Current balun vs voltage balun

BALANCED - UNBALANCED - BALANCEDUNBALANCED ↔ BALANCED WITH A BIT OF IMPEDANCE MATCHING THROWN INA A quick word on this pageI definitions here are mostly consistent with the ARRL manual, although this wording is a bit confusing. The only problem I have with the manual is the marking of the current transformer. There is simply no difference between a current, voltage or an impedance transformer. Learn more about the transformers at the bottom of this page. SEE ALSO: - Air action transformer core and magnetic material - experiments to try yourself that demonstrate how different devices actually work. Antennas Need a baloon, some sources of currents of general mode and that they are. PAGE INDEXBASSDEFINITIONS - AS USED ON THIS SITECall their all something else if you like.1) Transformer is a device that converts voltage and therefore and impedance and therefore current, even if 1:1. Typically, this definition may be limited to some device with a core and winding, but should not be. The simple LC series can be used as a transformer and often. There is no difference between the voltage and the current transformer. The current is converted because of the tension, because the tension. Tension, current and inseparability are inextricably linked and cannot be divorced. If it converts or is able to transform, it is a transformer.2) AutotransformerA core wound device that divides the winding between primary and secondary. The core can be air. Two examples are the third example of a transformer 1:1 and a guanella balun.3) BalunA device for interaction between an unbalanced power line (one signal referred to the ground) and a balanced power line (two controlled signals that refer to each other). Pretty often both signals refer to the ground, but they don't have to be. Balanced signals used in computer communication systems are often two opposite signals, each of which fluctuates between 0 and 5 volts or some other voltage. Insulation baluna can and is used at the end of long balanced power lines (e.g. twisted steam) to eliminate noise, because the noise picked up along the line affects both signals at the same amplitude and phase.4) BalunA voltage voltage uses some form of transformer action to transfer energy back and forth between a balanced and unbalanced power line. The voltage baloon involves converting the voltage, often using a core-type transformer (even if 1:1), but this definition should not be as restrictive and may include the 1/2 wave loop described on this page. This implies a transformation of the intransigence (even if the same). It also includes self-transformers like Guanella balun. See also the tension and the current baloon - the direct comparrison below.5) The current baluna current allows the working currents to pass, but stifles the general current mode - no more. There is no transformer Since this is a current control device, not a transformer, there can be no such thing as a 4:1 current baloon. In other words, the current baloon controls the currents, presenting a low movement, through a device desired by currents, but high mutilation is undesirable. See the action described for the balun current core below for desciption on how such a device works. See also voltage and current baluns - the direct comparrison below.6) Other definitions will support that voltage of the baloon is used, where the antenna is driven at the maximum voltage point and the current of the balun is the one that is used to drive the antenna to the point of maximum current. Any transformer (voltage) baloon can be used for any work simply by changing the values or number of turns. The baloon action is exactly the same, so why should it have a different name? If the length of the antenna is changed, the distribution of inconsistency will change. The baloon, designed to operate at a minimum voltage of the first antenna (thus voltage), can now be used somewhere other than the minimum. If minimal mutilation is halved and the baloon is therefore not used at this point, we now change the name of the baluna from voltage to current, and where do you draw the line? After all, the antenna can be controlled anywhere and only unsalthused (and therefore necessary transformations) changes. It makes no sense at all to say the tension is a baloon where the tension is greater than the current. The best definition of the voltage or current of the baloon (or anything else in the universe) should be based only on the action of the device itself, not on where it is used. The hammer is still a hammer whether it is used to drive into the nail or smooth out a little metal.7) BalancedA balanced power line is one with two conductors holding equal currents No. 2 out of phase (equal and opposite in direction). None of the signals should refer to the earth only as long as the currents are equal and opposite. A twisted pair of computer communication cables are a common example where the voltage of both signals is above ground. This means that both the oki and/or voltages are managed in one way or another. The signal of interest is the difference between the two references to each other. Balanced lines have the advantage that noise affects both conductors equally. This makes it an added benefit if they don't refer to the ground, because that's where most of the noise comes from.8) An unbalanced power line is also one where there are two conductors with equal and opposite currents. The difference is that there is only one guided signal conductor and reverse currents can pass through any number of paths. You can ground both ends of the coaxial part for example. It has a disadvantage that only one signal noise, so it should usually be protected (such as a coaxial cable). BASIC LAWS1) Ohms Law.The Law.The through a conductor between two points is directly proportional to the potential difference between the two points, and is inversely proportional to the resistance (or inconsumability) between them. This law also applies to complex deviations as well as pure resistance. The energy consumed will depend only on the resistor component.2) of the current Kirhoff Act (sometimes called the first). In any node (connection) in the electrical circuit, the amount of current flowing into that node is equal to the amount of current flowing from that node. This can often be misinterpreted. You can call two currents from the node and thus deplete or strengthen the charge carries in this knot. In the end though, what goes up should come down and that comes out, should come back. Kirhoff's current law basically says you can't create a charge of carriers out of the air, and everyone tries to be neutral.3) Kirhoff's Voltage Act (sometimes referred to as the second). The directional amount of the difference in electrical potential around any closed circuit should be zero. The word directed refers not only to both negative and positive tension, but also to the phase corner of these tensions. In the LC series circuits, for example, voltage throughout the capacitor and inductor will always add up to more than applied voltage if the value is only taken into account. In fact, for the ideal non-resonance LC series of the circuit, the voltage on one component will be greater than applied voltage. With or near resonance voltage on both will be greater than applied voltage.4) Faraday's act of induction-induced EMF in any closed circuit equals the rate of magnetic flow change through circuit.5) VK5AJLs Law (Murphy's extension) No matter how hard you try, if you wind two identical inductors, they will be different. CONCEPTSVOLTAGE AND CURRENT BALUNS - DIRECT COMPARRISON Simple 1:1 voltage baloon Simple 1:1 current of the baloon voltage baloon uses magnetic transmission (transfomer action) to produce a balanced signal at the exit. A 1:1 conversion is achieved by making each winding's thread the same. When you change the number of turns on one (or more) winding changes the voltage, it is a voltage baloon. The current 1:1 balun controls the currents. There is no transformer action. Equal and opposite (balanced) electrics cancel each other and represent the 500th place. Common mode toks produce a mutually inductive magnetic field, which is a high non-connect to these undesirable signals. If the number of turns on one winding is different from the other, the action will remain the same, except that there will now be a slight impact associated with balanced currents, but still a much higher effect on the overall currents of the mode. When the number changes On one (or more) winding the current changes, then it is the current baloon. Works Works travel (induced through the nucleus) in the same sense in the voltage of the baloon, but in the opposite sense (not induced through the nucleus) in the current baloon. By quote from ARRL (2008 21.16-17):-Choke or the current baluna forces of equal and opposite currents flow. As a result, the currents emitted back to the power line by the antenna are effectively reduced or suffocated, even if the antenna is not perfectly balanced. If the tortuous inductive reaction becomes marginal at lower frequencies, the balun's ability to eliminate antennaocks decreases, but (for 1:1 baluna) there is no winding along the line. Although this wording is a bit confusing, it is completely consistent with this page. 1) This does not mean that the forces of equal and opposite currents flow is the current baloon. In fact Kirchoff's law currently says the 1:1 voltage balun shown above (unreferenced to the ground) does just that but still tensions balun. 2) At the same time, the 1:1 current balun shown above is not quite the balance line. Although there is a high intransigence presented by the general currents of the regime, this inconsistency is still finite, and therefore some common regime currents can still flow. 3) There is NO CHOKING action in any tension baloon including guanella. 4) In some ways these unfortunate words (for the 1:1 balun) were included. This may lead people to believe that winding is allowed in the 4:1 baloon, but the 4:1 baloon is not shown. It is marked as a current transformer, not a baloon. These words have obviously been included so readers don't think there is a meandering impedance in the 4:1 transformer. That's the main problem I have with the wording. There is no difference between a transformer voltage, current or unsusive. TYPE TYPE OF BALUN TO USE - BANDWIDTHThe type of baloon used depends on what you want to achieve and what bands you work for. If you're going to maximise bandwidth coverage, you won't have an antenna so well at one particular frequency, but the wide bandwidth is balun better. If you're looking for the maximum signal using a narrow mode such as the CW or SSB, it's pointless to use a broadband antenna (ergo balun), and in this case it's best to use a narrow bandwidth balun. WHICH TYPE OF BALUN TO USE - VOLTAGE OR CURRENTThe best baloon to use is the one that does the job with the least losses, of course. At 6 m and above, they usually use a special antenna. The 1/2 wave loop of the RG-214 has a loss of insertion of approximately 0.03db and therefore is the lowest loss of the balon I could find. It's a voltage ball. General choking mode (ugly balun), a type of current baloon, wound with RG-58 using the recommended lengths has a loss of approximately 1.2db. Also, some kind of conformity impedance may be required so the strain of the baloon is a real alternative. It is desirable to have a wide bandwidth on HF. Balun voltages are either too big or Inefficient. If you use a tuner that makes all the impedance matching necessary so a simple current balun after an unbalanced tuner has the lowest insert loss. In this situation, the best is now the baloon. If wound baloon with impedance matching is necessary, auto-transformer types tend to be more effective. FERRITE V POWDERED IRONBoth ferrit and powdered iron core are ceramic materials. They consist of small iron particles (for powdered iron, obviously) or a mixture of iron oxides mixed with binders and shot into the oven like ceramics. Both are more effective than hard iron. There are advantages and disadvantages in using both. Ferrit is saturated (filled with a magnetic field) at a lower level than powdered iron. Once any core is saturated, it behaves like just a piece of wire and not like a coil anymore. You should also remember that the connection between the magnetic field force and amp turns is not linear so the closer you work to the saturation point of any nucleus, the more harmonics (mostly odd harmonics) you produce. Suppose you have a powdered iron core and a ferrite core of the same size. Suppose the powdered iron core is saturated at 12 watts and the ferrit kernel is 10 watts. If you put 5 w through them, ferrit, being more efficient, will transfer more energy. If, on the other hand, you put 9 w through it, although powdered iron is less effective, less energy is lost in harmonics. The transfer of energy at the right frequency will now be about the same for both, and you won't bother your TV neighbors anymore. WINDING DETAILS Number of turns will depend on the main material. Because there are so many types, exact numbers cannot be quoted here. For the HF transformer and powdered iron core, about nine or ten turns on winding is a good place to start. Since the current baloon is a type of general choking mode, the more turns the better. There are several ways to test, but none of them are very easy. If 10 turns work normally, leave it. If you really need to be sure, one way to test is to put power through it at ever higher levels and run it into a dummy load. Wind 1:1 BALUN with additional turns, using the desired material connecting the primary source and the ground of the RF and secondary to the dummy load (50). You will need a large load dummy. The Dot NOTATIONDot designation is used to simply refer to the starting point of the winding, which all have to be made in the same sense as shown on the left. NOTE ON WINDINGS: Having windings as shown in the photo is not important, but it is probably better to have them evenly, as shown in the photo. the authors insist that they should be close because they are power lines. They are power lines only when telegraph equations can be applied. This applies to current baluns, but not transformer baluns. The point of notation can be checked on the COILS WITH COAX There are situations where meandering coaxing coax is helpful, but there are some strange misconceptions. The central conductor is surrounded by a good conductor that contains any magnetic or electric fields that it (center) produces. The internal conductor therefore does not produce any magnetic effect regardless of whether in the coil or any former wound it is if it sinks it causes in the outer. Coaxial coaxing coax around the first is not a transformer. They form suffocation only on the external conductor. VOLTAGE BALUNS1/2 WAVE LENGTH COAX BALUNHighly recommended where it can be used (usually impractical on HF). This is a very low loss of the baloon. This baloon works on the same principle as transformer balun, in fact, it is a transformer balun. One side of the signal is transmitted as it is, and the other side is made by delaying the signal by half the wavelength. These are signal inverts to produce the opposite one. These baluna work well enough, but have the disadvantage of being limited to a very narrow bandwidth. They are the best if narrow bandwidth is what you want. The length of the semi-wave loop is calculated from both the wavelength and the cable speed factor. The RG213 usually has a speed factor of 66%, so for 144.4 MHz the wavelength is 299.8/144.4 (2,076 meters), divided by 2 (1,038 m), multiplied by the speed factor, give 685 mm. To be sure, consult with the specifications of the coaxial you use. It is important to use the best coaxial you can for balun, even if you use lousy coaxial for feedline. Using heliax is a bit impractical because it doesn't bend so easily, but something like benelec LMR400 is ideal. The baloon of this cable will have a loss of insertion of about .05db. One side will be managed more strongly than the other for this amount. It also has an 85% speed factor meaning it should be longer. The losses will be almost the same regardless of frequency. At higher frequencies the loss is one meter higher, but you need less. Since the electric fields in both halves of the dipole will affect the other, the average insert loss will be less than 0.05db, probably about 0.03, but who counts. SINGLE SIDED TRANSFORMER BALUN (4:1 impedance match) Less than ideal and not recommended. A simple transformer balun here rests on one side of the transmitted signal and produces the opposite signal with the help of a transformer. It can be a wound on the toroidal nucleus of the necessary frequency characteristics. There are so many types listing everyone here and vendors being a waste of time. There are only a few twists on the RF transformer anyway so it's easy to wind another if the toroidal core you find in the old power supply works or not. I used wires from the old car to the wind that worked normally. These baluns have the advantage in any way that they can be used for a fairly wide frequency frequency For example. all HF. When winding this balun the cheap speaker wire works fine. Keep winding together. Do not put primary on one side of the toroids and secondary on the other. Performance will deteriorate faster with frequency. SEE WINDING THE DOUBLE SIDED CORE BELOW AND DOT NOTATION ABOVE. DOUBLE SIDED TRANSFORMER BALUN (4:1 or anything:1 impedance match)Use only if you want a 4:1 match. Not recommended. NOTE: - The schematic view shown for transformers usually show two ends of each winding. These baluna wounds are on the toroids, so there is no real end. It's a continuous circle. The ends and dots simply show the point of delivery. This baloon works in much the same way as the first one, but, in this case, both signals are transmitted through the transformer. There are some additional transformer losses in the conversion of both signals, but both signals suffer the same loss and therefore more correctly BALANCED. IT'S AN INTERESTING POINT. Left 4:1 balun published in a similar form elsewhere on the Internet as an improvement Guanella balun. It's a good idea, but it can be improved. It uses two parallel windings for the primary and retains two groups of windings, one for each side of the balanced output. There's no need for that. The magnetization of the nucleus is proportional to the number of turns multiplied by current (almost). There are twice as many turns, but half (resistor) current in each side. The magnetization of the kernel can be achieved even better with just one primary winding, as shown below. Also, the inductive current is larger with this double winding. It has been repeatedly stated that inductive impotence should be as high as possible. Using only one wire instead of two achieves this. This winding method uses one winding for the primary, so twice the rateful current, as well as double the inductive current, as shown above, and therefore the same magnetization of the nucleus. Also, since there is only one triple winding, the connection is as balanced as you can get. This was only done to illustrate purposes.1:1 TRANSFORMER BALUNS The third example can be adjusted for other than 4:1 and recommended for the first two. Here are three interpretations of the 1:1 voltage baloon. The transformer 1:1 baloon can be made by simply winding the same number of turns on each side of the transformer and connecting as shown, or as in the third example, making impedances input and output the same. The first example has the advantage that, no matter what impedance each half of the antenna itself, there should be equal currents in both legs. (Kirhoff's current legislation applies between both ends of the antenna). It uses transformer action and can be used to match impedances using different odds and the tension balun. It has the disadvantages of high losses, especially on the bands and there is no direct DC path to the ground to defuse the static. The static discharge can be explained by winding with a central crane, as shown in the second example. This negates the advantage of ensuring equal currents if the deviations of each half of the balanced antenna are different, for example, one end is next to the iron roof. This can be achieved by placing a nominal resistor in the center of the land crane, say 1k or 4k7. This is enough to defuse static, but more than any radiating resistance. Another method of winding the voltage of 1:1 is the third example. All signals refer to the ground. Some call it the current balun, probably because it has a voltage conversion of 1:1, but it is nothing more than an auto transformer. Currents in the secondary (low winding) are induced by currents in the primary (top two windings). This system is not as balanced as it seems. Using an autotransformer to separate the input voltage is more effective and therefore stronger than inducing current in the bottom winding. In addition, since all signals are referenced to the ground, each leg of the antenna may have different shocks if the load is different. GUANELLA BALUNIt doesn't really balance anything. Not recommended. Contrary to some beliefs, the ARRL management does not describe the guanell balun. It describes what looks like one, but correctly marks it as a 4:1 balanced impedance corresponding transformer. (Chapt 21 page 16 2008 edition.) Various authors changed it into a baloon, connecting one side to the ground. It's a voltage baloon because it doesn't do anything to limit the general currents of the mode and allow working currents other than matching impedances. In the far left corner, two sets of dots are shown on the bottom set of windings. The pink dots are the ones as published. Whether it's a wound on one nucleus or two separate cores doesn't matter, the transformer action is exactly the same. Because there are two sets of separate windings, the dots (the beginning of the winding) of each winding set are completely arbitrary. On individual cores, the action and performance of this balon is exactly the same, no matter which end of the core you start winding so the blue dots can just as easily be used without changing the action of this devcie anyway. Seen in this light, Guanella Baloon two, crossed, series, auto-transformers. Another way to look at it is stretched, as shown on the left. Magnetic circuits are shown in yellow. It uses transformer action to cause the top and bottom winding. It converts the tension, so it's the voltage of the baloon NOT the current balun. On the right are shown the voltages of input and withdrawal in relation to the ground. The currents in both legs of the exit are all the same, but they work from different impedances. That doesn't mean the now but the tensions are not. It's This. only tension towards the ground, but balanced signals should not be references to the ground and often are not. Provided that the entire system is isolated from the ground, 100,000 volts (relative to the ground) can be connected to one point in this system, and the action is exactly the same. This is how birds can perch on power lines without getting electric. There are only two currents of interest. The general toks of the regime are equal to the toks in the phase (which implies direction) and the size in two parallel conductors. Working currents are the ones driving the load. They are equal and opposite (No/2 outside the phase), that is, if there is no turning back, nothing will go away. The land used in the schemes is a special case. It is almost a limitless source of charge carriers (electrons or lack thereof) and an almost bottomless pit for their absorption. Therefore, it can be seen as a zero-deviation compound (although this is not entirely true). Although the tension is different in relation to the land, there are no problems. Working currents on each side of the balanced line work against each other, not against the ground. General modes of sinks, induced in a balanced line of filing, is a different story. They also work in a variety of impedances and will result in a similar voltage model in the transformer BUT the overall current mode is working against the ground. Those in the upper conductor also work through the source of the impedance of the unbalanced side of the line. Those at the bottom also work in the same impedance, but with the addition of transformer losses. CURRENT BALUNSCORE TYPE CURRENT BALUNHighLY recommended. It is a very low loss of balun and is ideal for use with a tuner. This baloon works by controlling the currents. THERE IS NO TRANSFORMER ACTION. Two windings should be in the same sense (dots at the same end). Magnetic fields of opposite balanced working currents will cancel each other, and therefore there is very little impedance (except wire resistance) to these currents. On the other hand, the currents of the general regime will produce a mutually inductive magnetic field and face high pulses. This means that the more turns, the better, to the point. In this case, windings are a power line that has losses, but they are much lower than losses, transfer energy from one winding to another through the core. The design considerations are really very minimal. Since the loss of balanced lines is low compared to coaxial, you don't lose much except for resistance wires, which are very low compared to radiating resistance anyway. The current baloon shown here, the wound around the steel bolt is probably a little damp, but why not? Steel or iron is not usually used for RF because there are too many eddys making it too inefficient for transformers. In this app, as there is no magnetic effect for the desired desired Never mind. On the other hand, inefficiency is an advantage for the current of the general regime. Not only is the high intransigence represented by the general currents of the regime, the energy from them is absorbed by the bolt. I tried but was unable to measure any insert loss associated with either bolt or toroid former (powder iron) for working currents. There were some but the meter needle was so close to the same value in and out, I really couldn't tell what the loss was. Once I have time, I will measure the rejection of the general current mode with various formers.COMMON MODE CHOKE or UGLY BALUNNot is recommended. There are better ways to achieve the same effect. Before we start, COMMON MODE CURRENTS ARE 4 CURRENTS IN PHASE AND BIG IN TWO PARALLEL CONDUCTORS. (The phase also implies direction.) Volt (potential difference) produces an electric field, while amplifiers (current) produces a magnetic. Fluctuations in the electric field can induce shocks just as orthogonal magnetic ones can. With coaxial, there are at least two effects on currents in the outer conductor, one caused by fluctuations in the electric field and the other by orthogonal magnetic vibrations to it. Since there are orthogonal electric and magnetic fields between internal and external conductors, the coaxial can be considered a wave guide. Things are more complicated than described here. This type of baloon is one of the easiest, but harder to explain. It would be easiest to create a picture. Let's look at the following situations first. Figure a) shows a situation where the external conductor is not connected to anything. No matter what happens to the inner conductor, there can be no current at point A because it is not connected. The current should have at least some space to flow. Where one radiator is present like this, the electric field on the inside tries to work against the coaxial exterior and produces a general toy mode that just heats the coaxial. Figure (b) shows a situation where the external conductor is now connected to the radiator. In this situation, there are still commom current mode. The coaxial shield is a pseudo ground and does not attempt to push any current anywhere. With an unbalanced line it is only the inner that is managed. The coaxial shield is held only by working pins, because they are pushed internally. The electric field created along the radiator connected to the coaxial center partially works against the coaxial. Figure (c) shows a situation where the coaxial cable gets choked. Choking is nothing more than a great induction. Induction resists changing the current of both the magnitude and the direction. As the frequency increases, the probability increases. On the radio frequency the pulse is so great that no induced current can pass through it, except for working currents on the inner Shield. Point A may have currents induced by an electric field in the radiators, but this current can't pass through the throttle and onto the ground. I called it 1/2 general choke mode instead of ugly baloon because it only affects the external conductor. Since both magnetic and electrical fields generated by the internal conductor are contained in the coaxial, they are not affected, and therefore the

currents in the inner conductor are not affected. ANOTHER WAY TO DO ITMore ferrit is usually required than two parts, but you should get the idea. MORE ON TRANSFORMERSDON'T FORGET THE BASIC LAWSPeople say that the current fed or stress fed as if they are different things. If there is tension and there is no tension, there is no current. The current flows only because electric media are pushed by voltage. It's all relative. If the antenna (or any load) is 0.001 to produce 100 w, you need a voltage of .31623 ... volts producing 316.23 amplifiers. If the antenna (or any load) is 1000 euros, to produce 100 w you need a voltage of 316.23 to produce a current of 0.31623 amplifiers. It doesn't make sense to compare tension with the current. You can only look at the changes in any and say things like, the more current, the thicker the wire you need or the more voltage, the more separation (isolation) you need. Simply put, where do you draw the line? If you want to say that it is being served when the number of amplifiers is greater than the number of volts, it just means that you are talking about a load of less than 1 . Either way, it's ridiculous comparrison doesn't use or benefits either. The same goes for transformers. Any device with two winding sets, even if only a straight piece of wit with only one, can be considered a black box with all the text and images on this site are copyrighted by John Langsford (vk5ajl). You can provide links to other sites or use information and photos for personal use. You can use text or images for rework or quotes provided you recognize the source, that is. vk5ajl.com.I think that's pretty fair, right? You?