



**mnet**

We call it Magic

# M-NET'S

**TECHNICAL**

**STANDARDS**



# Technical Standards

No: - BCS/TS/008

## SCOPE OF DOCUMENT

M-Net transmits signals on analogue and digital networks conforming to the CCIR/ITU System I, MPEG 2, HDTV (H264 MPEG4) and DVB-H standards respectively. The availability of a common framework of technical standards and processes, to work within and comply to, is most important and beneficial for all makers of programmes; both for live or recorded transmission on M-Net and associated channels. M-Net strives to maintain a high technical standard and thus expects programme material produced for its channels to conform to standards that shall meet at least level 4 of the CCIR 5-Point Quality Grading Scale being:-

Acceptable	Not Acceptable
5 = Excellent	3 = Fair
4 = Good	2 = Poor
	1 = Bad

This document stipulates the minimum acceptable technical requirements for material delivery and is available to all suppliers of such material to M-Net. Material of a lower standard may be acceptable under special circumstances. This must be agreed with the appropriate point of authority. The Head Transmission Centre or The Head engineering may be contacted in this regard.

***Last updated: 1 February 2008/04/03***

# 1 VIDEO

## 1.1 General

- The picture is to be well lit and sharp unless specifically required otherwise to meet special artistic/production requirements.
- Excessive black crushing and highlight compression shall not be present. Transient Response shall be such that streaking, smear, ringing and overshoots are not visible. Moiré and other patterning shall not be noticeable. Spurious signals such as Hum & Crosstalk must not be apparent.
- All blanking, line timing, bandwidths and amplitudes must adhere to the relevant CCIR/ITU system specifications.
- All electronic titles must be placed within the picture "safe area" defined as 80% of the picture width and height to accommodate differences in picture areas displayed on domestic receivers compared to those on professional monitors.
- Programme video signal levels shall be accurately related to their associated line-up signals within the maximum deviation specification of 2% for Video Luminance and 5% in respect of Video Chrominance.



## 1.2 Video quality assessment

M-Net retains the right to final acceptance or rejection of any material delivered which does not meet its minimum technical specification requirements, whether measured or subjectively assessed.

- For subjective quality assessment, as especially referred to under consumer formats, special visual attention must be given to assess the following items when recording material to tape:
  - Chroma Break up
  - Chroma Noise
  - RF Drop out
  - Bearding
  - YC Delay
  - Digital Artefacts or Channel Condition
  - Betacam SP's to be at least first generation/sub masters, YUV copies (Dolby encoded).
  - Digital clones or YUV, component recordings are preferable.
  - M-Net retains the right to final acceptance or rejection of any material delivered which does not meet its minimum technical specification requirements, whether measured or subjectively assessed.

### 1.3 Standard Definition Delivery

For Standard Definition delivery, content shall be supplied on a 625 line 25 frame per second 2:1 interlace component digital videotape system produced in accordance with ITU-R Rec BT.601.M-net will accept:

- Betacam SP
- Betacam SX
- Digital Betacam

### 1.4 Analogue Video –System Levels

SYSTEM	TYPE	PAL		
		Level in Volts	Max. Level (Ref. 1V)	Min. Level (Ref. 1V)
Composite	Luminance	700 mV	106 % Ref. 1V 760 mV	0% Ref. 1V 0 mV
	Black Level Setup	0 mV		0% Ref. 1V 0 mV
	Chroma		123% Ref. 1V 930mV	-18% Ref. 1V -180mV
	Sync	300 mV	309 mV	291 mV
	Burst	300 mV	309 mV	291 mV

Component	Luminance	700 mV	700mV	0mV
	Colour Difference	700 mV	700mV	0mV

## 1.5 Line Up Test Signals and Leader

- Maximum video levels of material with reference to line-up signals shall be 700mV including an operational tolerance of +25mV for luma (Y) and 700mV for each colour difference signal (Pr,Pb). Whatever the combination of luma and chrominance components the signal shall not produce an R.G.B or PAL coded gamut error when measured by an appropriate instrument.
- Black level shall not extend below blanking level (0mV luma)
- The line-up colour bar test signal shall replay at the correct levels at the VTR manufacturers "Preset" position.
- The line-up colour bar test signal shall replay at the correct chroma phase with the chroma phase control in the manufacturers "Preset" position.
- The start of programme and any subsequent part should be preceded by 30 seconds line -up colour bar test signal.
- A countdown clock indicating programme title, subtitle or episode number, part number must provide a clear countdown of at least 30 seconds fading to black at 3 seconds to first programme pictures.

## 1.6 High Definition

- For High Definition material, the content shall be supplied on a 1125 line, 1080 active 25 frame per second 2:1 interlace component digital videotape system produced in accordance with ITU-R BT.709-5.M-net will accept: HDCam
- All delivered high definition master tapes must be 1080i 25 frame 50Hertz (whether acquired 1080P 25 or 1080i 25).
- The aspect ratio shall be a full height 16:9 image
- For high definition, the vertical interval time code (VITC) shall be to a standard yet to be defined.
- Due to the immature state of High Definition systems this documentation will evolve and will be added to and modified as required in the future.

## 1.7 Tape Labels

The following details are to be supplied by the programme supplier on their recording report:-

- Programme Supplier.
- ProgrammeTitle / Subtitle
- Origination Format.
- Video and Colour Standard.
- Time Code indication of the start and end of the actual program plus its duration.
- The Audio Channel and Track Assignment used for the recording must be noted on the label.
- Subtitling delivery is to be supplied on a 3.25 inch stiffy in the format of "\*.pac".
- The "use of" and "type" of Dolby Noise Reduction.
- If the recorded tape format is composite, the black signal must be colour black and the eight-field colour sequence for PAL must be uninterrupted.

## 1.8 Consumer Formats

Program material shot and recorded on formats like DVCAM /DVCPRO 25/50 /HDV if 1st single generation dubbed to M-Net's delivery formats may be accepted on program content merit. Subjective picture assessment will, however, take place to accept or reject this material for transmission purposes. Acceptance of material shot on these formats will be the exception and not the norm.

## 2 TIME CODE

### 2.1 Longitudinal Time Code - Professional Videotape.

- Time code is to be delivered on the embedded video tape machine track.
- Professional video tape recordings should have continuous longitudinal
- Time code (LTC) – refer later to delivery requirements.
- The LTC and VITC time code must be the same time code value.
- User bit information is not required.
- Time code level to be 0dBu maximum and -6dBu minimum

### 2.2 Vertical Interval Line Allocation

Vertical Interval Time Code Line Allocations for Professional Video Tape Formats

Time Code Type	C Format	Betacam SP	Betacam SX	Digital Betacam
VITC	19, 21 332, 334	19, 21 332, 334	19, 21 332, 334	19, 21 332, 334



## 3 AUDIO

### 3.1 General

- Station systems - Peak Program Meters (PPM's) are used.
- Stereo and Mono recordings - to be recorded in phase.
- If interrupted reference tone is used it will be interrupted every 3 seconds for 0.25 seconds and will only be used to identify sound track 1. This is not a strict requirement in the case of manually interrupted tones.
- M-Net uses a tone (wobble) generator of 1 kHz switched to 10 kHz (every 10 secs). This is used for confirmation of frequency response of videotape machines and system integrity.
- Dolby Surround Sound Is an encoded sound system that requires the use of two audio channels. The audio may be dubbed but no additional signal processing may be used in the process. It is important when dubbing Surround Sound Audio that the gain and the phase relationship of the two audio channels are kept the same as the original source audio channels.
- Programme audio signal levels shall not deviate by more than 1dB relative to their associated line-up specification.



## 4 GENERAL AUDIO QUALITY ASSESSMENT

### 4.1 Audio

- The Audio shall be free of spurious signals inclusive of noise, hum and crosstalk. Artefacts such as Distortion, sibilance and wow & flutter must not be apparent.
- No programming with a dynamic range suited to Theatrical presentation (Cinema audio mix) will be accepted, as these are not suitable for the audio range required for broadcast.
- Special attention is to be given to hiss, buzz, hum & compression when quality assessing audio.
- Dolby noise reduction –Betacam SP Dolby C = Noise reduction is to be switched - ON.

M-Net would prefer the AFM full mix or Stereo Left and Right where available, as opposed to M & E on channels 3 & 4.

## 4.2 Analogue Audio System Levels

All M-Net's equipment is high input impedance of 10k ohm or greater and output impedance of 10 ohm or less.

0dBu = 0.775V unterminated

0dBm = 0.775V terminated into 600 ohms

	Frequency – Hz	Digital Audio	Analogue Audio		
		Audio Level DB FS	Audio Level dBu	Program Meter (PPM)	Sony Volume Unit (VU)
Reference Tone Level	1000 Hz or wobble	-18dB FS	0 dBu	-6dB or 50%	-4 VU

Analogue audio should peak at a maximum of 8dB above 0dBu.

This equates to – 10 dB FS for digital audio.



## Dolby Surround/Dolby E

- For standard definition content delivery, the audio can be standard stereo (Lo Ro).
- Optionally, by agreement between the parties, tracks 3 and 4 (AES2) may carry a Dolby E soundtrack encompassing 5.1 multichannel audio. This is in addition to the basic track 1/2 (as mentioned above.)
- Both Stereo and Dolby E soundtracks must be delivered in sync with Video. No frame delays must be induced on any of the tracks.
- The Dolby E bit stream must be in 16 bit, 5.1 format.
- If the requirement exists to deliver more than the above mentioned audio tracks, the additional maximum of two tracks will be carried within a 20 bit 5.1 + 2 Dolby E configuration.
- If Dolby E is specified as the audio multiplex, then in this usage the metadata to be included in the Dolby E signal shall be:
- Metadata Parameters:-

**Bits Mode:** Main Audio Service: Complete Main

**AC Mode:** 3/2

**Dolby Surround Mode:** Not Indicated

**LFE Channel:** Enabled

**Dialogue Normalization:** -27

**Audio Production Info:** Yes

**Mix Level:** 85 dB

**Room Type:** Small

**Copyright Bit:** No

**Original Bitstream:** Yes

**Preferred Stereo Downmix:** Lt/Rt Preferred

**Lt/Rt Center Mix Level:** 0.707 (-3.0 dB)

**Lt/Rt Surround Mix Level:** 0.707 (-3.0 dB)

**Lo/Ro Center Mix Level:** 0.707 (-3.0 dB)

**Lo/Ro Surround Mix Level:** 0.707 (-3.0 dB)

**Dolby Surround EX Mode:** Not Surround EX

**A/D Converter Type:** Standard

**DC Filter:** Disabled

**Lowpass Filter:** Disabled

**LFE lowpass Filter:** Enabled

**Surround Phase Shift:** Enabled

**Surround 3dB Attenuation:** Enabled

**RF Mode Compression:** Film Standard

**Line Mode Compression:** Film Standard



- For High definition the audio should consist of 6 discrete channels in the following format – L, R, C, LFE, Ls, and Rs.
- The minimum audio requirement shall be a Dolby Surround (Pro Logic II) encoded stereo pair. (Lt &Rt)

## **5 ASPECT RATIO**

### **5.1 16:9 Video Requirements**

- The material shall be produced in a full height 16:9 Aspect Ratio format – and shall be delivered to M-net in that format. It shall also be produced so that there is meaningful and useful image content to the 16:9 image are limits.

## **6 DIGITAL DELIVERY FOR COMMERCIALS/LONGFORM**

### **6.1 General**

- This section describes delivery systems, which deliver content via satellite, land-line or physical data storage
- The delivery system may deliver its content to either –
  - (i) M-nets "off line) or "near-line commercial storage system, or
  - (ii) M-nets "on line commercial storage system.
- The data reception system, associated server, data base and the interface to M-nets broadcast plant shall be at the distributors cost and the format of the video/audio signals ex the interface shall be by agreement between the distributor and M-net.

## TECHNICAL PARAMETERS FOR THE INCOMING SIGNAL

- Line-up signals must be available prior to the programme start time, with sufficient time to allow the completion of a technical line-up and a technically competent contact must be designated to liaise with BCS engineering staff.
- The production company producing or commissioning the material shall be responsible for the costs of all necessary communications and for communicating feed requirements to ICR plus any pre-existing link arrangements. This will enable agreement on best delivery method and to ensure that all the necessary circuits are booked from the source to the point of recording or transmission. Where multiple agencies are involved, a collaborative approach is essential.
- A technical contact will be required to be available prior to the event to confirm technical planning and for dealing with any queries. Similarly a technical contact must be available at the source throughout the line-up period and during the feeding of material.
- The parties involved acknowledge that it is technically unrealistic to provide telecommunications services free of fault and M-Net does not undertake to do so.
- Producers and commissioners should be aware of the options open to them for reducing the risk of signal failure, especially during live transmissions with particular attention paid to single points of failure.
- Certain broadcasts may be considered sufficiently important for some additional facilities to be deployed as backup. In some cases a second, independent transmission path may need to be established. This should take a different route to the main transmission path.

## **7 EMERGING TECHNOLOGIES**

- At time of writing, a number of options for asynchronous streaming are available, such as the internet, store and forward systems and file formats such as MXF. These include streaming via IP, including the use of interim storage or caching. This document does not prohibit the use of these technologies, but they must be considered as special cases requiring particular attention and planning.