Indian Streams Research Journal ORIGINAL ARTICLE ISSN:-2230-7850

DEVELOPING SIDE BY SIDE APPLICATION OF AUTOMOTIVE DIGITAL SATELLITE CONTROL SYSTEM & POWER SIDE BY SIDE APPLICATION FROM AUTOMOTIVE DIGITAL SATELLITE CONTROL SYSTEM FOR COMMUNICATIONS, BY USING THE MICRO CONTROLLERS SYSTEM

Shiva Prasad Padigala , Farhan Akthar , Ranadheer And Shankar

Abstract:-This paper discusses the antenna power system supply side by side application from automotive digital satellite control system for communications, by using the micro controllers System for communications, by using the micro controllers MAX16948 model automotive dual, high voltage switch. The ADSCS application circuit provides a remote antenna power system and also starts one way communications from the radio unit block to remote antenna block. This type of Architecture provides flexibility in ADSCS frequency choice(1000 HZ to 300KHZ) which allows the user to select best frequency for their applications.

Keywords: Automotive power, Antenna power, Radio Head unit, Remote antenna, LDO, LNA, LNB,ADSCS(automotive digital satellite control system).

1.INTRODUCTION:

The microcontroller MAX16948 is an digital automotive device of two high voltage low dropout linear regulator (LDO) and the internal circuit switch with output current sensing technology. The device provide power supply over the coaxial cable for the remote radio frequency (RF) low noise amplifier (LNA) in the automobile application system with a least current of 250 Ma/channel. The micro controller max 16948 device providing a stable & fixed regulate output voltage of 10 V or an adjustable low dropout mode from 1v to 12v at regulated output voltage.

The Automotive digital satellite control system standard is a communications protocol proposed & developed by Eutelsat & sstl used between satellite receivers which act as master switch and satellite peripheral equipment control such as disk circular switches, low noise blocks and defined as claves switch. The Automotive digital satellite control system communication systems uses only the coaxial cable, thus making the ADSCS ideal to reduce cost and improve reliability the ADSCS is an open access communication standard with non property commands. Thus to start one way ADSCS communications on the antenna cable, a 30kHZ tone frequency must be transmitted from the radio head unit block and received by the remote antenna block that derived produced voltage amplitude of the tone burst (frequency) is 600mv, which is the value indicated by the ADSCS, standard protocol. The antenna coaxial cable is also used to feed the low noise amplifier and to transmit the received radio signal. Due to this effect the ADSCS receiver must be able to reject unmounted radio signal on the coaxial cable.

The ADSCS application circuit:-

In the application circuit of the ADSCS the micro controller MAX16948 is used in the low drop point made (LDO) and the reputated O/P voltage is the convectional changed to generate the ADSCS wave form. The blue black as the radio head unit, which include the remote antenna power supply to the micro controller MAX16948, which is also used as ADSCS tone burst transmitter and the tuner. The red black is the remote antenna, low noise amplifier (LNA) and ADSCS receiver. The microcontroller MAX931 of low power comparator.

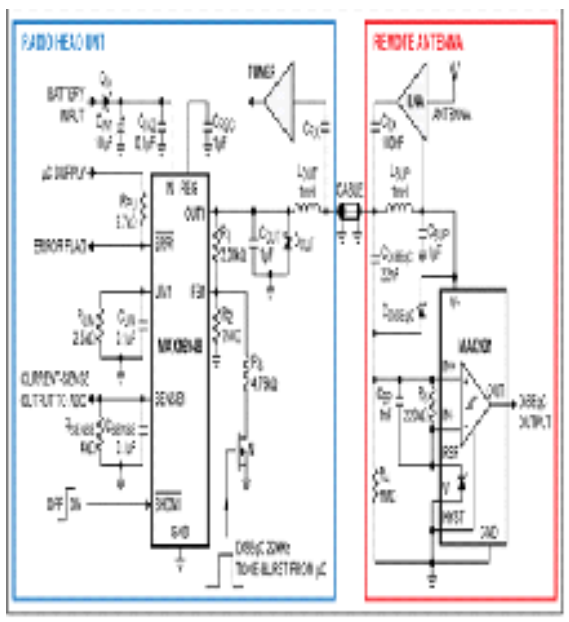

Figure 1. The ADSCS application circuit

The coaxial cable starts the communication between the radio head unit block and the remote head block. Also it is used to feed the remote LNA, reducing the cost and complexity the configuration of the MAX16948 micro controller is done in low drop point (LDO) made with 95 V output voltage, when the external NMOS device is turned off this output voltage is obtained in the dimensions of R_1 and R_2 resistors or it is shown in the radio head unit. For the relation of the external components for the automotive a dipole

remote antenna current sensor LDO per switch if the different dipole antenna feed voltage is required for which the use of following equations can be related R_1 and R_2 .

$$R_1 = \left(\frac{V_{OUT}}{V_{FB}} - 1\right) \times R_2$$

Where the VFB is the voltage at which feedback pin in the regulation and R_2 must be less than or equal to 1kohms. When external device NMOS is turned on, the R_3 resistor is connected in the parallel with R_2 resistor. Thus it brings the output voltage regulation to 5.60 volts with the help of circuit configurations, the user can easily generate a ADSCS 30 KHZ tone burst by tuning the external NMOS device on and off through the micro controller. If the different remote antenna feed voltage is required, then select the R_3 resistor using the below equations.

$$R_3 = \frac{R_1 \times R_2}{\left[\left(\frac{V_{OUT} + 0.6}{V_{FB}} - 1\right) \times R_2\right] - R_1}$$

RLIM and RSENSE set the o/p current limit to 200mA and the analog to digital convertor full screen range up to 4V. For the specification the reason, only one channel of microcontroller MAX16948 is shown on the schematic, since the same consideration was also applicable to the same channel. The output inductor is required to filter out for the radio signal and reduce the complexity conflict with the microcontroller MAX16948 low drop out regulator. Now considering the Lower frequency AM bands of 160 KHz, a 1.2mH inductor output is sufficient. The radio signal is extracted from the coaxial cable by the tuner with a bypass capacitor. The remote antenna power supply is used to feed the low noise amplifier is obtained through a low power filter which is built with the indicator and capacitor. Therefore the first approximations are that power supply filter is on RLC Low per filter.

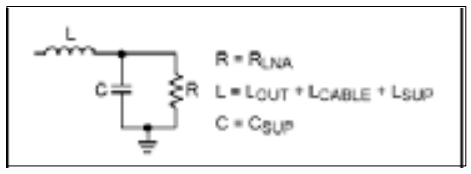

Figure 2. Power supply filter.

The -3db pass band must be below the frequency used for ADSCS communications. The low power comparator which gets ON the ADSCs and it is supplied with the same voltage supply as the low noise amplifier. The negative input comparator is connected to the REF voltage provided by the microcontroller MAX931 itself, while the positive input comparator is polarized with air resistor diode in the order to have zero output voltage in the absence of ADSCS tone burst. To reverse the ADSCS tone burst is rent on the coaxial cable, the pristine input voltage exceeds the negative input voltage, which generates a wave form on the output of the comparator. The stocky diode for protections is connected between positive input thermal and comparator power supply input to avoid the over voltage on the positive input pin. Also to avoid false output pulse triggering due to the radio signal travelling on the cable, A1nF bypass capacitor is placed between MAX931 comparator.

Bench test:-

The bench test were used to perform for generating 5V amplitude of 2kHz tone burst within waveform generator connected to the gate of the external NMO device. A sinusoidal wave form of 500mV amplitude RF signal is obtained with another wave form generated and injected with the transmitter capacitor, emitting the low noise amplifier amplitude (LNA). Out put radio signal the MAX931 output is monitored with oscilloscopic to conform whether the rent tone burst is received and check that injector radio signal does not influence the ADSCS communications Fig 3 and Fig 4 illustrates the scope of the test performed. Fig 3 shows result with an injected radio signal at 16kHz that consider with the lower band width AM frequency Fig 4 shows the result with an injector radio signal at 37kHz which is sub harmonic of the lower AM band frequency.

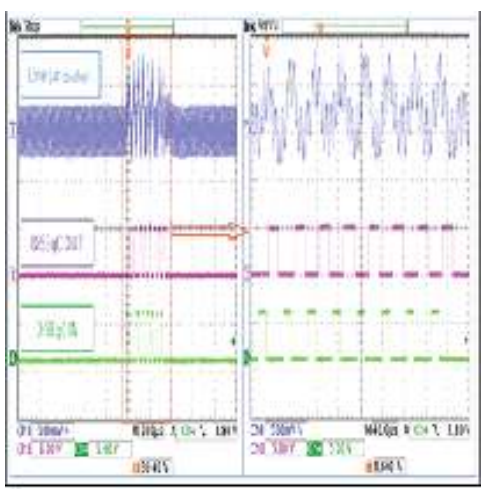

Figure 3. RF signal at 160 kHz (500mV amplitude).

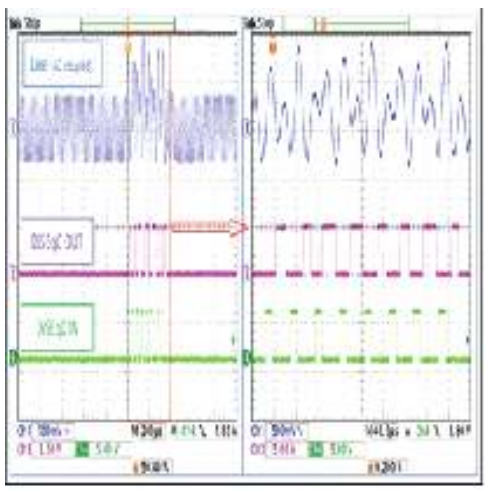

Figure 4. Shows the results with an injected radio signal at 37kHz

CONCLUSION

The presented ADSCS application circuit is a low-cost and flexible solution for an antenna phantom supply that is compatible with the ADSCS communication standard. Additional bench test results have confirmed that ADSCS communication still operates when selecting the ADSC Stone-burst frequency in the range between 100Hz to 30kHz. This provides the flexibility to tune the most suitable frequency for ADSCS communication, thus minimizing interference with other RF signals on the coax cable. Users can also regulate the tone-burst duty cycle and add hysteresis to the MAX931 comparator to attain the best ADSCS communication performance.

This application circuit enables one-way ADSCS communication; if a receive-acknowledge signal is needed from the remote antenna, it can be generated by modulating the load current of the MAX16948. A simple way to do this would be to connect an extra load in parallel to the LNA supply inside the remote antenna once the ADSCS message is received. The microcontroller in the radio head unit can receive the acknowledgment by sampling the load current.

REFFERENCES

1.Gallager R., Low-density parity-check codes, Ph.D.dissertation, 1963.
2.MacKay D. J. C., Gooderror-correctingcodesbased on very sparsematrices, IEEE .Transactions on Information theory, vol. 45, n. 2, March 1999, pp. 399-431.

3.Miladinovic N. andFossorier M. P. C., Generalized LDPC Codes and Generalized Stopping Sets, IEEE Transactions on Communications, vol. 56, No. 2, Feb 2008.
4.Wang Y. and Fossorier M. P. C., Doubly Generalized LDPC Codes over the AWGN Channel, IEEE Transactions on Communications, vol. 57, n. 5, May 2009, pp. 1312-1319.
5.Perez-Fontan et al., Statistical Modeling of the LMS Channel, IEEE Transactions on Vehicular Technology, vol. 50, no. 6.
6.Kschischang F. R., Frey B. J., Loeliger H-A., Factor graphs and the sum-product algorithm, IEEE Transactions on Information Theory, vo. 47, no. 2, February 2001.
7.Consultative Committee for Space Data Systems (CCSDS). Low density parity check codes for use in near-Earth and deep-space applications.
8.Verdù S., Spectral Efficiency in the Wideband Regime, IEEE Tran. Inform. Theory, vol. 48, no. 6, June2002.
9.European Union, European GNSS (Galileo) Open Service, Signal In Space Interface Control Document.
10. RTCA SC-159, Assessment of Radio Frequency Interference Relevant to the GNSS L5/E5a Frequency Band, RTCA DO 292, July 2004.
11."Navigation device assisting road traffic congestion management." FreshPatents.com. 9 March 2007. http://www.freshpatents.com/Navigation-device-assisting-road-traffic-congestion-management-dt20080925ptan20080234 921.php 12 Oct. 2008.
12. Husby, Jonathon. "In-car navigation matures beyond 'Point A to Point B'." Electronic Engineering Times. 28 Jan. 2008. http://www.automotivedesignline.com. 12 Oct. 2008.
13."City Maps" Tele Atlas BV. 2008.
http://www.teleatlas.com/OurProducts/MapEnhancementProducts/CityMaps/index.htm. 12 Oct. 2008.
14."United States Updates Global Positioning SystemTechnology."America.gov.3Feb.2006.
http://www.america.gov/st/washfileenglish/2006/February/20060203125928lcnirellep0.5061609.html. 12 Oct. 2008.
15.An Introduction to the Imaging CCD Array, Technical Note 82W-4022, Tektronix, Inc., Beaverton, OR., 1987.
16.Brad Brannon, Using Wide Dynamic Range Converters for WideBand RadiosRF DesignMay 1995.
17.Joe Mitola, The Software Radio Architecture, IEEE CommunicationsMagazine, Vol. 33, No.5, May 1995, pp. 26-38.
18.Jeffery Wepman, Analog-to-Digital Converters and Their Applications in Radio ReceiversIEEE Communications MagazineVol. 33, No.5, May 1995, pp. 39-45.
19.Rupert Baines, The DSP Bottleneck, IEEE CommunicationsMagazine, Vol. 33, No.5, May 1995, pp. 46-54.
20.Brad Brannon, Overcoming Converter Nonlinearities with Dither Application Note AN-410, Analog Devices, 1995.
21.Chris Keate and Mark O'Brien, DBS Receiver Chip Simplifies Set-Top Box Design RF Design, November 1995.
22.Bill Schweber, Direct Satellite Broadcast EDN, December 21,1995.