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Extended Range Guitars:
Cultural Impact, Specifications, and the Context of a Mix

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Abstract

This article addresses the cultural and historical significance of the modern interpretation of extended range guitars while also discussing specifications of the instruments and the context of a mix. The extended range guitar refers to the added strings on a traditional six string guitar by adding a seventh, eight, and even ninth string to the electric guitar. First, this article explores how artists such as Steve Vai, Korn, Meshuggah, and Animals As Leaders have impacted and shaped the commercial creation, success, and cultural effects on the musical community with these extended range guitars, specifically within heavy metal. Secondly, it examines the specifications of the extended range guitars, such as scale length, string gauges, hardware, wood, and price in relation to seventh, eighth, and ninth strings. Lastly, it discusses how to approach a mix with extended range instruments, considering that these guitars are now interfering with low frequencies in relation to a drum kit and bass guitar.

Commercial History of the Extended Range Guitar

An extended range guitar generally refers to a guitar with added strings. These extra strings are usually used to add a lower range on the guitar between a fourth and/or an octave in range. These guitars have been met with negativity due to the oversaturation of bands only using these low open strings for most or their entire repertoire of songs. Yet, there have been certain bands, such as Meshuggah, Korn, and Animals As Leaders, that have showcased as to what can be achieved and played on these extended range guitars. With these guitars commercially available on the market, many companies have their own personal take on these guitars, such as body type, scale length, and hardware to showcase the tonal and timbral qualities of these instruments. Also, these guitars have also changed as to how they are mixed within the context of a song when they are using multiple layers of extended range guitars, bass, and drums.

Steve Vai played a large role in producing the first mass market seven-string guitar. In collaboration with Ibanez Guitars, Steve Vai released a signature guitar series called the Ibanez JEM model, which happened to be a precursor to the extended range guitar models. In an interview with Steve Vai, Vai recalls that he had a conversation with someone from Ibanez from about creating an eight-string guitar, but Vai questioned him as to how it would be built or played. This then caused him to realize that the creation of a seven-string guitar would open up a world of possibilities for rock and heavy music (Vai 2010). Vai then convinced the luthier from Ibanez to make a seven-string guitar that resembled his JEM signature model, but refused to let the seven-string guitar be another Steve Vai signature guitar. The Ibanez Universe 7 (UV7) string guitar was released in 1990 and came with the standard tuning of B-E-A-D-G-B-E. It featured the tuning of a standard six-string guitar and the seventh string was tuned a fourth below

the low E to a B natural or B1 on a piano. The UV7 featured a 25.4” neck, a single maple piece neck, and neck, middle, and bridge pickups with a five-way selector switch [Figure 1] (Sweetwater Ibanez UV7). The Ibanez Universe 7 was the first commercially available seven-string guitar on the market.

Figure 1: Ibanez Universe 7



Once the Ibanez UV7 was released, it spawned new metal sub-genres with bands like Korn and Meshuggah. Korn’s 1994 self-titled debut album established the sub-genre of ‘Nu-Metal,’ which is a combination of heavy metal with the use of hip-hop electronics, and helped popularize the seven-string guitar (Hart). Korn approached this album by tuning the seven-string guitar one step below standard tuning, from B-E-A-D-G-B-E to A-D-G-C-F-A-D (low-to-high). James ‘Munky’ Shaffer was influenced by Steve Vai’s 1990 *Passion and Warfare* album, which also featured the Ibanez UV7 (Shaffer). In an interview with *Ibanez Guitars*, Munky says that he knew that he was meant to own the UV7 guitar, because it opened up

creative opportunities for the guitar (Shaffer). Since the added range allowed to achieve certain aspects of the guitar that were not as easily available on a six-string guitar. Once he owned the UV7, Munky claims that the music and band started to take off (Shaffer). With the accessibility of the extended range guitar, Munky was able to expand his musical repertoire and develop music on the seven-string guitar. According to Munky, their approach to the guitar is very rhythmic, and they compliment the range of the instrument by having one guitarist playing the lower register of the instrument while having the other playing the higher register (Hart). This creates a sense of balance within a mix and song structure while leaving space in the mix for bass, drums, and vocals. Korn's music then comes to a full circle when Steve Vai acknowledges in a 2010 interview with Ibanez that he recognized the timbre and tone of the Ibanez UV7 guitar when he first heard Korn's "Blind" on the radio. Korn has recently celebrated the twenty-year anniversary of their self-titled debut album (Vai 2010). Ibanez guitars and Munky have now collaborated in creating a signature seven-string guitar called the Ibanez APEX200 and APEX20. Like its predecessor, the APEX200 and APEX20 is based on the Ibanez UV7 model. Munky wanted to take all of the best parts of the UV7 and combine them with his own specs for his signature model (Shaffer). The Ibanez APEX200 features a five-piece maple/wenge neck, a 25.5" scale neck, and passive DiMarzio Blaze pickups. The guitar comes in a factory tuning of A-D-G-C-F-A-D (low-to-high), with a floating bridge, and at a price point of \$2,599. Ibanez has also manufactured an affordable version of the APEX200, the APEX20. The APEX20 features 25.5" scale neck, passive DiMarzio Blaze pickups, and a factory tuning of A-D-G-C-F-A-D (low-to-high), but it has a three-piece maple neck, a fixed bridge, and a price point of \$899. The APEX models do have similar specifications in terms of scale length and passive electronics.

Like Korn, Meshuggah, a heavy metal band from Sweden, have also played a large factor in the popularity and use of the seven-string guitar. Since their inception in 1987, Meshuggah has been internationally recognized for their music, and their guitarists, Mårten Hagström and Fredrik Thordendal, are recognized as some of the leading figures of the extended range guitar. Meshuggah's back catalogue has been incorporated into courses at Boston's Berklee College of Music for their metric complexity and their significance in modern music (Charupakorn and Nuclear Blast). Meshuggah debuted their first album in 1991, but according to Josh Hart of *Guitar World* magazine, the album only features down-tuned six-string guitars. Fredrik Thordendal, guitarist of Meshuggah, mentions that he wanted to be able to play low notes on the guitar and when Ibanez released the UV7, he claims that he was able to fully realize his creative potential (Hart). Like Munky Shaffer from Korn, Fredrik Thordendal felt that with extended range guitars, he was able to fully realize his creative potential.

Meshuggah released their 1994 EP, *None EP*, which not only features the debut of their rhythm guitarist Mårten Hagström, but also showcases some of the possibilities of the seven-string guitar. While *Destroy. Erase. Improve.* marks as one of their most influential works, the *None EP* has also had a large impact in the heavy metal community, both of which feature the use of the seven-string guitar. The *None EP* has helped define the signature sound of their band and has influenced the heavy metal sub-genre called 'Djent' [jen-t] (Thompson). Djent was originally used as an onomatopoeic device to describe the tone and play style on the guitar, especially on the *None EP*. By definition, 'Djent' is a heavily palm muted note and/or stacked power chord on the lower register of the guitar with the use of staccato rhythms (Thompson). Misha Mansoor of the Progressive Metal band Periphery, helped coin the term for the sub-genre

when he used the word ‘Djent’ to describe the tone and sound of the guitar in an online forum (Okubo and Mansoor). The description was simply ‘djent, djent, djent’. Misha Mansoor and Marc Okubo, guitarist of Veil of Maya, argue that the prime example of what is considered Djent would be the song “Aztec Two-Step” from Meshuggah’s *None* EP. There is a notable connection between the song and the onomatopoeic device of ‘djent,’ especially since most of song consists of these heavy palm muted and staccato power chords. This is significant because Meshuggah was able to achieve that tone, or ‘Djent’ with their seven-string guitar. With the use of the seven-string guitar, Meshuggah directly influenced a new sub-genre and developed progressive metal with the *None* EP and *Destroy. Erase. Improve.* which later influenced future releases of countless bands, such as Periphery, Animals As Leaders, Tesseract, and After The Burial that predominantly feature the use of either a down-tuned six-string guitar, a seven- and/or eight-string guitars.

Their 1995 release, *Destroy. Erase. Improve.*, also features the use of an Ibanez UV7 guitar tuned a half-step down from standard tuning, low-to-high, Bb-Eb-Ab-Db-Gb-Bb-Eb. This release features a very rhythmic and syncopated approach to the music, while featuring complex time signatures and harsh metal style vocals. Many of the songs on this album are played on the lower register of the seven-string guitar, but it is balanced with solos on the higher register of the instrument. *Destroy. Erase. Improve.* has been recognized as one of Meshuggah’s most influential albums to the heavy metal musical genre and community (Nuclear Blast). Meshuggah’s potential is fully realized through the extended range guitar and during the mid-to-late nineties, Meshuggah continued to play a large role in popularizing the seven-string guitar.

While Meshuggah helped popularize the seven-string during the nineties, they are also widely recognized for their use of the eight-string guitar. Before recording their fourth studio album in 2002, *Nothing*, the band members were considering the idea of recording an experimental album with only bass guitars (Hagström). While the idea of a bass-only album did not follow through, they did however approach a guitar luthier from Sweden named Fredrik Nevborn of Nevborn Guitars to build them guitars with a wider range. Mårten Hagström and Fredrik Thordendal asked him if he was willing to create a set of eight-string guitars for their upcoming album and tour. Nevborn agreed to make them these custom eight-string guitars, but unfortunately, their custom Nevborn eight-string guitars were not ready in time for the studio sessions (Hunter). As a result, they tracked their album with the use of their seven-string guitars and down-tuned them to F-Bb-Eb-Ab-Db-Gb-Bb (low-to-high), which is essentially the tuning related to their eight-string models. While *Nothing* did not use eight-string guitars on this album, it was the first to use these extremely low-tunings on the seven-string guitar.

Once Meshuggah received their custom eight-string guitars, they used them on the tour to support their album *Nothing*. The Nevborn Sleipner 8XL guitar featured a 29.4" scale neck with a three-piece maple and bubinga neck-through design. The guitar featured passive Lundgren 8 prototype guitar pickups that eventually led to the signature Lundgren M8 pickups (Allen). These eight-string guitars are tuned F-Bb-Eb-Ab-Db-Gb-Bb-Eb, the lowest note being F1 on a piano. However, the Nevborn models were retired after their tour due to tuning and stability issues with the instrument. According to their guitar technician, Allen Hunter, the Nevborn eight string guitar prototype was the the guitar that paved the way for the creation of a commercially available eight string guitar model.

Before the release of the Ibanez's eight-string model, this type of guitar was only available through custom orders. However, Ibanez decided to follow through with the release of the eight-string model because they recognized that Meshuggah had a wide audience and figured that there was a market for eight-string guitars (Wallace). Ibanez unveiled and released the Ibanez Prestige RG2228 model during the 2007 NAMM show, which became the first eight-string guitar available to the market (Figure 2). The RG2228 model was based off of the Ibanez RG model, with a baritone scale length of 27", active EMG 808 pickups, and a bolt-on, five-piece maple/wenge neck with a rosewood fingerboard. While Meshuggah did inspire the release of the RG2228, it has also managed to inspire other musicians to pick up the eight-string guitar and expand the instrument to its full potential, just as Steve Vai envisioned with the release of the Ibanez UV7.



Figure 2: Ibanez RG2228

Meshuggah's collaboration with Ibanez eventually led to a signature eight-string guitar series, the Ibanez M8M model. The signature Ibanez M8M model features a 29.4" neck with an alder body and a single Lundgren M8 humbucker bridge pickup specifically made for this guitar, and the instrument carries a price tag of \$5,999. As a result, Ibanez later released a more affordable version of the signature guitar called the Ibanez M80M under their Premium line. The Ibanez M80M features an ash body, a five-piece maple/walnut bolt on 29.4" neck with single Lundgren M8P humbucker pickup (Sweetwater Ibanez M8M and M80M).

One of the leading figures of the extended range guitar is Tosin Abasi from Animals as Leaders. Tosin Abasi has been recognized by *Guitar World* magazine as the "leading figure and undisputed champion of the eight-string guitar" (Di Perna). Abasi was influenced both by Steve Vai and Meshuggah, and thus they inspired him to pick up the seven and eight string guitar. Abasi mentions that he felt that it was redundant for him to tune down his six-string guitar to a low tuning of B-E-A-D-F#-B since there was an option to add an extra string and not have to tune down his instrument at all, while losing his highest string (Abasi 2010). In an interview with Alan Di Perna from *Guitar World* magazine, Abasi states that he was attracted to the timbre of the guitar, since it did not sound like a bass or a guitar when he first heard it. Abasi then approached a luthier to build him an eight-string guitar since they were not commercially available at the time (Abasi 2010 JamPlay). After releasing his self-titled debut album, *Animals As Leaders*, in 2009, which then turned into a trio band, Abasi was recognized not only for his virtuosity and songwriting abilities, but also for his experimental approach and technique on both the seven and eight-string guitar (Di Perna). Abasi saw online fame by playing his songs for

EMG TV where he is seen playing an Ibanez RG2228 (Abasi 2010 EMGtv). Tosin Abasi is a prime example of showcasing what can be done with an extended range guitar with metal, but most importantly how it can be used outside of metal.

Just as Ibanez recognized the fame of Meshuggah's music and acknowledged that there is a market for eight strings guitars, Ibanez collaborated up with Tosin Abasi and made two signature eight string guitars in 2013 and 2014, the Ibanez TAM100 and the TAM10. TAM100 being the Prestige edition and TAM10 the Premium and more affordable version of the guitar. The TAM100 features a 27" neck with a five-piece wenge/bubinga neck, passive Dimarzio Ionizer 8 pickups (making it the first eight string guitar to feature single-coil pickups), and a price tag of \$4,000 (Figure 3). The TAM10 features the same electronics at the TAM100, but varies in quality of the wood, inlays, and hardware, such as a hipshot-through-body bridge rather than the Fixed Edge III bridge on the TAM100.

Figure 3: Tosin Abasi and his signature Ibanez TAM100



Tosin Abasi has also managed to break some of the stereotypes of the extended range instrument. Greg Kennelty, a journalist for *Metal Injection*, wrote that the metal community has been overly saturated with low-end riffs when it comes to extended range guitars. While bands like Meshuggah and Korn are known for their low-end riffs, Abasi has brought Steve Vai's vision of the potential of the extended range guitars by creating a fusion of genres (metal, jazz, classical, and electronic). Once explained, Abasi's approach to the instrument is relatively easy to understand. First and foremost is Abasi's tuning of the eight-string extended range guitar. Abasi sets the tuning of the instrument, from low-to-high, as E-B-E-A-D-G-B-E. The eight-string is dropped to an open fifth interval below the lowest B note on the guitar instead of the fourth interval of F#. Abasi reasons in an interview with *JamPlay*, that by saying that by having the low-E as a fifth, he is able to have three open E strings on his guitar and the quality of the chords will not change if he were to bar across the frets (Abasi 2010 JamPlay). Also, Abasi mentions that it helps break up the monotony of playing through scales and note values and forces him to have creative ways to implement the fifth of the instrument (Abasi 2010 JamPlay). Abasi showcases options on the extended range guitar that are not as common and is able to bring the the guitar to its full potential.

As a result of the popularity of the eight-string guitar, Ibanez decided to create a nine-string guitar model. In the Winter 2013 NAMM show, Ibanez first unveiled the RG9 prototype which features a 28" neck with Lace Deathbar pickups and is tuned, low to high, C#-F#-B-E-A-D-G-B-E (Figure 4). With the introduction of nine string model, there has been a mixed reception between musicians and the online community. Chris Alfano, of *Gear Gods*, wrote an article reacting to this specific RG9 prototype. The seven-string guitar does not fully

reach into bass guitar territory, but when the eight-string was introduced, that changed. The nine-string guitar will definitely cross over into bass territory and range. Alfano mentions that when the eight string was introduced, it was also met with negativity and the simple question of “Eight strings on a guitar? Why?” Alfano states that with the introduction of the nine string guitar, it further narrows the gap between guitar and bass.

Figure 4: Ibanez RG9 Prototype



At the Winter NAMM 2013 show, Ibanez showcased their nine string model which would be sold to the masses after the NAMM show (“NAMM 2013 - Ibanez RG9 Prototype 9 String Guitar”). Like its previous prototype, it offers a 28” neck with jumbo frets and QM neck and bridge pickups for a list price of \$1,200. Ibanez is also releasing a Prestige RG90BKPISH with nine-string Bare Knuckle pickups in late 2014. Schecter guitars also released its own version of the nine-string guitar called the Hellraiser C-9 model with a 28” neck, EMG 909 pickups, mahogany body, and a price of \$999 (Schecter Guitars). As of August 2014, Mårten Hagström and Fredrik Thordendal posed for a German guitar magazine, and what stands out from that picture is that Hagström is seen holding the new Ibanez Prestige RG90BKPISH. While

it has not been confirmed by the band, having them pose with the nine-string guitar goes to show that they have considered using the newest addition of extended range instruments (Kennelty). Especially since they played such an integral part in having the eight-string guitar model publicly available for the mass market, their adoption of the guitar would be particularly significant, especially considering that they have played a large role in the commercial success of the eight-string guitar. In addition, on Meshuggah's *Nothing* album, the lowest note on the guitar for the song "Spasm" is a Bb/A#, which is one and a half steps lower than that of a stock tuning for a nine-string guitar.

This then leaves the question as to what exactly you can do with a guitar that has nine strings. Greg Kennelty of *Metal Injection* offers a possible solution by simply saying, "Are you creative enough to do something amazing with these instruments?" Tosin Abasi mentions that having an eight-string guitar has opened up a creative state of mind that was not available to him with a six- or seven-string guitar (Abasi 2010 JamPlay). There may be bands that specifically focus on playing on the lower register of these instruments, such as After the Burial and Glass Cloud. Meshuggah takes a very rhythmic approach to the extended range instrument, but many of their songs are played on the lower register of the guitar. Hagström from Meshuggah stated that upon receiving the eight-string guitar, he had to rethink as to how he approached the extended range guitar due to its scale length and the added strings. There is also the option of using the extended range guitar outside of the metal genre. For example, Tom Lippincott, a jazz musician who custom ordered an eight-string guitar since he suffered from what he considered 'pianist envy.' Lippincott's approach to the extended range guitar is based around a jazz approach but uses the lower strings for wide interval chords that can only be achieved with a

piano (Lippincott). Yet, the extended range guitar is still seen as an instrument that is exclusively seen to be played in heavy metal, and there is nothing wrong with that. Kennelty also mentions that bands like the Ramones and Black Sabbath use minimal amount of chords on their songs, but still manage to get their message across. As for the extended range guitar, it may be likely that those that play these type of guitars are inspired to write these types of riffs and songs because it not conventional or easily available on a standard six-string guitar. And of course, there is also the approach to write very intricate songs and fuse genres, but it is all leads back so to what the extended range guitar can inspire and how it allows one think outside of established norms of guitar and challenge the guitar medium.

Scale Length and String Tension

When playing or purchasing extended range guitars, one has to take into consideration the scale length of the necks. Although it is not always considered, the scale of the neck plays a large factor in both the tone, timbre, and playability of the instrument. The length of the neck affects the spacing of the frets, the length of the strings used, and how much tension is placed on the body and neck of the guitar from the strings. The tension on the body and neck affects the tension on the strings once they are tuned and set with the proper action and intonation of the (Nuccio). A Gibson LesPaul generally has a 24.5” neck, and a Fender Stratocaster can have a 25.5” neck. In this case, a Gibson Les Paul will require less string tension than a Fender Stratocaster to reach a standard tuning at concert pitch, even if the string gauge is identical. In this case, the Gibson will have a looser or “slinky” feel to the strings and the Fender will have a tighter tone in comparison (Nuccio). In contrast, a guitar with a shorter neck will be more

susceptible to fret buzz with higher gauge strings since the tension will not be as high and can cause the string vibrations to be wider in turn.

After the length of the guitar neck exceeds 25", it may fall into the category of baritone guitars. Baritone guitars vary between 26" to 30" scale length necks. The added length adds a higher string tension to the neck, which can result in the guitar having better intonation, especially if the guitar is set in a lower tuning (Jones). According to Thomas Jones of Premier Guitar, the sustain of the baritone guitar is also extended due to the added length of the neck, while also providing a slightly faster attack as well. The attack and release of the strings can be greater in lower tunings to when compared to guitars with a 24" or 25" neck, due to the balanced tension of the strings over a longer neck rather than a shorter one (Figure 5).

Figure 5: Six-string guitar models and their scale length (Jones)

Fender Duosonic	22.5"
Gretsch 6120	24.6"
ESP LTD EC-1000	24.75"
Gibson LesPaul	24.75"
Carvin DC600	25"
Danelectro	25"
PRS SE Custom 24	25"
Jackson Soloist	25.5"
Fender Stratocaster	25.5"
Ibanez Prestige RG652	25.5"

As for extended range guitars, the length of the neck has to be adjusted to match that of the added tension on the neck and body of the guitar. Production models of seven-, eight-, and nine-string guitars are set-up differently according to the manufacturer (Figure 6). Ibanez UV7 seven-strings are made with a 25.5” neck, which is the same as a six-string Fender Stratocaster, Jackson Soloist, and many other six-string guitars. The length of the neck does not have to be as long as its eight- or nine-string counterpart, since that scale length is able to properly sustain the standard tuning of the low B. Yet like any other guitar, it can access lower tunings with a proper guitar set-up and ideal string gauge. Once the eighth and ninth string are introduced to the guitar, the length of the neck is extended. Eight-string guitars can vary between 26.5” to 30” in neck length (Figure 7). Nine-string guitars are generally longer in neck length between 28” to 30” (Figure 8).

Figure 6: Seven-string guitar models and their scale length

PRS Custom 24 7-String	25.5”
Mayones Regius 7	25.4”
Carvin DC700	25.5”
Ibanez UV7	25.5”
Jackson Pro-DK7	25.5”
Music Man JP BFR 7	25.5”
ESP E-II Horizon FR-7	25.5”
ESP E-II Horizon NT-7	27”

Figure 7: Eight-string guitar models and their scale length

Jackson Soloist 8	26.5"
Ibanez RG2228	27"
Washburn Parallaxe PXM18	27"
ESP E-II HRFT NT 8-B	27"
Agile Septor 827	27"
Carvin DC800	27"
Schecter Hellraiser C-8	28"
Ibanez M8M	29.4"

Figure 8: Nine-string guitar models and their scale length

Ibanez Prestige RG9	28"
Hellraiser C-9	28"
Agile Septor Elite 928	28.625"
Unga Chameleon	30"
Legator JTS Ninja 300 9-String	30"

Perry Vasquez, a luthier from Salinas, California, makes custom guitars under his brand Unga Guitars and has had experience in building a nine-string extended range guitar. Vasquez argues, "I think the ERG's (extended range guitars) aim mostly at accessing lower registers. Lower tunings require bigger strings. Bigger (gauge) strings set to lower tunings require longer

scale lengths.” Vazquez custom made a nine-string guitar set with a seven-piece neck and a scale length 30” neck. Vasquez wanted the guitar to reach the lower tunings without compromising the tone and timbre of the lower strings.

There are guitar manufacturers in the market and luthiers who make multi-scale guitars, for both extended range and non-extended range. The concept of the Fanned-Fret guitar was originally trademarked and patented by Ralph Novak of Novax Guitar. Novak’s goal was to make an new aesthetically pleasing and more playable version of the guitar. With the concept of the Fanned-Fret, Novak was able to have his guitars more adaptability to altered tunings, increased tuning range, enhanced harmonic definition and better control of the string tension (Novak). While the trademark is not owned by Novak anymore, he still owns the patent for Fanned-Frets, and thus other companies have to use the term multi-scale (Vasquez). Companies such as .strandberg* Guitars, Rick Toone, and Mayones Guitar and Basses make customized guitars where the use of multi-scale necks are incorporated along with the extended range guitar. Ola Strandberg, founder of .strandberg* Guitars, has built his reputation on making multi-scale, extended range, and headless guitars. Currently, .strandberg* offers offers production models for six-, seven-, and eight-string guitars called Boden 6, 7, and 8. The Boden 7 offers a scale length neck that starts at 25” at the first string and gradually increases to 25.75” to the seventh. The Boden 8 model has a wider range in length, the neck at the first-string is set to 26.5” and gradually increases to 28” to the eight-string. While .strandberg* offers production models, they are known for creating custom and “made to fit” according to the length specified by the guitar players. Their guitars have been made popular by artists such as Tosin Abasi from Animals As Leaders, Paul Masvidal from Death/Cynic, Chris Letchford from Scale the Summit, Misha

Mansoor from Periphery, and Al Mu'min from The HAARP Machine (Strandberg 2013).

.strandberg* is one of the companies that is utilizing unconventional shapes and experimenting with the guitar as to how it is played and approached, which goes along the lines of the extended range guitar.

Even more unconventional than Ola Strandberg's guitar design, Rick Toone offers multi-scale instruments built with non-traditional tools. Rick Toone focuses on creating ergonomic guitars that are made to measure to the physical dimension of the guitarist. Toone utilizes an all aluminum neck with a multiscale feature similar to .strandberg* guitars, and their guitars are also headless. Rick Toone received recognition for his work when he built Tosin Abasi, of Animals As Leaders, a one-of-a-kind eight-string guitar named 'Blur' (Toone 2013). The first six strings E-A-D-G-B-E, are set at twenty-four frets, while the seventh and eighth strings have twenty-six. The built-in capo allows the guitarist to raise the pitch of the lower two strings by a minor third. The top of the neck is where the extra frets and the capo are located (Figure 9). The standard tuning, from low-to-high, is E-B-E-A-D-G-B-E, but with the added frets on the lower two strings, it can actually reach a tuning of C#-A-E-A-D-G-B-E, low-to-high (Reyes and Abasi). In this case, Abasi and Reyes do not have to own or play a nine-string guitar in order to reach these low-tunings but can do so with a built in capo to the guitar where there are extra frets for the lower strings.

Rick Toone mentions that his main motive for creating these ergonomic guitars is to make them as comfortable as possible by mimicking the motions of the human body, while also allowing the guitars to reach their optimal pitch with a specific scale per string. The scale length of the high-E string is set at 25.625" while the eight string is set at 27.75". Toone argues, "The

24 5/8" high E on the 8-string allows for warmer tones and easy bends...it is basically a Les Paul in terms of performance” (Toone 2014). For example, the 27 3/4" scale length of the low F# on the 8-string allows tight crisp punchy bass without string flop. Toone’s goal is to have the best features and tone similar to a Gibson Les Paul available while also allowing the best intonation and tone on the extended range guitar without having to compromising the tension of the lower string by having the guitar set at one specific scale length.



Figure 9: Rick Toone’s ‘Blur’ with an ergonomic, aluminum neck, with added frets at the top of the neck

Mayones Guitar and Basses, based out of Poland, is a mid-level company that makes production models and customized guitars and basses that utilize traditional scale length and body material as well as multi-scale instruments. Their extended range guitars have the option of being made with our without the multiscale function. For example, the Regius 7 is set at 25.4” scale length or a baritone scale length of 27”. The Regius 7 V-F simply utilizes both of the scale

length in a single guitar, which is set at 25.4” and gradually increase to 27” for the seventh-string. The Regius 8 is set at a scale length of 27” and the Regius V-F Multiscale is also set at 25.4” to 27”. While Mayones guitar are set at a high price, they offer many options for guitar players of extended and non-extended range guitars.

One of the main factors in deciding upon the scale length of the guitar has to do with the tuning that the player wishes to reach. After contacting multiple string companies, each one has its own approach as to how to reach the best possible tuning and stability of the instrument in regards to extended range instruments. According to Jon Moody of GHS Strings, there is not a set of recommendations for extended range guitars and gauges. Moody mentions that it ultimately lies with the guitar player and their personal reference:

[A] guitarist playing in a progressive metal group that relies on thick, chunky chords with a lot of low end definition may rely on a ‘medium’ set of strings for their guitar, whereas a guitarist playing in another progressive metal group that likes a darker, more rattling type of tone would opt for a ‘extra light’ set of strings, or in the case of some of the greats, grab a ‘heavy, set and tune it down.

In contrast, DR strings recommend their eight-string pack called TiteFits gauged from .010 to .075 and .011 to .080 sets. D’Addario provided a link that redirects to their page named “String Tension Pro” where guitarists can apply the exact specifications of their guitars and make their own set of strings or base a set on an already existing pack. Ernie Ball replied with “Your instrument should be set up for the optimal gauges by the manufacturer. They should be able to let you know what the gauges are that are intended for your instrument.” Their representative then lists their set of eight-string packs, which feature a gauge from .010 to .074 and Skinny Top

Heavy Bottom set from .009 to .080. They then follow this by saying that no matter what the instrument uses, the guitar still has to be set-up to a specific gauge. GHS strings reiterated what Perry Vasquez said, that it ultimately lies on the tuning, comfort, and feel of the musician in order to get the best possible result and tone for their instrument and their style of music. Rick Toone argues that there are no compromises in terms of string gauge for an extended range guitar, but mentions that the scale length of the neck will affect the tone of the instrument and will slightly more difficult to bend the higher string due to their added tension of the scale length (Toone, 2014) The guitar simply has to be set-up to the desired pitch and gauge, while considering the scale length of the instrument and just how low one want to go in terms of tuning.

Mixing with Extended Range Guitars

Mixing with extended range guitars may present challenges that are not as common with six- or down-tuned six-string guitars. However, knowing what needs to be achieve before anything is tracked is a vital aspect that will ultimately affect the mix. Mixing goals might include wanting to achieve a tight sound with a seven- or eight-string-guitar, or having a “wall of sound” with all of the instruments present in the mix.

One of the main concerns in mixing with extended range guitar deals with overabundance of low-end frequencies in a mix. It can vary between guitars but there can be a lot of competition in these regions when factoring layered guitars, bass, and the drum set, specifically the kick and toms. For starters, the source tone of the guitar plays a very important role, since it will ultimately affect how the tone from the amp sounds and the overall mix. The hardware, wood,

and construction of the instrument will determine how much mids and low end are present in the source tone of the guitar (Mynett). Lower-end models, especially for extended range guitars, may have a rhythm sound that is not as desired and will require heavy processing and/or equalizing later on in the mixing stage. These type of models generally have lower wood qualities on the body and/or neck that cause the overall tone to not sound as tight as it should (Mynett). Also, depending on the tuning, whether the guitarist is using a down tuned six-string guitar or an extended range guitar, having the proper set-up before hand is important. Changing the strings will cause the guitar tone to become brighter and have a higher clarity, whether it is a lead or rhythm part.

Before tracking the guitar itself, knowing how to achieve the proper tone from an amplifier also plays a very important role in the mix. In order to help differentiate the extended range guitars from the bass, ideally, the low end of the EQ on the amplifier, head, or amplifier processing unit should be reduced in order to avoid a muddy guitar tone, but not enough to make the guitar sound flat (Hughes and Kettner). This allows the bass to better cover the low-end of the mix, while also not interfering or masking the signal with the kick drum and other instruments. If not, the EQ processing may be extreme in order to reduce the low-end of the guitar and clear up space in the frequency spectrum. Re-amping the guitar may also be a solution if the direct input of the signal of the guitar was tracked, and find that the guitar tone is too problematic in the post-production. Dialing in mids on the amp will also cause the guitar to have a better presence in the mix and will help differentiate it from the bass guitar (Bailey). Reducing too much of the mids can also cause the guitar to sound flat, especially is the guitarist is down-tuned or using an extended range guitar. Lastly, guitar heads and/or amplifiers do not have

to be that loud in the live room in order to have a great guitar tone, since the tubes or cabinet may have a breaking point and compress the guitar tone before it reaches the microphone (Mynett). Thus, taking simple precautions before tracking can yield a better recording and, ultimately, a better performance.

There is also the option of using an overdrive pedal in front of the amplifier in order to help tighten up the low-end of the guitar. With guitars, an overdrive pedal is a great tool to allow the guitar to come through in a mix, whether in a live or studio setting (Bailey). In these cases, the guitar may be going through a high gain stage and allowing the signal to be boosted before it reaches the head or amplifier will allow clarity in the signal. Overdrive pedals also tighten up the low-end of extended range guitars and allow more clarity and definition of the lower notes to cut through as well. Overdrive pedals such as the Ibanez Tube Screamer or the Pro Tone Overdrive pedals can exponentially help increase clarity of the extended guitar. Pro Tone Pedals offers signature artists' overdrive pedals, such as the Bulb Overdrive or the Keith Mellow Overdrive with an 'attack' option to specifically boost the attack and clarity of the lower notes on the extended range guitar. However, the attack setting can cut some of the low-end from the amp and boost the mids, but it causes the guitar to have a high attack from the strings (Mansoor 2014). This may be useful in trying to clear space in a mix to allow the bass to cut through, while not being masked by the low-end of the guitar.

The choice of microphones, specifically dynamic microphones, will then affect how the guitar tone sounds in a recording once the ideal or desired tone is achieved on the guitar, amplifier and/or processing unit. Mark Mynett from *Sound On Sound*, argues that a simple approach to microphone choice and placement will yield great results. Mynett recommends the

use of two Shure SM57s or a SM57 and a Sennheiser MD421, in order to achieve a tight sound from the amplifier and guitar, if a heavy metal tone is desired (Mynett). This also varies as to how much low-end the audio engineer or band/guitarist desires in their recording. A Shure SM57 has a natural roll-off from 200Hz and gradually decreases to 50Hz. The SM57 also provides a high-end boost between 2,000Hz and 15,000 Hz (Shure). It gives it a crunch on the high-end if that is desired, while reducing the amount of low-end from the guitar. The Sennheiser MD421 may capture more of the low-end from extended range guitars since it has a flatter frequency response on the low-end. Similar to the SM57, the MD421 also has a high-end boost between 1,000Hz and 15,000Hz (Sennheiser). This also gives the high-end of the guitar a desired crunch to give the guitar a tight signal, while having more body than the response of a SM57. There is also the option of using an Electro-Voice RE20 when tracking with extended range guitars. The RE20 has a flatter frequency response when compared to the SM57 and the MD421. The low-end rolls off between 75 Hz and 50 Hz. There is a slight boost in the high end around 7,000Hz and 10,000Hz (Electro-Voice). Unlike the SM57 and the MD421, there is a significant difference in tone, especially on the higher end. The SM57 and the MD421 give a high-gain amplifier more character on the high-end, but the RE20 may give a closer representation as to how the guitar sounds in the live room. While typically used as a vocal microphone, the Shure SM7B can yield great results from tracking extended range guitar as well. The SM7B has roll-off between 100Hz and 50Hz while also having a boost between 4,000Hz and 5,000Hz in the high-end response (Shure). In contrast with the SM57, the SM7B has a decreased response between 6,000 Hz and 9,000 Hz. The SM7B can be used in combination with a different microphone in order to capture the low-end of the extended-range guitar and making up the

high-end with the use of a SM57 or a MD421. Dynamic microphones can yield a great tone from extended range guitars, especially during a high-gain tracking session.

While it is not as common, condenser microphones can also be used in the production of tracking high-gain extended range guitars. A less common approach of microphone choice on an extended range guitar is the Josephson E22S, a side-addressed condenser. The E22S has a roll-off between 100Hz and 20Hz, while also providing a boost in the high-end at 6,000 Hz and 18,000Hz (Josephson). The Josephson has similar characteristics to the SM57, but will provide a different tone for high-gain amps when used in combination with other microphones. Though not as common, condenser microphones may prove useful in adding different harmonic content in combination with dynamic microphones when recording with extended range guitar.

Ribbon microphones can also be applied in tracking extended range guitar, though they are not a common choice. The Royer 121 can help capture the low end of extended range guitars with their frequency response. There is a boost at around 50Hz of the microphone, while there is a dip in the low-mids between 100Hz and 1,000Hz (Royer). This can prove either desired or problematic in the later stages of a mix, if the low end of the guitar wants to be boosted while cutting out some of the body, especially considering that an extended range guitar has more low end than a traditional six-string electric guitar. A Ribbon may require phantom power like a condenser microphone, though in principle, they are a type of dynamic microphone.

While microphone placement is important for any recording application, it is best applied in practice and varies as to what type of genre and tone that is desired. With extended range guitars, they are generally associated with heavy metal. This usually results in close miking techniques that may vary on the size of the cabinet, how many speakers on the cabinet. The angle

and proximity of the microphone to the grill and speaker will also affect the outcome of the tone. Generally, using two or three microphones will yield variable result and provide different harmonic content for the mix. Using multiple microphones and varying placement around the cone and grill of the cabinet will showcase how each microphone responds to the low and high end of the extended range guitar.

When mixing extended range guitar, one of the main issues to keep in mind is how much low end is present on the guitars. An over abundance in low end from extended range guitars will cause other instruments to be masked in the mix, such as a bass guitar or the kick and toms. Mark Mynett from *Sound On Sound* suggests to avoid boosting any of the lower frequencies on guitars, since doing so can easily create a muddy mix. Mynett also argues that however downtuned or low the guitar may, it is still not a bass instrument (Mynett). Boosting, cutting, or placing a high-pass filter on each guitar will clear up space in the mix for the rest of the instruments. Attenuating the low-mids around 250Hz may reduce resonant frequencies on the guitar, while also cutting between 1,500Hz and 2,500Hz will reduce some of the brittle tone of the guitars.

These techniques were implemented in two tracks, “North of the Wall” and “Demon’s Run”, where “North of the Wall” utilizes all seven-strings on an extended range guitar and “Demon’s Run” utilizes all eight strings of an extended range guitar. Reference tracks were picked for each song in order to help the direction of the mix. The reference track for “North of the Wall” was “Gods of War Arise” by Amon Amarth, and “Physical Education” by Animals As Leaders and “Marrow” by Meshuggah for “Demon’s Run.” Only one layer on each side of the stereo field was used in “North of the Wall”, and two layers were used in “Demon’s Run.” The

signal chain for “North of the Wall” consisted of an Ibanez RG2228 with passive Ionizer pickups, going directly to an Pro Tone Bulb Deluxe Overdrive, into a Blackstar HT-5 and to a Egnater Rebel 1X12. On this track, five different microphones were used in a single session, which included an Shure SM57, Electro-Voice RE20, a Royer 122, a Josephson E22S and a direct signal from the guitar into a Radial ProDI. All microphones were placed straight on the direction of the cabinets (Figure 10). These microphones were placed around the Egnater cabinet into the live room and tracked through API 3124+ and an SSL Matrix.

Certain problems arose when mixing these guitars and choosing the right microphones to implement on on the final mix. When listening back to all of the microphones at once, they all blend in fairly well to each other, but upon closer inspection, the Royer was out of phase with the other microphones. Once the phase the flipped on the Royer, it caused the 122 to be upfront in the mix and become very boomy. The E22S had similar characteristics to the SM57, but had a slightly brighter high-end. However, the E22S had an overabundance of mids that clashed with the other microphones and making difficult to blend in the with the other microphones. Out of the four microphones, only the SM57 and the RE20 were implemented in the final mix of “North of the Wall” where the SM57 gave the guitar a bright high-end and the RE20 and clearer body due to its flatter frequency response. Each track was the high-passed at 146Hz in order to clear up the low-end and allow the bass guitar to cut through. Since this song consisted of a significant amount of palm muting, there was a resonating frequency around 140Hz that was not desirable and would mask many of the other instruments on the track. there was a high-end resonance that was present on the SM57 at 6,200Hz and the RE20 at 2,690Hz that was cut and helped clarity to the guitar track.

On “Demon’s Run”, the same microphones techniques and placements were implemented since they were recorded on the same night as “North of the Wall.” This then resulted in using the only the SM57 and RE20 for the first layer on this track. A second layer of guitar was added with a different signal chain that added more character and harmonic content to the track. An Ibanez RG2228 and all eight strings were utilized on this track. The guitar then went directly to a Peavey 6505+ head without an overdrive pedal, which then went to a Marshall 4X12. In contrast, three microphones were used on this layer without capturing a direct input from the guitar. A Shure SM57 and a SM7B were used in combination with a Sennheiser MD421 on the lower left of the of the Marshall cabinet (Figure 11). In contrast to the Blackstar HT-5, the Peavey 6505+ head yielded a higher gain output. Therefore, the signals from the 6505+ have a louder presence in the mix than the HT-5. However, since the HT-5 was used in combination with the Bulb overdrive pedal, it manage to provided more harmonic content and added a tight presence in combination with the 6505+ head.



Figure 10: Tracking with an eight-string guitar with a SM57, RE20, R-122, and a E22S



Figure 11: Adding layers to “Demon’s Run” with a SM57, SM7B, and an MD421

In order to attain the desired tone exemplified by the Meshuggah track, “Marrow,” aggressive high-pass filters were utilized while scooping specific mid-range frequencies in the process. Both SM57s, the RE20, and the MD421 were all high-passed around 120Hz, while the SM7B was aggressively high passed at 200Hz since it was a muddy frequency that was masking the kick drum and bass guitar. One SM57 was scooped at 450Hz, while the second SM57 was scooped at 5,800Hz to eliminate the high-end presence from the Peavy 6505+ head. The RE20 was scooped at 170Hz and was low-passed at 6,000Hz. This gave the guitar a mid-range presence that was attenuated on the other guitar microphones. The MD421 was significantly scooped at 900Hz, and allowed the mid-presence on the RE20 to be combined with the MD421. Lastly, since the SM7B was aggressively high-passed, the mids were boosted at 1,000Hz to make up for the presence that was cut from the other microphones. All guitars were hard panned on the left and right side of the stereo field, which allowed the bass guitar some space in the center of the mix in contrast with the extended range guitar

Another issue that presented itself when mixing with extended range guitars is implementing the presence of the bass, specifically, making the bass audible and letting it blend in with the other instruments. A five-string Warwick Streamer LS bass guitar was used in “North of the Wall” and a four-string Ibanez GSR100 was used in “Demon’s Run.” The Warwick was an octave lower than the lowest note on the Ibanez RG2228, which is a B, or a fourth below a low-E on standard six-string guitar. In contrast, the lowest note on Ibanez GSR is the same note on the eight string on the Ibanez RG2228. However, due to the gauge of the strings and scale length of the bass, the low-note still manages to cut through in a mix and cover the lower range of the track. The Warwick was tracked directly into the input of the API 3124+, but a Pro Tone Bulb Deluxe Overdrive pedal was placed in front of the 3124+. Using the the Pro Tone overdrive pedal with the in front the API 3124+ did not yield the most desirable tone as it was being tracked, but once it was re-amped within Pro Tools, it blended well with the rest of the guitar and tracks. The Warwick signal was then printed with a Universal Audio Softube Amp Room with a custom patch the best amplified the lower frequencies of the bass guitar. This track was then duplicated and used in parallel with different plugins and EQ settings. The original printed bass guitar was heavily compressed while having a high and low-pass filter. The mids were slightly scooped which were brought back in the mix with the parallel bass track. The parallel bass track was re-amped once more with a Sansamp PSA-1 and then bandpassed between 700Hz and 2,000Hz. This allowed the bass guitar a tighter attack and was set about six dB lower than the original bass track with the Universal Audio plug-in. This setting allowed the bass to have a presence in the mix in combination with the extended range guitar, and removing it would cause the entire mix to feel flat. On “Demon’s Run,” the bass guitar was tracked directly

into the API 3124+ without the use of an overdrive pedal. Similar to the Warwick, this Ibanez bass was re-amped with the Universal Audio Softube Bass Room. The bass then duplicated and used in combination with a Waves Gtr Amp. This bass track was then bandpassed and set about six dB below the Universal Audio printed track. While the bass guitar is set at a lower level than the the the extended range guitar, it still provides some of the low-end that was cut from all of the extended range guitar tracks.

The Effect of Extended Range Guitars

Extended range guitars have had a relatively short lifespan, but have managed to have a significant role in music during that time. Bands like Meshuggah, Animals As Leaders, and Korn have exemplified what can be done with an extended range guitar and that they can be viably popular in music. Ibanez guitars also took a large risk in being the first company to sell these guitars at a commercial level, which would also not have been possible without the aid of Steve Vai, Fredrik Thordendal, and Mårten Hagström from Meshuggah. With the added string on these extended range guitars, it can easily open up creative possibilities such as interplaying with a bass guitar, like having an extended range guitar play the lower notes of its register, while having a bass guitar play on the higher register. Having alternate tunings that are not common on six-string guitar are also easily available. For example, Jost Travis from Glass Cloud tunes his nine-string guitar from low-to-high A-D-A-D-C (16 cents sharp)- C-G-Ab-E (Travis). Extended range guitars also vary in scale length and between companies, leaving many options for the consumer in terms of they want to play and how they can achieve their desired tone. As for mixing with extended range guitars, one has to be aggressive in terms of cutting or rolling of the

low-end, since there are certain frequencies in that low register that can easily cause a mix to become muddy or boomy. Since there is also usually a bass guitar in the mix, cutting the low-end on the guitars will then leave audible space for the bass and will not be as masked without it.

Each individual playing an extended range guitar can and will approach the instrument differently, whether it is using wide chord voicings or only focusing on the lower register of the instrument. One can still view the extended range guitar as standard mid-range instrument guitar with added strings, or completely eliminate a bass player since they feel that they do not need one. If considering buying an an extended range guitar, one has to be patient in getting used to the length and girth of the guitar neck and the added strings. If one feels pain when playing these guitars, stop and come back to them later a little at a time in order to get used to the instrument. One may feel slightly disoriented at first since they are not use to those added strings. The most important aspect that an extended range guitar to the player is creative liberties and options not available on a standard six-string guitar.

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