YARC-MITTER

PRESIDENTS CORNER

NEXT MEETING SUNDAY NOVEMBER 11TH.

NOV. 2012

THE OFFICIAL NEWSPAPER OF THE YONKERS AMATEUR RADIO CLUB

TURN YOUR CLOCKS BACK NOV 4TH, ONE HOUR. WELL A COUPLE OF FOLKS SAID THAT I SHOULD GET A BETTER PICTURE SO HERE WE ARE ,WITH A NEW MUG SHOT, HOPE EVERYONE LIKES IT,. TEN METERS HAS BEEN REALLY HOT LATELY , HOPE EVERYONE GOT A CHANCE TO WORK THE DX THERE. THE WEATHER IS STARTING TO CHANGE, I FOR ONE HOPE WEE HAVE A MILD WINTER, BUT IF WE DO NOT ,REMEMBER TO LISTEN TO THE 2 METER MACHINE FOR WEATHER UPDATES AND CLUB UPDATES WELL WE GOT HIT WITH SANDY THE HURRICANE,KNOCKED OUT OUR 2 METER MACHINE AND WAS JUST A PAIN IN THE NECK. THANK GOD IT WAS MOSTLY HIGH WINDS WITH LITTLE RAIN, NOT TO SAY THERE WASNT FLOODING IN SOME LOW LYING SECTIONS. WELL THE HOLIDAY PARTY IS COMING AND WE COULD USE A HOLIDAY PARTY COORDINATOR TO ARRANGE THE PARTY AND FOOD CONTRIBUTIONS. IF INTERESTED CALL 914-969-6548.

HAPPY THANKSGIVING!

JOIN RENEW THE ARRL THRU THE YARC, THE CLUB GETS $2.00 FOR EVERY RENEWAL AND $15.00 FOR EVERY NEW MEMBERSHIP FOR DETAILS CONTACT WB2AUL

SPECIAL SERVICE CLUB

NEED HELP, HELP STUDY ING FOR UP-GRADE. GET IN TOUCH JOHN, WB2AUL,HE MIGHT BE ABLE TO HELP YOU STUDY AND PASS YOUR EXAM.

RETIRED GUYS/GALS LUNCHEON

TOP LT-W3IFX-WB2AUL-HELEN---BOTTOM LT. WA2KAJ-W2LAP-WB2AUL-WA2BOM

NOV. 4TH

NEXT VE TESTING WILL BE HELD ON NOV4.TH , AT 830AM . PLEASE BRING TWO FORMS OF ID. ONE ID MUST BE A PICTURE ID. TESTING IS HELD AT THE 1ST PRECINCT ON EAST GRASSY SPRAIN ROAD IN YONKERS NY. FOR FURTHER INFO CONTACT AC2T AT 914-237-5589

THE NEXT MEETING OF THE RETIRED GUYS/GALS WILL BE HELD ON NOV. 15TH THURSDAY AT MONT OLYMPOS RESTAURANT IN YONKERS THE TIME IS 1200 PM NOON, YOU DO NOT HAVE TO BE RETIRED TO JOIN US EVERYONE IS WELCOME MEMBER OR NON MEMBER ALIKE IS INVITED. FURTHER INFO CONTACT WB2AUL @9 1 4-969-6548

ARTICLES OR PICTURE

IF YOU HAVE ANY ARTICLES OR PICTURES FOR THE YARC-MITTER PLEASE SEND THEM IN AND THEY WILL BE PRINTED. WB2AUL@YARC.ORG

FOX HUNT NOV.18

NEXT FOXHUNT OF THE YONKERS AMATEUR RADIO CLUB WILL BE HELD ON SUNDAY NOV. 18TH, REGISTRATION WILL BE AT 830 AM, FOX RELEASED AT 900 AM. THE LOCATION WILL BE TIBBETTS BROOK PARK, YONKERS NY. FOR FURTHER INFO CONTACT MIKE,KF2FK, AT 914-879-6887

WE NEED A HOLIDAY PARTY COORDINATOR IF INTERESTED LET US KNOW 914-969-6548

ITS THAT TIME OF YEAR AGAIN, DUES IS DUE AGAIN. IF YOU GET A CHANCE REMEMBER THAT THE YEARLY DUES ARE DUE. PLEASE SEND YOUR CHECKS OR GIVE YOUR DUES IN AT THE MEETINGS.
SEND TO-: PAUL MAYTAN
19 HUNTSBRIDGE ROAD
YONKERS,NY 10704

DONT BE EXPUNGED

VERY INFORMATIVE WEBSITE PLEASE VIEW THANK YOU---thanks to w2lap for this site

http://www.wadsworthsales.com/Pages/hamradio.aspx

HAPPY THANKSGIVING

SWAP MEET

1 ALINCO 220 MOBIE RADIO—WB2AUL

1 WEST MOUNTAIN PRO BLASTER—WB2AUL

1 TILTOVER TOWER MOUNT—WB2AUL

4- SECTIONS ROHN 25 TOWER—WB2AUL

MONDAY—730PM—
INFORMATION
NET
K2JJ MODERATOR—146.865—
PL110.9

WEDNESDAY—800PM—
TECHNICAL NET
WB2AUL MODERATOR---
146.865—
PL110.9

THURSDAY—800PM—JUNIOR OPS
NET
KF2FK MODERATOR—
146.865—
PL110.9

SUNDAY---700PM—10 METER NET—28.456MHZ—USB—
WB2AUL
MODERATOR

THE TECHNICAL CORNER

What is a Switching Power Supply?

On August 12, 2010, in Technical Articles, by gtsblog

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There are many types and designs of power supplies. This article will describe what is commonly known as a switching power supply, sometimes referred to as a switched mode power supply (SMPS), or 'switcher'.

All electronic circuits require a voltage source in order to operate. In the United States, the most common voltage available to consumers from the electric utility is the 120V RMS nominal alternating current found at outlets throughout homes and businesses. In contrast, most electronic circuits in use today require a stable direct current source with a much lower voltage – usually 3 to 12 volts.

Virtually every electronic device that operates from the AC mains must include a circuit that will derive a different voltage from the 120 volts that the utility provides. This is accomplished by a type of circuit referred to as a power supply. Power supplies can be generally grouped into two classes of operation.

Linear power supply designs are quite common and familiar to most people. They use a 'brute force' method of power conversion and regulation. The AC mains voltage is fed directly to a transformer which converts the 120V AC to the highest voltage required by the circuit it is designed to supply. The lower voltage is then converted to DC via a bridge rectifier, and then regulated by a transistor operating within its linear range – thus being dubbed a 'linear' power supply.

The advantage of linear power supply designs is that they are simple and straightforward. Disadvantages include inefficiency (50% or less), large physical size and weight, and generation of heat.

Switching power supply designs are typically more complex than their linear counterparts. As a result, the SMPS is also more versatile. SMPS design allows for either AC or DC input, and can output either AC or DC voltages, depending on circuit topology.

In a popular AC to DC SMPS design, the incoming AC mains voltage is first converted to DC using a bridge rectifier. This DC voltage is then fed to a 'chopper' stage containing highly efficient MOSFET switching transistors. The gates of the transistors are fed by an oscillator providing a constant frequency, pulse width modulated (PWM) signal (usually in the range of 50 to 300KHz) in order to 'chop' the DC into a high frequency AC voltage. This AC voltage is fed into the primary winding of a high frequency transformer. The transformer secondary winding voltage is then rectified to DC for use in the circuits where it is required. Regulation of the output voltage is accomplished by a circuit that samples the output voltage, and signals the PWM oscillator to vary the ratio of transistor 'on' time to 'off' time to maintain a constant voltage output.

There are significant advantages of this design over the linear design. The high efficiency of the switching transistors (80 to 90%) means less energy is wasted as heat, and the high frequency of operation allows for a much smaller and lighter transformer to be used.

Should an AC input voltage not be available – such as in an automotive application – the designer need only remove the rectifier stage from the power supply input, and use a high frequency transformer with the appropriate turns ratio to provide the desired output voltage.

In summary, the principal advantages of the SMPS are its ultra high efficiency, along with a significant reduction in size and weight. In today's world where efficiency and portability have become more important than ever, the SMPS is quickly becoming the preferred design for power supply circuits.

LINEAR VS SWITCHING POWER SUPPLY 2ND COMPARISSON

Have you heard the latest about switching power supplies? The newest designs offer persuasive advantages compared with linear power supply technology.

Power supplies serve extensive wireless communications applications. Basic distinctions between linear and switching power supplies make a difference, depending on the specific application. Each type has its own advantages and disadvantages.

Transformers Power supplies contain two main circuits: a primary side and a secondary side. The primary side connects to the power source, and the secondary side connects to the load. The interface between the two main circuits is the heart of the supply: the transformer.

Transformers convert the voltage available on the primary side to the required voltage level on the secondary side. Energy transfers from the primary side to the secondary by the continuous building up and collapsing of a magnetic field. Alternating current passing through the primary winding generates this field. The transfer of energy, from the primary to the secondary, takes place during the build-up and collapse phase of the magnetic field. This electromagnetic energy gets picked up by the secondary winding to generate the required voltage on the secondary side.

The voltage generated on the secondary side is generally proportional to the ratio of number of wire turns between the primary and the secondary windings. A transformer is normally made of a primary winding of copper wire, which is isolated from a secondary winding, and a core, which is made from a ferrous material such as iron or ferrite. Design and construction of a transformer requires consideration of such things as input and output current, voltage, core cross-sectional area and materials, insulation materials and methods, physical size and style, and temperature rise caused by core and wire losses. A transformer that has not been designed correctly may have less efficiency and may be electrically unsafe.

The basic technology behind switching transformers is: As the rate of change of the magnetic field increases in the transformer (i.e., increase in switch

frequency), the transformer can be made smaller with smaller cores and wires to produce the same output power. Lighter core materials such as ferrite can be used instead of laminated iron. The resulting transformer assembly becomes much smaller and lighter than its linear counterpart.

Linear supplies: basic theory The incoming ac voltage is stepped down to a lower ac voltage. For example, 120Vac is stepped down to 24Vac. The 24Vac is then rectified through a full-wave bridge rectifier, usually with a high-current, low-voltage bridge. A filter capacitor is used to maintain a constant dc level with minimum ripple.

The output voltage is controlled by a power transistor operating in its linear region. It acts as a variable resistor in series with the load. The power transistor receives its control from a circuit that senses output voltage. The control circuit modifies the transistor bias to maintain a constant voltage output, regardless of changes in the load current.

Switching supplies: basic theory The incoming ac voltage is rectified and filtered to produce a high-voltage dc. A low-current, high-voltage bridge rectifier (that may not require a heat sink) can be used, as opposed to the linear bridge.

A power transistor_a metal-oxide semiconductor field-effect transistor (MOSFET)_is connected in series with the transformer. The MOSFET serves as an on-off switch and switches at a preset frequency. While the MOSFET is switching, the magnetic field in the transformer is building and collapsing, allowing energy to transfer to the secondary side.

The magnetic energy received by the secondary windings of the transformer is then full-wave-rectified and reconstructed into the proper dc level. A sample of parameters (Vout, Iload, etc.) can be sent back to the primary side to serve as input to the pulse-width modulator (PWM). The PWM circuit modifies the length of time that the MOSFET is switched "on" in order to maintain output regulation. For example, in a switching power supply producing 12Vdc and powering a 3A load, an increase in the load to 4A causes the output voltage to drop slightly. The feedback circuit detects the voltage drop and passes it to the PWM, which turns the MOSFET on for a longer period (i.e., it increases the duty cycle), causing more magnetic energy to transfer to the secondary side until the output voltage reaches its predetermined value.

Switching frequency Frequency for a switching power supply usually ranges between 30kHz and 150kHz, but it can be much higher. Frequency for linear power supplies is the same as the line frequency (60Hz in North America). Switching frequency selection depends on the application for which the power supply is designed. Because high frequency switching occurs at fo, harmonics

are generated at 3fo, 5fo, 7fo…. The selection of the frequency has to be such that none of these harmonics will interfere with the load. With power supplies for two-way radios, for example, the switching frequency should be selected so as not to interfere with VHF, UHF or the intermediate frequencies (IF) used in the radios.

Advantages and disadvantages * Linear _ One advantage of linear power supplies may be familiarty, because they have been available for many years. They are known to be relatively noise-free and reasonably reliable. They are generally easy to design and fairly inexpensive to manufacture.

Because of the large transformers required, linear power supplies are generally heavy, which may be either an advantage or a disadvantage, depending on the need to balance weight distribution in a given application. As a general rule of thumb, a 16V-output linear power supply weighs about one pound per ampere. A possible disadvantage of linear power supplies relates to the power transistor used to regulate the load. Because the power transistor operates in its linear region, and all the output current must pass through it, it requires large heat sinks to dissipate energy loss. (Recall that the power transistor is in series with the load and acts as a variable resistor.) Except in rare instances where heat is wanted to warm interior space, the inefficiency of linear power supplies_50%_has to be considered a disadvantage.

*** Switching power supplies _ Although switching power supplies have been available for a number of years, higher production costs, compared to linear power supplies, have limited their use in some applications. Early switching power supplies used discrete components to control pulse width, and transistors instead of MOSFETs as main switch components. As a result, the disadvantages of switching power supplies once included uneven reliability and radiated EMI (electrical noise). Although they were known to be noisy, unreliable and difficult to mass produce, switching power supplies had the advantage of being lighter and smaller than their linear counterparts. In the last few years, big improvements in PWM and MOSFET design have been made. Today, when all design considerations have been taken into account, switching power supplies are highly reliable and virtually noise-free. Production costs have come down because application-specific components are being designed for use in switching power supplies.**

Switching power supplies are about 80%-90% efficient. Higher efficiency usually is an advantage, because heat normally is considered to be wasted energy (at the least) and potentially damaging to nearby electronic components.

Conclusion Switching power supplies are gaining in popularity mostly because of their smaller size and lighter weight. Reliability and noise characteristics are

becoming less-and-less of an issue as customers learn about the latest product developments. When assessing efficiency, size and cost of shipping, one has to consider the alternative to a linear power supply: the switching power supply.

QUITE A FEW MEMBERS HAD ASKED ABOUT THE DIFFERENCE IN A LINEAR POWER SUPPLY COMPARED TO A SWITCHING SUPPLY, I HOPE THE TWO COMPARISSONS ABOVE HELP YOU TO UNDERSTAND THERE DIFFERENCES AND HOW THEY WORK.