How to Collect:

Compact Cassette Tapes

- An Introduction To Cassettes
- How to find/collect cassettes
- How to maintain your equipment
- How to clean your cassettes
- How to fix your portable cassette player (common issues)

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Chapter 1

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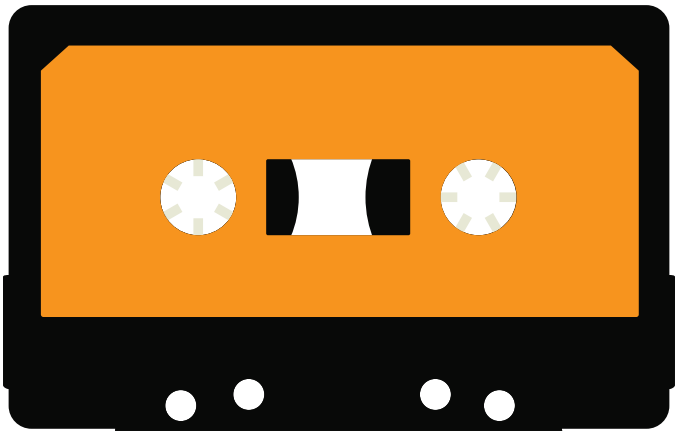
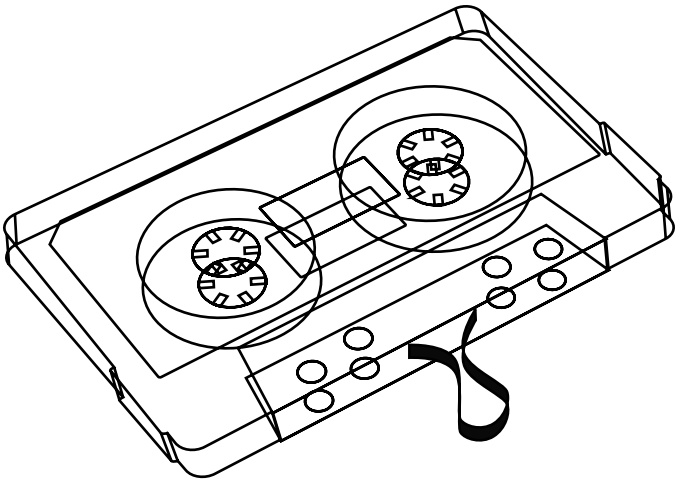


Prerecorded cassette tapes have been sold since 1966 and exploded in popularity after the release of the Walkman TPS-L2 in 1979, the first portable cassette tape player. Cassette tapes were originally created shortly after WWII as a means to record audio and first used to pre-record radio programs, they had later become the best selling form of music, selling more than LPs by the 80s. Cassette tapes are cassettes containing magnetic tape, Similar to VHS, and store wave forms on it, protected by a magnetic coat. They're actually very similar to vinyl records in how they store sound! Instead of physical grooves, the waves are magnetically encoded into the tape. It's then played back when inserted into a cassette player by having the head be moved up and down by the tape!



There are many moving parts to a cassette and a tape deck. A cassette stores the tape between two spools, with guide rollers in place to ensure the tape can safely travel from one spool to another to allow it to be read procedurally. In the middle point where the head connects with the tape, there is a pressure pad (or sponge) for the head to press the tape against. Aside from the magnetic coding to the tape, there is also leader tape at the ends of the tape, which don't contain sound and can't be recorded on, they are there to ensure the tape stays protected during loading, if something goes wrong, it would happen on a part of the tape without sound (assuming you're wound to the absolute end or absolute start).

TYPE I (NORMAL) POSITION

There have been 3 major types of tape that have been sold in retail. Most of the differences are technical, but some provide notably better sound quality than others. Type I tape uses iron oxide (Fe_2O_3) and are the most common type of tape. These are labeled as 'low noise' tapes and come with a lot of downsides. The nature of their oxide particles notoriously cause distortion as they can't be tightly packed due to some particles having irregular shapes. Some tapes classified as Tape I tapes were later demoted to Type 0 tapes, which is an umbrella term for tapes that don't reach the IEC standard or Philip's specification for cassette tapes. A Type 0 tape is basically a tape that isn't playable by the standards for tape decks, and it might be impossible to find a machine that can play back the data on them.

Type II tapes use chromium dioxide (CrO2) and with decks that could read Type II came Dolby noise reduction. Type II tapes are also called chrome tapes, and had much less noise than Tape I, which combined with Dolby noise reduction resulted in higher fidelity than past tapes. This caused cassette purchases to grow as cassettes finally became a worthy alternitive and not simply something that sounded worse than vinyl records.

Type III tapes used double-layer ferrichrome tapes having a five-micron ferric base coated with one micron of (CrO2) pigment (i'm not quite sure what that means either). Type III was meant to be a hybrid of Type I and Type II tapes, combining the good low-frequency MOL of Type I tapes with good high-frequency performance of Type II tapes. Type III failed to catch on, it never found market appeal and had limited support, in fact, as far as i'm aware there were no prerecorded Type III cassettes sold in store.

Type IV tapes use pure metal particles, typically chromium oxide (CrO2) and are the most sought after tape type. Commonly known as metal tapes they are easily the type of the highest quality. They were often the most expensive and most elusive and typically needed higher end decks in order to reach their full potential. These tapes provided the best quality for consumers, but would also decay at the same rate as Type II tapes.

Unfortunately, the biggest problem with magnetic tape and it's biggest downside is how it degrades over time. This also holds true to a greater extent with VHS, but cassette tapes are known for lasting around 30, 50 or 100 years in storage, with no two sources agreeing on each other. It seems to vary a lot in the environment the tape was stored in, how often it was played, if any dust or dirt got on the tape and was played back by the head, and tape type, with Type II and Type IV lasting the longest due to it's magnetic coating.

Chapter 2

How do you actually go about collecting tapes, and furthermore, how do you go about playing them back? Usually when it comes to collecting cassettes, people are looking for ones with prerecorded material on it, while some enthusiasts may also buy blanks to record their own content or mixtapes on. One popular use for cassettes is for use in old cars that only have a cassette deck and not a cd, people either record their own mixtapes for use in the car or use a cassette to aux adapter. Today, it may be difficult to find cassette tapes given the market being mostly dominated by vinyl records and CDs which both usually provide better sound, last much longer, and aren't as finicky as cassettes. Some artists sill release their works on cassette, but usually as limited releases with vinyl and CD versions being more common. You can still find a lot of tapes at thrift stores, and just like with thrifting, patience and consistency can get you some amazing finds. If there isn't a store that sells cassettes in your city, (be sure to search for one first though) you can always take your chance at online retailers. There are always people selling their cassettes on eBay or Etsy, with Etsy even having sell-

Modern portable cassette players (from left to right: We Are Rewind player, FiiO CP13, Gracioso C-317).

ers willing to allow you to make a custom mixtape for them to record and send to you. Most if not all resources for sourcing cassettes can be found online, with good quality cassettes fluctuating from $12 to up to $50. I say, never buy a cassette for more than you could buy a vinyl record. I may be writing a book about cassettes, but they come with a lot of downsides, often have poor or fading quality, bad packaging, and bad shelf lives. I can't even in good conscience say they should be worth more than CDs, but I understand that more as cassettes tend to be a novelty item. I wouldn't pay more than $30 for a cassette if I am sure it's new or good quality.

As for a deck, it was very difficult for me to find a new cassette deck, all the listings I found were for pre-owned and used decks on eBay or similar stores. I failed to find any new decks at an affordable price, with most being around $700 by brands I've never heard of. The market for cassettes are pure-

ly in portable cassettes which focus on simply playing cassettes. If you go this route you have options, and a lot of them have very appealing designs but lack in features and are often made to be more of a statement than something reliable (if you're looking to actually take this outside and listen to things). While some have line-in recording (which is very fun for making your own mixtapes or making cassettes of your favorite albums) they lack important features like noise reduction, eq options, sound processing or auto reverse. New cassette players

We are rewind belt clip

are usually based off of the TPS-L2 and miss features from later cassette players, and for as iconic as the TPS-L2 has become, it is far from the best cassette player. Some come with bluetooth functionality, which I personally don't enjoy with cassette players or vinyl players but it remains an option for those who enjoy it. Be sure to do your own research and think about what you want out of a record player before committing to ordering something, as even affordable models don't come cheap. New players float around $50 - $200 without accessories, some companies offer accessories with their players, such as a belt clip or headphones that are usually modeled after walkman headphones.

Of course, this manual will focus more on older players, with the next chapter being about how to restore and maintain an old walkman and cassette deck. If you're looking into buying a portable player, I recommend something with auto reverse and auto-stop. Auto reverse means that you won't have to flip your cassette to the b side, once the player finishes reading the a side, it turns the cassette the other way and uses a different head in order to switch to the b side, this is convenient if you're actually using your walkman outside but isn't a necessity. Auto-stop means that the unit powers itself off when the tape is finished, meaning you won't have to remember to manually turn it off. This can save you a lot in battery life over time, since burning through AAs isn't fun. Other information and terminology can be found in the glossary, take a look through and think of what you want from an ideal player and look for models that have these features.

There are many resources online for walkman models, the most complete of which that i could find being walkman.land, a website dedicated to documenting all commercial walkman models. While not a complete list, it is the most extensive I could find, and shines a light on portable players outside of Sony's models. It's often easy to forget that there were other manufacturers competing, since Sony's Walkman has grown so synonymous with the idea of portable cassette players that Sony actually lost their trademark over the name as the name had passed into common usage and was used to describe any portable player. The Sony brand comes with it's Sony price, so look into other manufacturers to see if you can get a better deal (or maybe just to be different).

Of course, the most popular model, the TPS-L2 and WM-3 are rare and expensive, especially since it's inclusion in the Guardians of The Galaxy movie. Other notable players shown in media are the AIWA P02 MkII Sony Walkman used by Marty Mcfly in Back to the Future and the WM-8 used by Max Mayfield in Stranger Things season 4. The most fascinating to me is the WM-R55 featured in METAL GEAR SOLID V: THE PHANTOM PAIN, where a broken model for parts floats around $200- $400 with active bidding. These models are rare in their own regard, but became even rarer and marked up after their inclusion. walkman-archive.com have a good list of other walkmans features in movies, but as far as I know their inclusion haven't made them as much of a collector's item as the movies I mentioned.

The TPS-L2 featured in Guardians of The Galaxy (2014)

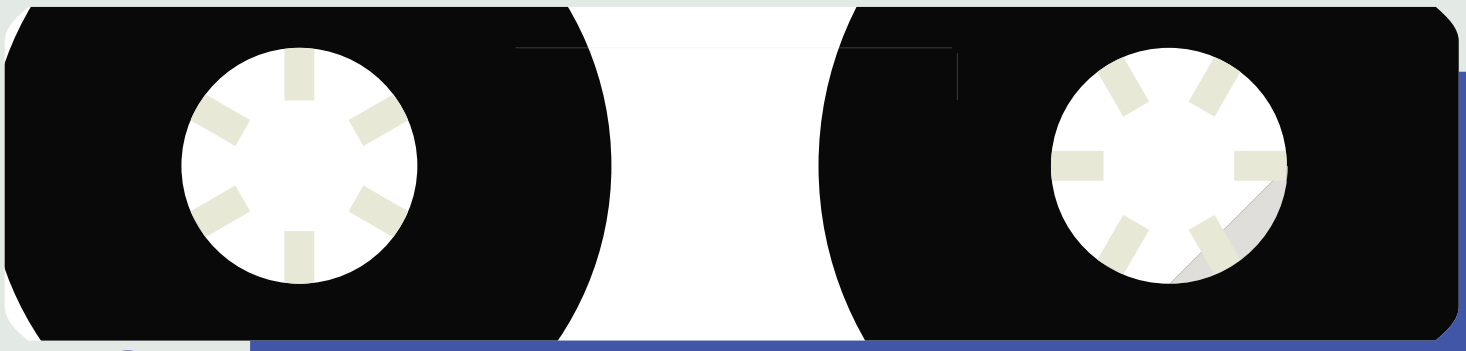
AIWA P02 MkII featured in Back To The Future (1985)

WM-8 featured in Stanger Things Season 4 (2022)

WM-R55 featured in METAL GEAR SOLID V: THE PHANTOM PAIN (2015)

Chapter 3

Common Problems And Fixes



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TYPE I (NORMAL) POSITION
NORMAL BIAS 120 µs EQ

Super EF90

A cassette deck has many moving parts, and if my high school science class taught me anything, it was that if you give someone a powder of kool aid they will have some no matter what instructions you give them, but also that more moving parts means more points of failure.

The biggest and most common problems with any deck or player are: worn belts, dirty heads, dirty rollers, and failing switches. Portable players also often have problems with aligning speed, Walkmans also don't perform well on low battery, so batteries have to be changed often. If you are facing a problem with your portable player, change the batteries before going straight into removing the back plate… take it from me…

I had to replace the belt before I could use my Walkman. I also have to clean the head and lube the spindles but I'm procrastinating by writing the book about cleaning them so that after printing I can follow my own instructions.

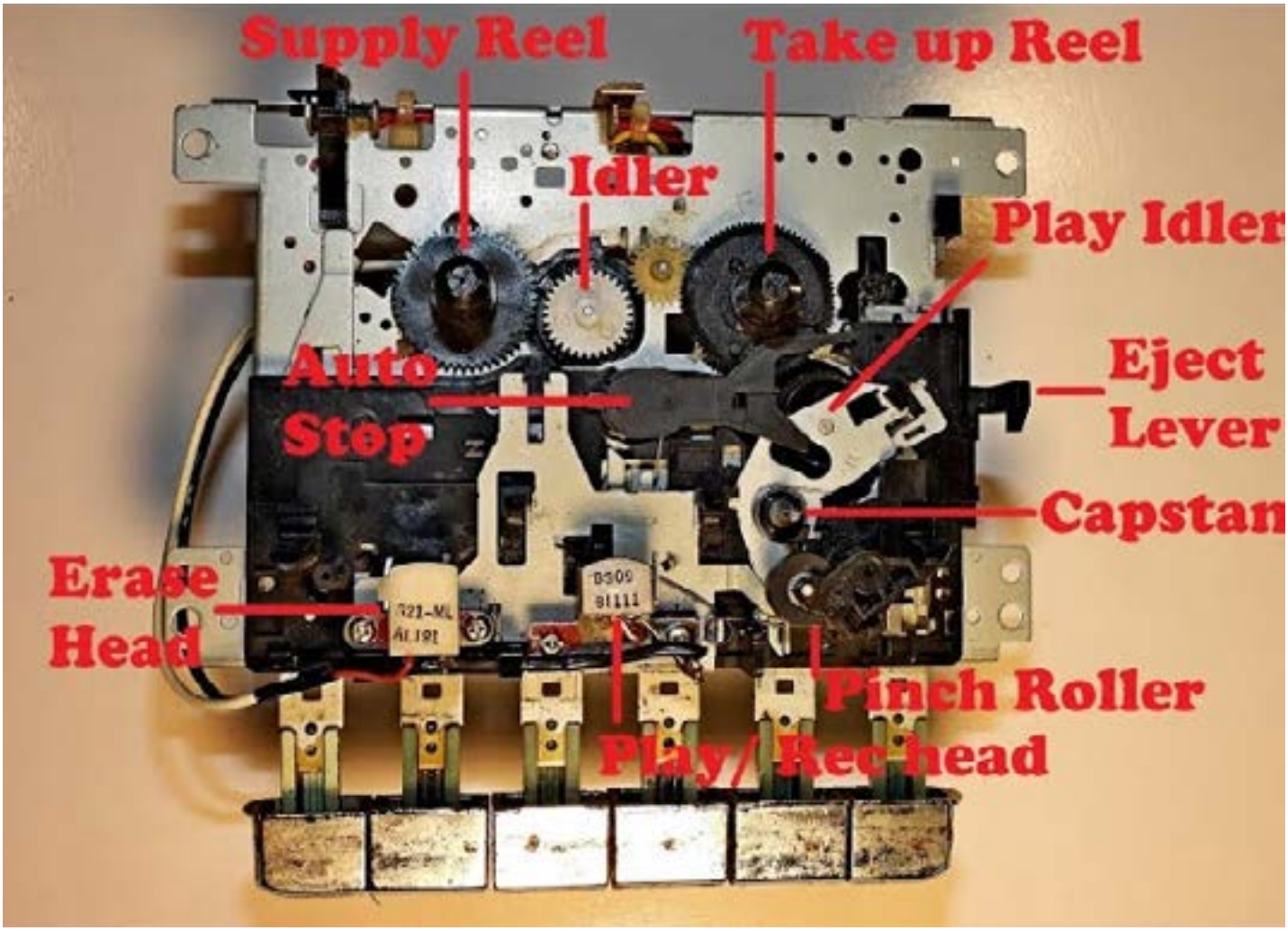
These are all relatively simple procedures that work for all models, some of the pictures in this section of the book come from my WM-FX301, which has a screwless back plate you have to remove by placing pressure until the latches around the frame let go. Truly a terrifying experience, and I would recommend checking that your Walkman has screws. I won't go into specifics for opening the device as I couldn't sit here and list how to open every deck and player ever released, instead I recommend that you search for your model number and try to find a guide online for opening it, the cassette community is small, but very dedicated to their craft and have done a good job archiving most models. ALWAYS BE SURE TO REMOVE ANY POWER SOURCE BEFORE OPENING YOUR DEVICE.

Replacing your belt is maybe the easiest thing to identify and replace, mine fell out when I first opened my Walkman, or maybe it was so excited to see me it took off the belt to strip for me. It's a good idea to replace the belt of any used model. It's easy to find replacements online. I got a pack of 50 for $8. I use the rest to secure my laptop to my ceiling as I write this. Simply string the belt along the motor and two reels. If you're using a portable player it may have an anti-rolling mechanism that you'll have to put your belt around. Search your model number for help applying the belt.

It's also a good idea to clean the heads in your machine. Use a q-tip dipped in isopropyl alcohol, open your player and put it in play if possible. You may need to hold the play button for some decks or even fool it into thinking there's a tape inside by pressing a tab in order to get the head to raise. Place the swab on your playback head, some debate you need to swipe in the direction that that head reads in or if you can just go back and forth, but both have achieved results, just

be sure to apply pressure but not too much pressure, it's sensitive. Move from there to the eraser head if your deck has one, then to the rollers. Simply hold it where the tape comes in contract and let the spinning roller rub against the tip and clean itself, nasty!

When it comes to fixing switches and adjusting speed, it varies from machine to machine and usually involves some hands fucking up a green board experience. If you're comfortable with digging your hands into it, despite it's age, then you'll be able to see that old lady pur again. But when it comes to decks it should be easy to find information on fixing or even replacing every part online.
Adjusting speed can usually be done with the case still on with a small screwdriver carefully turning the mechanism to fine tune the speed, but i'm unsure if this holds true for all models.



Index

Glossary

AR (Auto Reverse)	A cassette player with auto reverse means that it has a mechanism that allows it to play both sides of the cassette tape.
Anti-Rolling	A tape mechanism made to reduce speed changes when the machine is moving.
Auto Stop	A cassette player that powers off automatucally when reaching the end of a cassette, protecting the tape and prolonging battery life
AVLS (Auto Volume Limiter System)	AVLS is a system mady by Sony after concerns that prolonged use of Walkmans could lead to hearing damage. It limits the maximum sound level heard through the headphones when toggled on
BL Skip (Blank Skip)	Blank Skip means that the player detects the part of the cassette tape that can't be written on and fast forwards to the written part.
Cassette	A cassette tape. What this entire book is about. Generally referes to magnetic tape stored in a "cassette", said tape caan contain or can be recorded on to contain would waves played back by a cassette player.

Glossary

Loudness	If your stereo has a loudness option, it will boost the amptitude of the audio played through it in order to compencate for how the human ear perceives noise
Mega Bass	Mega Bass was a term used by Sony for a loudness system that would boost the bass on small headphones connected to the Walkman.
Walkman	A line of portable cassette players by Sony, started in 1979. The Walkman brand still lives on today in the form of professional digital music players that carry the version of the logo used in the 2000s and have physical buttons on the device.


maxell
CR-E II 60 IEC II
SONY
TYPE II NORMAL POSITION
BHF90
SUPER PRECISION ANTI-RESONANCE CASSETTE MECHANISM
METAL BIAS 70μs EQ
MA-X
TDK
IEC IV / TYPE IV METAL POSITION
MA-X 46
BASF
STEREO
NOISE RED.
NO