Enhanced CD / CD-Extra / Mixed Mode

Technical Conditions

These technical conditions describe the acceptable source data and materials, including documentation required for the Enhanced CD, CD-Extra and Mixed Mode CD production in the company GZ Media, a. s. The customer has the duty to get acquainted with them prior to placing the order. The source data not mentioned in these technical conditions, or source data, which are inconsistent with these conditions, should be consulted in advance with a pre-mastering engineer.

1   Technical Specifications and terms definitions

Technical parameters of source materials for the production of Enhanced CD, CD-Extra and Mixed Mode formats must conform to the specifications written below. If the supplied source materials do not conform to these specifications, they will be adjusted in the pre-mastering, or will be rejected as nonconforming, should it be impossible to adjust them.

1.1   CD-Extra
- referred to also as a „CD Plus", „Enhanced Music CD" or „Blue Book enhanced CD"
- technical parameters of source materials must conform to the **Blue Book** specification
- the first session must contain one or more (up to 98) audio tracks in Red Book format
- the second session must contain one data track in CD-ROM XA (mode 2) format with ISO 9660 (and possibly also Joliet and/or HFS) file system
- there must be an AUTORUN.INF file present in the root folder of the disc. This file must conform to the requirements of Autoplay function of Windows operating systems.
- both CDPLUS and PICTURES folders must be present in the root folder of the disc containing files with the structure and the content required by the Blue Book specification
- the disc may also contain other files and applications with various content

1.2   Mixed Mode
- Mixed Mode discs combine two or more tracks with different formats in one session
- the first track must be a data track in CD-ROM mode 1 or mode 2/XA format with ISO 9660 (optionally also Joliet) and/or HFS file system
- the second track and following tracks (up to 98) must contain audio in Red Book format
- some older CD Audio players can have problems with the first data track and they can try to play it back as an audio track, which leads to loud and unpleasant digital noise, that can even damage the loudspeakers or listener's hearing

1.3   Enhanced CD (multisession)
- generally it is meant to be a CD with two sessions combining audio and computer data
- technical parameters of source materials must conform to both the Red Book and the Yellow Book specifications for multisession discs
- the first session must contain one or more (up to 98) audio tracks in Red Book format
- the second session must contain one data track in CD-ROM mode 1 or mode 2/XA format with ISO 9660 (optionally also Joliet) and/or HFS file systém

1.4   Parameters of audio tracks:

There can be present ISRC codes, CD-Text or graphics information in subchannels (like CD+Graphics format) for all audio tracks.

Number of channels:
Specification according to the standard: 2 channels (stereo)
The source data in mono recording will be transferred in stereo, both in the left and right channels. It is possible to encode the multiple track recordings using the technology Dolby Surround (Pro Logic I or II), or to mix them into stereo.

Sampling frequency:
Specification according to the standard: 44.1 kHz
The source data with sampling frequencies 32, 48, 88.2, 96 and 192 kHz will be digitally re-sampled.

Quantization:
Specification according to the standard: 16 bits
It is possible to deliver the recordings with resolution up to 32 bits. At the transfer there will be used the upper 16 bits. Optionally it is possible to use the algorithms for the bit reduction, which will use even the information in lower bits.

Pre-emphasis:
Pre-emphasis may not be changed during one track. The interval between tracks, in which the pre-emphasis is being changed, must amount at least to 2 seconds.

SCMS:
Unless specified otherwise in the documentation or supplied source data, a tag of digital copying will be set up at "forbidden" for the pressed CDs.

Length of programme:
The maximal possible length of the audio part depends on the data part size – the larger is the data part, the less space remains available for audio tracks and vice versa. There is a separator between the audio part and the data part and it is 2:32 long for the Enhanced CD and the CD-Extra formats and 0:02 long for the Mixed Mode format.

ISRC codes:
ISRC codes may be stored on a functional CD-Audio master, in DDP data, in CD image or may be supplied in the accompanying documentation (tracklist).

Bit reduction:
If the supplied input medium was produced from a multiple-bit recording using the algorithms for the bit reduction (for example SBM, UV22, HDCD, etc.), it is necessary to inform about this fact in the documentation. As for algorithm HDCD, this obligation is set forth in the licensing conditions.

Record level:
The digital level of input source medium will be transferred to the CD without changes (recording on a pressed CD will have the same number of bits as the supplied source

medium), unless specified otherwise by the customer in the order.

Limitations for PQ coding, offsets:
Maximal number of tracks: 99
Maximal number of indexes in one track: 99
Minimal length of track (without the initial gap): 4 seconds
CD offset (gap before the 1st track): at least 2 seconds (150 frames)
PQ offset before the 1st track: 50 frames are recommended
PQ offset at the beginning of the 2nd track and next tracks: 25 frames are recommended
PQ offset at the end of track: 12 frames are recommended
PQ offset after the last track: 75 frames are recommended
1 second = 75 frames

1.5   File systems for data tracks:

A file system specifies the description and location of files on CD with regard to the files used and platform, for which they are determined. The applicable division is stated in the table below. The selection of file system must be already carried out during the master processing.

File systems for CD-ROM, which can be processed		
name	**platform**	**description**
ISO 9660 Level 1	DOS, Windows, Linux, BSD, Mac OS 7-10	files with names in the following form: name 8 characters, dot and 3 characters of extension, directories: only 8 characters without extensions, maximally 8 levels of nesting, limiting of the applicable characters to: A-Z, 0-9, _
ISO 9660 Level 2	Windows 95 and higher, Linux, BSD, Mac OS 7-10	files with name length up to 31 characters (name and filename extension), they must neither begin nor end with any dot; only one dot is permitted in the name, limiting of the applicable characters to: A-Z, 0-9, _
Joliet	Windows 95 and higher, Linux, BSD, Mac OS X 10	recommended system for Windows 95, 98, ME, NT, 2000, XP, Vista, extension of ISO 9660 file system, maximally 64 arbitrary characters (unicode), backward compatible with DOS and Windows 3.xx (it will convert the names to 8+3)
Rock Ridge	Unix, Linux, BSD, Mac OS X 10	extension of ISO 9660 file systém for Unix systems, up to 255 characters, less limitation on the character set than ISO
HFS, HFS+	Mac OS	file systems for Apple Macintosh computers, files with name length up to 31 characters
Hybrid	DOS / WINDOWS / Mac OS	combination of ISO 9660 (possibly also with Joliet extension) and HFS file system on one CD-ROM

2 Formats of input source media

2.1 Complete master

Contains all data in the format, which is directly usable for the production by pressing without necessity of carrying out any changes or adjustments. The studio will carry out only the check of the supplied master, and if required or suitable, the studio will carry out the adjustment of master so that it would meet the standards and recommendations of Philips/Sony.

2.1.1 Enhanced CD / CD-Extra / Mixed Mode master

Fully functional pressed or burnt disc in the Enhanced CD, CD-Extra or Mixed Mode formats playable in both a computer and a CD desk player (see 3.1). We do not accept the shaped CDs, business cards, etc.

2.1.2 DDP (Disc Description Protocol) format

Worldwide standard for handing-over the source data for production of optical discs supported by all manufacturers of equipment for CD and DVD mastering, as well as by manufacturers of professional workstations for processing of audio or DVD authoring.

The version of DDP files must be 2.00 for Enhanced CD and CD-Extra, for Mixed Mode we also accept the older version 1.00.
If your authoring software supports it, choose in the setting-up the option for storage of audio tracks in one file.

2.1.3 CMF (Cutting Master Format)

It is similar to DDP. CMF is transferable to DDP. If your workstation supports both DDP and CMF, select the option DDP.

2.1.4 Files with CD image

Files, which can be used for the Enhanced CD / CD-Extra / Mixed Mode master burning without any adjustments, thereby can be transferred to the case 2.1.1.

Recommended formats:
- NRG (Nero)
- BIN/CUE/CDT (for multisession Enhanced CDs and CD-Extra discs we accept only „extended" CUE format created by the ImgBurn or ISOBuster applications)

Acceptable formats:
- C2D (WinOnCD)
- CIF (Easy CD Creator)
- CCD/IMG/SUB (Clone CD)
- CDI (DiscJuggler)
- MDF/MDS (Alcohol 120%)
- BWT/BWI, B5T/B5I, B6T/B6I (BlindWrite)

1.1 Separate masters for audio and data parts

We accept separate masters for the audio part (CD-Audio format) and for the data part (CD-ROM format). They can be supplied to us also as pressed or burnt discs, sets of DDP files or disc images (for the data part we accept ISO images as well). Our premastering department will create the final CD master from them. Unless ordered differently, it will be created as an Enhanced CD master with a CD-ROM mode 1 data track as a default. If there is no need or demand for additional changes to the master, this service is free of charge.

1.2   Individual files for the data part

Individual files cannot be used directly for the production by pressing. At first the data must be processed in pre-mastering and a master must be produced. The processing includes the check of supplied files according to the Yellow Book standard, possible adjustments specified by the customer in supplied documentation, compilation of the disc image with ISO 9660 and Joliet file system from the particular files and the verification of function of the resulting master.

2.2 Physical audio carrier

It is an analogue or digital carrier containing the continuous recording of programme. The division of programme into tracks is realized by means of technical facilities of a specific player (ID marks in the time track) or by means of the accompanying documentation.

2.3 Audio files for the audio part

They cannot be used directly for the production by pressing. At first the data must be processed in pre-mastering and a master must be produced. The processing includes the check of supplied files according to the Red Book standard, possible adjustments specified by the customer in supplied documentation, compilation of the disc image from the particular files, setting of the starts and ends of the particular compositions (PQ coding) and the final verification of function of the resulting master.

Unsupported formats must be consulted in advance with the pre-mastering engineers.

2.3.1   Recommended formats:
- WAV (Windows PCM) – uncompressed audio
- AIF, AIFF (Apple Macintosh) – uncompressed audio
- APE (Monkey's Audio) – lossless compressed audio, including the detection of errors
- FLAC (Free Lossless Audio Codec) - lossless compressed audio, including the detection of errors

2.3.2   Unsuitable and non-recommended formats:
Compressed audio with loss in the formats:
- MP3, MP2, MP1 (MPEG-1 Layer 3, 2 and 1)
- MP4, AAC, M4A (MPEG-4, Advanced Audio Coding)
- AC3 (Dolby Digital)
- DTS (Digital Theatre System Coherent Acoustics)
- WMA (Windows Media Audio, Microsoft)
- OGG (Ogg Vorbis)
- MKA (Matroska Audio)
- MOV (QuickTime)
- RA, RM (Real Audio, Real Media)

2.3.3   Unacceptable formats:
- files with the DRM protection preventing from playing on unauthorized players, for example files with the filename extension M4P (format AAC with DRM protection)

3   Physical carriers

Scope of liability for damage: Company GZ Media, a.s. is liable for damage or loss of the medium only up to the price of new medium, not for the price of the medium content.

Physical carriers must be readable in the entire length of the programme. In the event that the supplied carrier contains non-correctable errors of reading, the processing of order will be suspended. The customer will be asked for supplying new source data.

The particular carriers must be unambiguously identifiable in accordance with the supplied documentation and order (catalogue number, customer). The description must also contain the format of data, which are stored on the carrier (for example Enhanced CD master, DDP master, WAV files or individual files for the data part). The description must appear both on the cover and on the medium itself. However, it must not prevent its error-free reading (self-adhesive labels and stickers, description of CD media using a hard-core pens, etc.).

If one data carrier contains files for more titles, the files must be stored in a separate folder named according to the catalogue number, in accordance with the supplied documentation and order.

Recommendation: For the production, please send always a copy of your original master. We recommend sending 2 identical copies clearly identified as master and backup copy. We will use the backup copy in order to minimise the risk of delays that could occur in case of master readability failure, in which case the material would need to be sent again.

3.1 Pressed or burnt optical disc - CD master

Fully functional pressed or burnt disc in the Enhanced CD, CD-Extra or Mixed Mode formats playable in both a computer and a CD desk player, and with the content according to point 2.1.1. We do not accept the shaped CDs, business cards, etc.

3.1.1   Methods of recording on CD-R(W):
- singlesession (DAO - Disc At Once) – RECOMMENDED
- multisession (SAO - Session At Once) – acceptable
- recording by tracks (TAO - Track At Once) – NOT recommended, such a burnt disc cannot be used directly for production without additional adjustments.

3.1.2   Instructions for burning the CD-R(W)
- Use only high quality media from a major brand, preferably the higher versions from the relevant manufacturer.
- Use lower recording speeds, maximally 16x (according to the possibilities of the burner drive). At higher recording speeds there will occur the step change of burning speed and operation of laser (zone burning). Thereby the readability of disc is worsened.
- Supply a PQ list and the error checking protocol for CD-R(W), if it is available.
- Don't cover the CD with self-adhesive labels; however it is possible to use the technologies for burning of graphic information on the labelling side of disc (LightScribe, etc.).
- Describe the medium only on the labelling side, and only with a felt tip marker intended for that use. Common felt tip markers are not suitable. Using hard-core pencils and ballpoints will damage the medium.
- We recommend test-listening of the CD master in a desk CD player prior to sending it to GZ, checking the correct display of CD–Text, if required, checking

the data part of the disc by an antivirus program and verifying the functionality of Autorun and all applications contained in the CD.

3.2 Optical discs CD-R(W), DVD-R(W), DVD+R(W) with data content

Those are discs in the format of CD-ROM or DVD-ROM with the content according to the points 2.1.2 - 2.1.4, 2.2, 2.3, 2.5. Discs must contain a compatible file system (ISO9660, Joliet or UDF). One carrier may contain the data for more titles.

3.3 Hard disk

We accept all sizes of hard disks (3.5", 2.5"), all applicable possibilities of connection (IDE, SCSI, SATA, eSATA, USB, Firewire, LAN).
We recommend using the external disks; however we also accept the internal disks.
One disk may contain the data for more titles.

Format of disk:
- NTFS (Windows 2000, XP, Vista) - we recommend
- FAT32 (Windows 9X) – we accept (the maximal size of file is 4294967294 bytes)
- EXT2, EXT3 (Linux) – we accept
- HFS (Apple) – we accept

3.4 Storage media

We accept the following memory cards: SD, SDHC, XD, MMC, Compact Flash, Memory Stick and storage media USB Flash disk.
One storage medium disk may contain the data for more titles.

3.5 Obsolete media

We also accept the following obsolete audio carriers for audio tracks:
- R-DAT
- Mini Disc (not recommended because of lossy compression ATRAC)
- 1/4" analogue tape

For more information contact the pre-mastering engineers.

4   Data transmission via FTP server

The source data for production transmitted via FTP server must contain the check elements enabling the verification of data integrity prior to the production itself. Without check elements it is impossible to guarantee the conformity of files received by the manufacturer to the original files on the side of customer.

The orders, which do not contain the check elements, are suspended until the customer sends the data in acceptable format. If the customer insists on the production from non-secured data, he will assume all risks related to any possible undesirable changes of data during its transmission and storage.

The check elements can be supplied in one of the following ways:

4.1 Source data packed in the archive

The files representing the image of disc, DDP, CMF or individual audio files, which do not contain any check elements (for example WAV), must be packed in one single file that can contain even the documentation.

Acceptable formats of archive files: ZIP, RAR, SIT, 7Z, ARJ, ACE, other formats might be accepted only with prior agreement with the pre-mastering department.

4.2 Format of source data, which already contains the check elements

ISZ, UIF – compressed formats of CD images with the check elements
APE, FLAC – lossless compressed audio formats with the check elements

4.3 The check code supplied separately

As for the files, which do not contain any check elements and are not packed in archive file, there must be supplied the check codes for them, by means of which it is possible to verify any damage to data or an unauthorised manipulation with data.

We accept the codes MD5, CRC32 and SHA1. The code must be calculated separately for each file and a "List of files with checking codes" must be attached to the documentation. The check codes can be created using for example the programme MD5Summer, HashCalc or FreeCommander, which may be used free of charge.

5 Location and identification of data and audio files

If the customer supplies the source data in the form of files on a data carrier or via FTP transmission, there must be chosen such location into folders and names of files so that the data identification would be unambiguous, and in accordance with the supplied accompanying documentation and order.

The observance of all below mentioned recommendations will secure the continuous and problem-free processing of the whole order and reduce the risk of production delay or even of mistake of data.

The source data saved on FTP into a disk space allocated to the customer, or saved on a data carrier must be located in a folder with the name, which is identical to the catalogue number of title. Any file or directory, even inside the archive, must not contain any inadmissible characters of operating systems for PC and Apple Macintosh: / \ > < : * ? |

Depending on the data format proceed in the following way:

5.1 Complete master

We recommend naming the file of disc image or archive according to the catalogue number of order and not adding any additional information to the name (date, etc.).

5.2 Particular files

If the file contains audio data for a CD track, the file name should contain the order of track from the beginning of CD and the name of composition (e.g. "02_Song_Name.wav").
The name of each particular file from the supplied source must be identical with the information in tracklist for the corresponding track.

Make a special notice if the source medium contains system files or hidden files, and specify whether or not those files are to be put on the CD. Unless specified otherwise, the entire data content of the medium will be transferred without change.

Recommendation for preparation of the data part:

5.3 Location of the file on disc

If the burning software allows it, place the frequently used and short files (index, database or program files) at the beginning of CD, where the access time is shorter. Place the long files, such as audio and video clips, at the end of the CD. When reading these files, the access time is not decisive, but the transfer rate is higher close to the edge of disc.

5.4 Check of content

Check the content of prepared master by an antivirus program with the updated virus database. Furthermore compare the bit conformity, as well as the number and sizes of files and directories of the resulting master with the original source data.

5.5 Check of functionality

Test the functionality of Autorun and all executable applications even on other computers or operating systems, which are different from those computers and operating systems, on which the applications were developed. That is to say the end user might not have the same standard software installed, which was used or presumed when developing the application (audio and video codecs, media players, etc.).

5.6 Check of data integrity

Check the data integrity by means of copying all files from the prepared master to another medium, for example hard disk.

6 Documentation

The documentation must unambiguously and undoubtedly identify the supplied source data so that it would enable making a decision about the accuracy of data during the input check and subsequent processing. It is necessary to specify mainly all non-standard elements and abnormalities, such as hidden track, errors allowed within the recording, intentional exceptions to the specification, required protections against copying, etc.

The processing of orders (titles) without the required documentation is suspended until the customer supplies the source data and documentation conforming to the technical conditions. If the customer insists on the production without the documentation supplied, he will assume all risks related mainly to the mistake of titles or mistake of compositions.

The documentation must contain the following information:

6.1 Identification information

Catalogue number, name of customer, name of title and interpreter, etc.

6.2 Information about source data supplied

6.2.1   Type of source data supplied
6.2.2   Location of source data on FTP server: directory and name of file
6.2.3   Format of source data (Enhanced CD master, DDP, disc image, individual files)

6.3 Description of the resulting product

6.3.1   Tracklist
Tracklist must contain the order, names and times of the individual tracks and total playing times. We also recommend specifying the lengths of gaps between the tracks. Should the CD contain text information in sub-code tracks, this fact must be stated in the documentation (CD-Text see below, ISRC code for the correspondent track, UPC/EAN disc code).

6.3.2   Hidden and bonus tracks
The requirement for a non-standard bonus track (a song or spoken commentary) hidden in the gap before the first track must be specified in the order and tracklist (including the length of bonus).

Should the last track contain a long section of silence and/or another, bonus track, it is necessary to specify this fact in the tracklist. It is also necessary to specify the length of gap and the length of bonus track and whether it has to be coded as a separate track or it has to be a part of the previous track.

6.3.3 CD-Text

The CD-Text information may be saved in the source data already supplied (on a functional CD master, in DDP data, in CD image) or may be supplied in a text file. Absolutely exceptionally, if no other possibility exists, as a hard copy. They enable displaying the additional information such as the name of composition, interpreter, author of music, author of text, etc., on the displays of compatible desk or software playback devices.

As for the information saved in the CD-text, it is possible to use only the characters from the set ISO 8859-1 (i.e. without diacritics, national and special characters – sharp S, vowel mutations, hooks, character &). Although some DVD players and most of software players supporting the CD-Text can display some non-standard characters, it is however recommended to transfer the text in order to keep the compatibility with all playback devices.

Syntactical errors and spelling errors of CD-Text in the source data supplied (for example in the files of CD image) are corrected only if the correct wording is specified in the CD-text documentation. The text in documentation has the priority. In the event of uncertainties the title is suspended and the customer will be asked for a correct wording.

If on the source material supplied there are saved any CD-Text information, which are evidently not related to the resulting product (for example names of compositions Track1, Track2, …..) and at the same time are not specified in the documentation, they will be deleted. They are usually created - unknown to the user - by some burning programmes, which always generate the CD-Text – for example from the names of files or from information contained in them (ID3 tags).

<u>Without filling in the name of the entire CD and interpreter of the entire CD, and all names and interpreters of the individual compositions there exists a risk that some playback devices will not display correctly the CD-Text information, or will not playback the disc at all</u>.

Information concerning the entire CD:
- **Disc ID** – according to the recommendation of standard the ID should be stated in the following sequence: catalogue number, name of the company (publisher) and year of issue. All items displayed are separated by a slash.
- **Genre** – music style (list of genres defined in advance, for example JAZZ, POP, …...)
- Subgenre – specification of music style (text information)
- **Title** - name of CD title (mandatory data)
- **Performer** (artist, interpreter) - artist or band singing, playing or speaking – for the entire CD. In the event of compilation it is usually stated: "various", "verschiedene", "ruzni", etc.

Information concerning individual tracks (compositions):
- **Title** – name of composition (mandatory data)
- **Performer** (artist, interpreter) – artist or chorus singing, playing or speaking
- **Songwriter** (lyrics) – author of text, lyricist
- **Composer** – composer, author of music
- **Arranger** – arranger of composition
- **Message** – arbitrary message
- **Info** – additional information, which are not displayed on display, but yet are saved on the CD

6.3.4 Name of disk
Name of the disk as displayed in the computer (volume label)

6.3.5 Number of files, folders and total capacity of user data
This combination is so unique for each data disk that it will enable the identification of disk. It is possible to obtain this information from the Explorer by marking all files and folders of the root directory of disk, and by subsequent selection of "Properties".

6.3.6 Target operating system
We recommend identifying the operating system, for which the disk is destined, possibly the file systems contained in the master too. This information will prevent any claims on the ground of malfunctioning on the unsupported configuration of computer. We do not carry out on a regular basis the testing of master functionality in older operating systems (Windows 3.xx, 95, 98, ME, 2000, MS-DOS, etc.)!