IP  
 PsF supported with INTERLACED FORMAT

Profiles supported: BP@HL  
 \*\*Video bit rates: HDTV to 50 Mbps  
 \*\*\*System Latency: <44 mS (Ultra-Low Mode)  
 Connector: BNC-F

### Video Encoding (SD)

Interfaces: SDI, Component, Composite or  
 S-Video  
 Standards: SMPTE-292M  
 Compression Standard: AVC / h.264  
 (Per ISO/IEC 14496-10)  
 Motion Est. Range: +/-192 Horiz., +/-128 Vert.  
 Video format standards: NTSC or PAL

Format	Resolution @ Frame Rate
576i	720x576 @ 25 fps (PAL)
480i	720x480 @ 29.97 fps (NTSC)

Variable GOP Structure: I-only and IP  
 Profiles: BP@ML  
 \*\*Video bit rates: to 50 Mbps  
 \*\*\*System Latency: <44mS (Ultra-Low Mode)  
 \*\*\*\* In Development (Future Option)

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# Messenger 2 Transmitter (M2T)



## Audio Encoding

Analog Audio Inputs:  
Dual, Line-Level or Mic-Level, Single-Ended or Differential, Clip Level 12dB  
Input Impedance: 600 Ohms (Mic),  
2 k Ohms (Line)  
Standards: SMPTE-272M, -299M  
Digital Audio: Embedded (2-channel) \*\*\*\*  
Compression Standard: MPEG Layer II  
Bit rates: 256 kbit/s/ch  
Sampling Frequency: 32 kHz, 44.1 kHz, or  
48 kHz  
THD: < 0.1 % max.  
Response: 20 Hz to 12 kHz, +/- 0.25 dB  
Crosstalk: >55 dB min  
S/N: >60 dB RMS  
Connector: BNC-F, p/o DB-44F

## Transport Stream

Standard: per ISO/IEC 13818-1  
Packet Size: 188 byte  
Bit Rate: Automatically set from active service settings.  
ASI Output  
Connector: BNC-F  
ASI Input  
Connector: BNC-F (same as SDI/HD-SDI in)

## Modulation

Modulation Type: COFDM w/QPSK, 16QAM,  
or 64QAM

## Standard: DVB-T compliant

FEC: 1/2, 2/3, 3/4, 7/8  
Guard Intervals: 1/32, 1/16, 1/8, 1/4  
Spurious: 50 dBc  
COFDM Carriers: 2k Carriers

## High Throughput Option

FEC: 1/2, 2/3, 3/4, 7/8  
Guard Intervals: 1/32, 1/16, 1/8, 1/4  
Spurious: 50 dBc  
COFDM Carriers: 4k Carriers  
Connectors: BNC-F, p/o DB-44F

## Scrambling Option

Type: 128 Bit Advanced Encryption Standard (AES)  
Key Storage: User Controlled, Local or Remote  
Implementation: Everything except TS Header  
Requires DDPC with AES Option on RX Side

## User Data Option

Protocol: RS-232C, Asynchronous, 8 Bits, No Parity,  
1 Stop Bit  
Data Rate: Selectable, Up to 38.4 kBaud  
User Data PID: Selectable  
Connector: p/o DB-44F  
Requires DDPC with AES Option on RX Side

## Physical

Dimensions: 3.25" (W) x 4.5" (D) x 1.95" (H)  
8.26 cm x 11.43 cm x 4.95 cm  
Weight: 13.4 oz ( 380.5 grams)  
Environmental:  
Operational Temperature: -10 to 65 deg C  
(EXTERNAL COOLING REQUIRED)  
Humidity: Up to 100% non-condensing

## DC Power

DC Voltage Range: 9 - 15 V  
Power Consumption: <15 Watts

## Control

Local frequency control is provided on housing.  
The M2T can be fully controlled through either the RS-232 or USB-1 control ports via a MS Windows based control application (Sold Separately). A Remote Control Unit (RCU) is also available for either local or remote control.

\* With 4K High-Throughput Option

\*\* C-OFDM modulator limits high end of bit rate to 32 Mbps or 64 Mbps\*.

\*\*\* Latency Delay is Decoder dependent