

Star Wars 30th Anniversary Listening Test

Introduction

May 2007 marked the 30th anniversary of the release of the first *Star Wars* film. Celebration has been relatively subdued with the expected high definition video release yet to come. In August it was announced that the soundtrack will see re-release in November. It therefore seemed timely to revisit the various releases of this classic score.

During a wintry January English afternoon, the author and original recording engineer Eric Tomlinson undertook a subjective listening test in order to select a preferred digital edition of the soundtrack.

The *Star Wars* releases put under the aural microscope comprised:

Original double CD edition

Released in 1986
RSO / PolyGram 800 096-2
Made in Germany

Prepared by John Neal for the 1977 LPs

Henceforth abbreviated to "2PG"



4CD Star Wars Trilogy box set

Released in 1993
Arista Records 11012-2
Made in USA

Mastered by Bill Wolford

Henceforth abbreviated to "4CD"

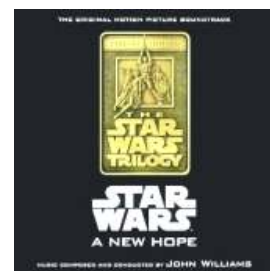


2CD Star Wars Special Edition

Released in 1997
RCA Victor 09026-68772-2
Made in USA

Mastered by Dan Hersch

Henceforth abbreviated to "2CD"



The 2004 edition issued by Sony has been excluded because it is ostensibly the 1997 release reprocessed through Sony's Direct Stream Digital algorithm. The DVD edition that supplemented the *Revenge of the Sith* soundtrack has also been excluded because the *Star Wars* cues were sourced from the 1997 discs and spread to fit a 5.1 configuration.

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Four cues were selected as test subjects and these were:

- 1.) "*The Desert*" retitled "*The Dune Sea*" on the 2CD set
- 2.) "*The Robot Auction*" retitled "*The Moisture Farm*" on the 2CD set
- 3.) "*Ben's Death*"
- 4.) "*TIE Fighter Attack*"

The first two cues offer *ostinatos* orchestrated predominately for strings and woodwinds whereas the latter two offer *forte bellicoso* music involving pounding timpani and extensive brass. It was considered that every section of the orchestra, in a semi-*solo* sense and in concert, would be represented by the cues selected. The study criteria included the texture and sheen of the strings, clarity and intimacy of woodwinds, strength of brass and thunder of the percussion section.

Whilst the "*Main Title*" may appear a careless omission it was excluded because the version heard on the 4CD set does not conform to the performance heard on other releases. All other editions were edited from several takes to match the version heard in the film itself. "*TIE Fighter Attack*" is one particular instance where certain bars from the 4CD set do not match the 2PG release and master edit plan adhered to for the 2CD set. The 2CD set is not immune as there are minor discrepancies in the positioning of edits – some are a bar or two different whereas others are fractions of a second different in timing.

The first two cues are not represented in the same sequence on the 2CD set and were therefore combined to match prior editions.

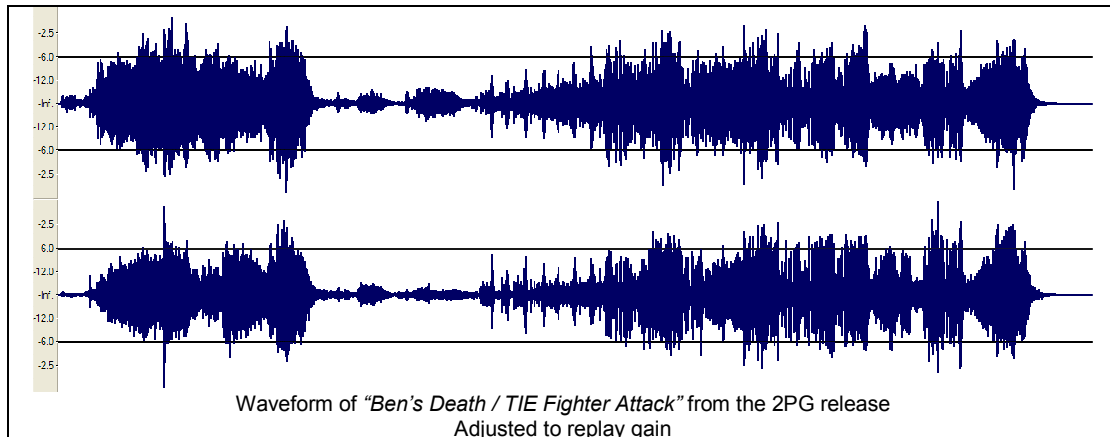
In order to remove any potential bias introduced through loudness, the music was level matched. This was performed in a digital audio workstation with a combination of aural judgement and waveform statistical analysis techniques used to achieve the correct level. A minor reduction to the "*The Desert*" and "*The Robot Auction*" from the 2CD set was made. For "*Ben's Death*" and "*TIE Fighter Attack*" the 2PG set was adjusted to 0 dBFS and the 2CD and 4CD editions attenuated by approximately 5 dB and 2 dB respectively to match. Other than adding consistent silence to the start and end of each track, together with removal of DC offset, no other adjustments were made. The cues were then transferred to a CDR and sequenced according to release date.

In terms of selecting the preferred version, the following criteria were cited:

- 1.) Tonicity
Do the instruments sound realistic? Does the recording have too much bass or treble?
- 2.) Clarity
Are there any issues with transparency? Is stereo image focussed and clean?
- 3.) Technical anomalies
Are there any levelling issues, dropouts, unusual buzzes, hums or pops?

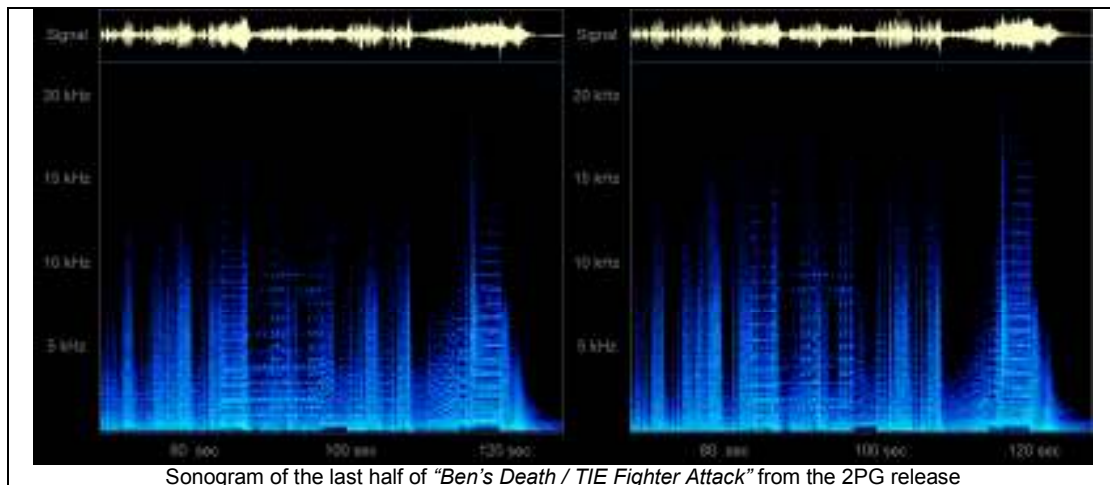
Results And Findings

Star Wars Soundtrack 2LP / 2PG



Whilst John Neal receives a "remixing" credit, this mix is most certainly a reduction of Eric Tomlinson's discrete left, centre, right film mix. The reduction does not always present a level balance between the three channels – stereo image has been narrowed periodically to draw focus to a particular *solo*. For example, the french horn statement of Luke's theme at the conclusion of "The Robot Auction" emanates predominately from the centre compared with left of image on subsequent reissues and within the film itself. Generally, the left channel has a slightly elevated level in relation to subsequent releases and this is most evident in "Ben's Death."

In terms of tone, this is the most muffled release and is by no means harsh or aggressive making it a pleasant listening experience over extended periods. Lowest registers have been attenuated to some degree and this is evident in the low frequency reach of double-basses and timpani. At the opposite end of the spectrum, frequency response extends to above 15 KHz.



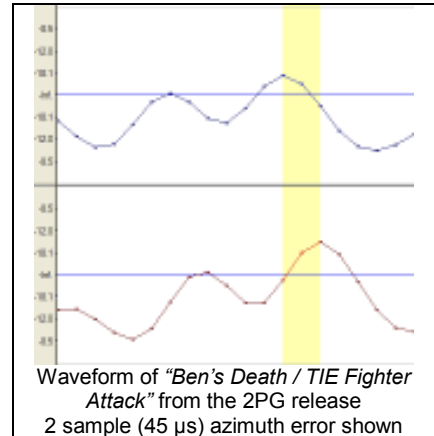
Artificial reverb was employed during preparation of this edition and is particularly noticeable during the flute flourish in "The Robot Auction" and elsewhere on the album during *forte-piano* passages. It is surmised that reverb was utilised to cover analog splices, mask studio noises and reposition the soundstage at a further distance to account for the difference between cinema and home listening environments.

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There is a 2 sample (45 μ s) azimuth error in “*TIE Fighter Attack*” however this can be corrected via delay to the left channel on the 2PG release. Azimuth elsewhere was almost faultless and provided a solid centre of stage. One dropout was detected at approximately 18 seconds into “*Ben’s Death*.” A partial reduction in fidelity of the left channel was also noted approximately 10 seconds later.

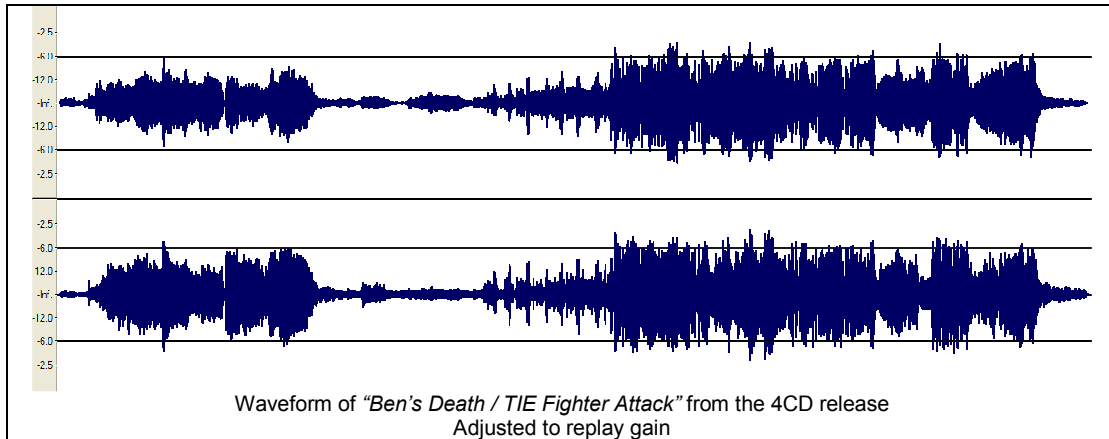
A small quantity of 60 Hz hum is present in all cues – this would have been introduced during preparation of the album master in the USA as the UK operates a 50 Hz electrical system. There is an occasional wow present in some other album cues.

It is also worth noting that the tails of “*The Robot Auction*” and “*TIE Fighter Attack*” have been faded out earlier than on subsequent releases.



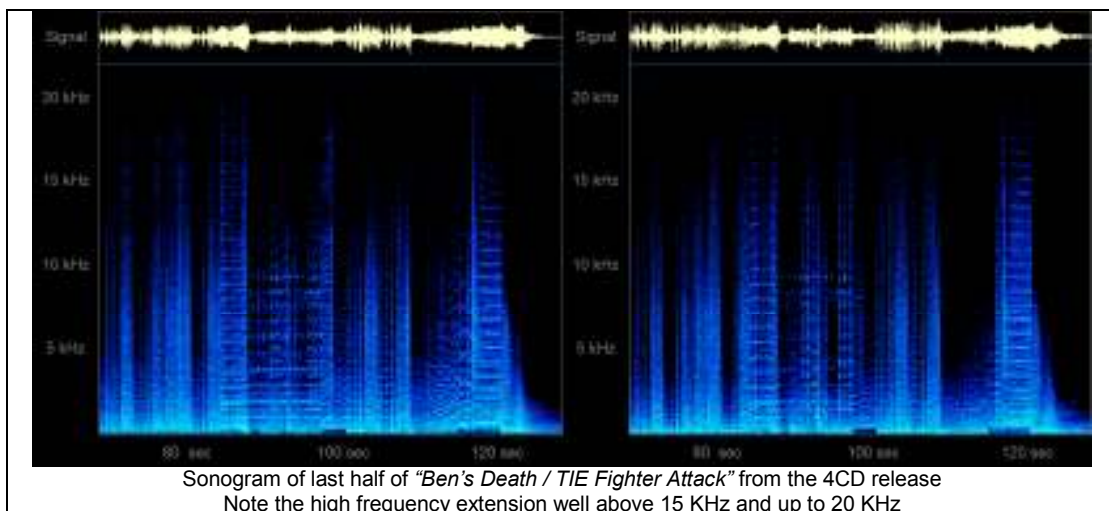
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Star Wars Trilogy 4CD Box Set



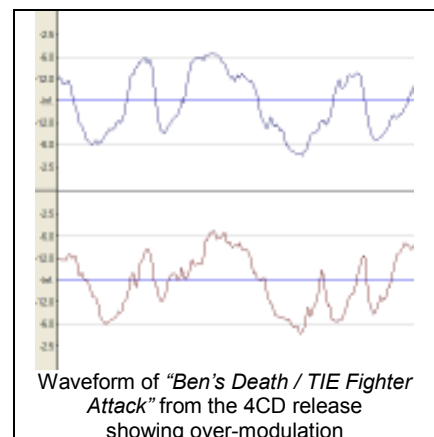
It is understood that this release was prepared from an existing two-track stereo magnetic tape reduction of the discrete left, centre, right film mix. In some cues, the left channel is considered to be three dB lower than intended and this is most evident when assessing the woodwinds in the quiet section of the "The Robot Auction" and by making direct comparisons with the 2PG and 2CD releases.

This edition is the cleanest and most airy however it requires slight attenuation at 125 Hz (lower cloud), gain at 3,400 Hz (midrange) and a tweak at 6,000 Hz (upper midrange) to achieve a more correct tonality.



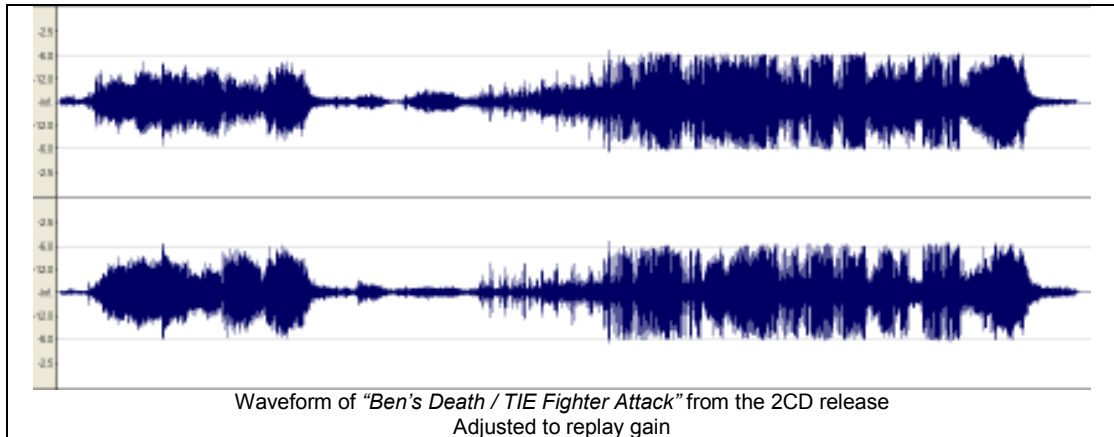
In the cues examined, dynamic range is, rather surprisingly, further restricted compared with the 2PG release. There is over-modulation and consequently harmonic distortion during loud passages. It is surmised that these issues may have been created during transfer to the digital domain and are not concerns with the analog source recording, which, admittedly was somewhat hot to begin with.

There are also minor quibbles with the solidarity of the centre of stage. Although azimuth is generally precise, the centre is a little ambiguous at times. After equalisation in accordance with the suggested parameters the centre does become clearer.



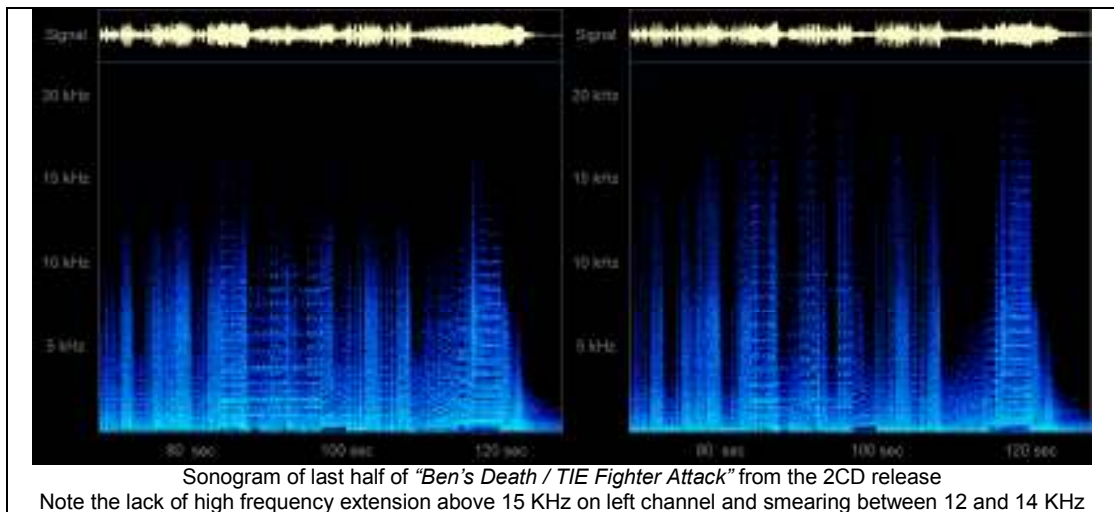
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Star Wars Special Edition 2CD Set

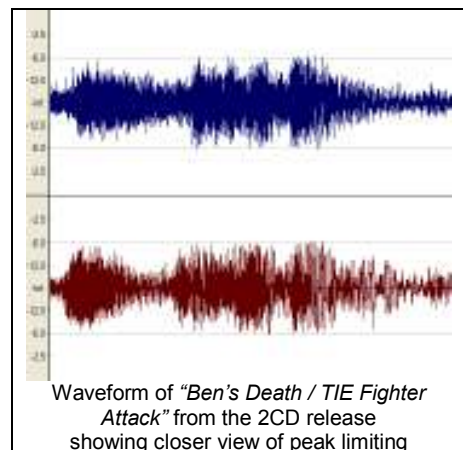


The balance between the left, centre and right channels appears to have been properly achieved during transfer of the three-track 35mm magnetic film for CD. The left channel may have benefited from a gain of one or two dB on "Ben's Death." Azimuth seems correct, as expected. There are no discernable issues with wow that often affects older magnetic film recordings through shrinkage.

Some amount of digital noise reduction has been employed to address concerns with hiss and this has consequently affected the quality and extension of the high frequency response. It is possible that decomposition of the magnetic film stock is also a contributing factor. However, considering that both existing two-track tape and magnetic film sources were used to prepare this edition, it is likely that the application of EQ has a significant role to play. There is a lack of upper frequency extension, above 15 KHz, on the left channel and a smearing between 12 and 14 KHz.



An application of dynamic range limiting during mastering leads to a somewhat fatiguing listening experience. The brass impart a rather harsh and aggressive texture that is most noticeable during "TIE Fighter Attack." Distortion is readily detectable and most prevalent during the brass statement of the Imperial motif and subsequent timpani roll at conclusion of the aforementioned cue.



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Conclusions

Whether the listener enjoys the **Star Wars** music is a matter of preference however its social impact cannot be denied. The score, as issued on double LP in 1977, was for many years the one orchestral soundtrack certain to be found in a modest record collection. Subsequently, there have been three CD releases of significance and all are derived from different source materials. Which release fares best?

Engineer Eric Tomlinson considered that the closeness of perspective heard on the Special Edition (2CD) discs is representative of what he presented in the control room in March 1977. The engineer also preferred the overall tone of the 2CD edition but noted a lack of upper frequency reach. Tomlinson observed that the french horn statement of Luke's theme at the conclusion of "*The Robot Auction*" on the 2PG release had been panned towards the centre. To the engineer, this was an unnecessary modification to his mix.

When compared with the 4CD and 2CD releases, which were issued 17 and 20 years following the original, the first album still has merit today. To this author, the original CD release (2PG) is the only one that enables extended listening periods to be enjoyed without fatigue. It is the most dynamic and tonally soft of any digital release of the **Star Wars** score. The main negative observation is that the balance, more specifically the panning of instruments, is modified during some cues.

The 4CD and 2CD releases are not without their imperfections however the 4CD box set certainly has the widest frequency response and airy sound. It is probably fair to say that, on final assessment, the best, and certainly most complete, release currently available is the 2CD edition. It is a disappointment that this edition does not have the frequency extension of the 4CD issue and has undergone an unnecessary reduction in dynamic range.

It is the opinion of this author that the best sounding **Star Wars** score still awaits public consumption. In late August 2007 it was rumoured that Sony BMG were preparing yet another release of the Original **Star Wars** Trilogy scores. On 29 August an official announcement at www.starwars.com/collecting/news/misc/news20070829.html detailed the content of a box set slated for release in the first week of November.

It seems that the new package will encompass repackaged issues of the 1997 editions together with the **Star Wars: The Corellian Edition** compilation CD. The box set will utilise the original vinyl artwork and include a CD-ROM containing digital copies of the art.

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Recommendations

Regrettably, an excellent opportunity has been unfortunately missed. The time is, and was, ripe to do **Star Wars** the sonic justice that it clearly deserves by creating a truly definitive audiophile issue. To this author this means the undertaking following:

- 1.) Creating an inventory of all analog sources of the **Star Wars** score including:
 - Two-track tapes used for the 1993 4CD **Star Wars Trilogy** box set
 - Two-track tapes used for the 1977 **Story of Star Wars** LP
 - What remains of the 16-track master session tapes
 - Original 1977 two-track album master
 - Two-track reference tapes that may be in the possession of composer John Williams
 - Extant three-track 35mm magnetic film from the original sessions
 - Extant three-track 35mm magnetic film edited for conformance with the film
- 2.) Creating an inventory of all multi-track digital sources of the score including:
 - Three-channel transfers of the 35mm magnetic film (should these exist)
- 3.) Employing Steve Hoffman as the mastering engineer to give the music a “breath of life” and retain its dynamics
www.stevhoffman.tv
- 4.) Engaging Hoffman to remaster all known sources directly from their analog sound units to the digital domain in high resolution
- 5.) Editing and sequencing the cues chronologically as per the 1997 **Special Edition** discs
- 6.) Issuing the resultant work as hybrid hi-resolution SACD discs and a limited edition double LP (see suggested sequence below)
- 7.) Preparing new liner notes that chronicle the creation of the music rather than describing scenes that it accompanies. Make extensive use of existing interviews and conduct new interviews, where possible, with the creative team including: John Williams, Ken Wannberg, Herbert Spencer, Eric Tomlinson and members of the London Symphony including trumpeter Maurice Murphy
- 8.) Using the original 1977 LP artwork
- 9.) Issuing a DVD video disc counterpart featuring the 1980 BBC **Star Wars – Music by John Williams** documentary on the scoring of **The Empire Strikes Back**. The DVD disc should also feature extant cine-film from the **Star Wars** and **Return of the Jedi** scoring sessions and the Prequel Trilogy together with still photographs and new interviews with John Williams

In addition the following criteria should be observed:

- 1.) Utilising the original film mixes – no extra reverb or trickery – unless source material is damaged beyond repair
- 2.) Engaging original engineer Eric Tomlinson as a creative consultant – he would appreciate being involved
- 3.) Issuing hybrid SACDs with left, centre, right three-track sound would be desirable however two-track would be entirely acceptable

The result would, without doubt, be the definitive soundtrack issue for generations to come. Those of the iPod generation who have a predilection for dynamic range limiting and a fear of tape hiss can continue to listen to their dehisssed, muffled and track slammed 1997 **Special Edition** discs, in particular **Return of the Jedi**.

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Suggested Double LP Sequence

A suggested sequence for a proposed double LP edition is shown below. The alternate “*Binary Sunset*” cue and “*Main Title*” archive have been omitted due to time constraints. The length of Sides 3 and 4 is of some concern in relation to preserving full fidelity on the vinyl medium. It is suspected that these will need to be cut at a lower level, and with more care, than Sides 1 and 2. For an experienced audiophile cutting engineer, such as Kevin Gray, this should be achievable.

| Side-Band | Title | Time |
|-----------|--|--------------|
| 1-1 | <i>20th Century Fox Fanfare (1954)</i> | 0:23 |
| 1-2 | <i>Main Title / Rebel Blockade Runner</i> | 2:14 |
| 1-3 | <i>Imperial Attack</i> | 6:43 |
| 1-4 | <i>The Dune Sea of Tatooine / Jawa Sandcrawler</i> | 5:01 |
| 1-5 | <i>The Moisture Farm</i> | 2:25 |
| 1-6 | <i>The Hologram / Binary Sunset</i> | 4:10 |
| | | 20:56 |

| Side-Band | Title | Time |
|-----------|---|--------------|
| 2-1 | <i>Landspeeder Search / Attack of the Sandpeople</i> | 3:20 |
| 2-2 | <i>Tales of a Jedi Knight / Learn About the Force</i> | 4:29 |
| 2-3 | <i>Burning Homestead</i> | 2:50 |
| 2-4 | <i>Mos Eisley Spaceport</i> | 2:16 |
| 2-5 | <i>Cantina Band #1</i> | 2:47 |
| 2-6 | <i>Cantina Band #2</i> | 3:56 |
| | | 19:38 |

| Side-Band | Title | Time |
|-----------|---|--------------|
| 3-1 | <i>Princess Leia's Theme</i> | 4:27 |
| 3-2 | <i>The Millennium Falcon / Imperial Cruiser Pursuit</i> | 3:51 |
| 3-3 | <i>Destruction of Alderaan</i> | 1:32 |
| 3-4 | <i>The Death Star / The Stormtroopers</i> | 3:35 |
| 3-5 | <i>Wookiee Prisoner / Detention Block Ambush</i> | 4:01 |
| 3-6 | <i>Shootout in the Cell Bay / Dianoga</i> | 3:48 |
| 3-7 | <i>The Trash Compactor</i> | 3:07 |
| | | 24:21 |

| Side-Band | Title | Time |
|-----------|--|--------------|
| 4-1 | <i>The Tractor Beam / Chasm Crossfire</i> | 5:18 |
| 4-2 | <i>Ben Kenobi's Death / TIE Fighter Attack</i> | 3:51 |
| 4-3 | <i>The Battle of Yavin</i> | 9:07 |
| 4-4 | <i>The Throne Room / End Title</i> | 5:38 |
| | | 23:54 |