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IMPLEMENTATION of DATA LOGGER INTEGRATED with TRANSMITTER and SENSOR

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ABSTRACT

The Data logger integrated with transmitter and sensor used in AWS (Automatic weather station) products .The data-logger is the heart of the Automatic Weather Station. In high quality weather stations, the data-logger may be designed by the supplier to be the perfect solution for a particular meteorological client. Indeed, usually data-loggers found in the market don't fit the requirement in terms of power consumption, inputs, communication, protection against animals (ants, rats, etc.), humidity, salty air, sand etc. The main functions of a data-logger are (A) Measurement: the data-logger collects the information from every sensor and archives it.
Calculation: the data-logger processes most of the meteorological data for the users. (B) Data storage: the data-logger saves all the data either on its own memory or on USB memory card. (C) Power supply: the data-logger manages the power supply of the Automatic Weather Station, using a solar panel for instance. Communication: the data-logger manages the communication protocols with the remote server. The different communication protocols are usually UHF Transmitter and GSM based communication.

Keywords: *Introduction, Back Ground related project, Design plane, Testing, Result, Reference websites.*

I. INTRODUCTION

This document describes Data logger integrated with sensors. Augmentation of current observation network is essential for providing weather and related information at local level. The AWS is designed as a very compact, modular, rugged, powerful and low cost system and housed in a portable self-contained package. The AWS consists of compact data logger, data transmitter, and crossed Yagi Antenna, GPS, Solar Panel and Meteorological Sensors (Air Temperature, Relative Humidity, Atmospheric Pressure, Wind Direction, Wind Speed, Solar Radiation, Rain Gauge etc...).AWS transmits Meteorological Data from any remote station installed in the footprint of INSAT/KALPANA Satellite.

Minimum Power requirements allow extended field use from a DC Voltage Source. The Automatic Weather Station (AWS) will be installed in the field for collecting Meteorological data. Each AWS will automatically take the observations from all meteorological sensors every hour (or user selected interval) and store data in its memory. The logged data will be transmitted in a self-timed pseudo random manner in its prescribed 10 minutes slots within an hour.

Every AWS transmits its meteorological data in a burst of 68 millisecond duration (at a data rate of 4.8kbps) 3 times within its allotted transmission window. The overall probability of data reception for the system is 95% or better. The data from the AWS network could be received centrally by an Earth Receiving Station (ERS) at the users at the users end. The ERS will receive and process the data transmitted by all AWS's in the field. The Transmitter, Data logger, Power supply and battery are housed in a weather proof enclosure. This AWS operates on a single 12 Volts rechargeable SMF battery, charged by a suitable solar panel.

II. BACK GROUND RELATED TO PROJECT

An AWS data Receiving Earth Station at Pune will be installed. There will be 550 AWS stations installed all over

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the country. These will transmit the weather data in the TDMA format. This data will then be processed and transmitted on an Ethernet Network as well as on the GTS link to be made available to the end user. The AWS equipment will incorporate the state-of-the-art technology (e.g. micro controller, ASIC, FPGA etc) and provide capability for unattended operation for over an extended period at remote places, using a 12V single Sealed Maintenance – free battery, rechargeable through a solar panel. All equipment will be qualified for MILSTD 454K specifications and suitable for outdoor application. The AWS will be housed in weather-proof enclosure and shall meet all specified environmental specifications.

AWS system will have in-built memory of storing data for at least 12 months period. Data retrieval will be through USB drive. The system will have inbuilt test facility to monitor and display the configuration and functions of various subsystems. System will have a dedicated port to interface a remote display unit and facilitate values of meteorological parameters to be displayed in real time basis.

The complete IMD AWS Network will consist of the following:-

a) AWS Receiving Earth Station
b) 550 Automatic Weather Stations (AWS) deployed in Field all over the country.

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III. DESIGN PLANE

Then the frequency filtered with band pass with band of 402-403MHzThen frequency is mixed up With BPSK modulated signal with low power. Again the modulated signal filtered with band pass filter. Finally will get the actual carrier with message signal without noise. Then micro controller wills trigger the supply for power amplifier
In power amplifier MOSFET RA07H4047M has capable to generate 10 Watt power. Our specification is 5 Watt

Then MOSFET is suitable for our requirement. Finally the output signal will on the RF SMA connector through isolator. Isolator protects reverse Protection of circuit.

A) Sensors
B) Battery/Charger/Solar panel

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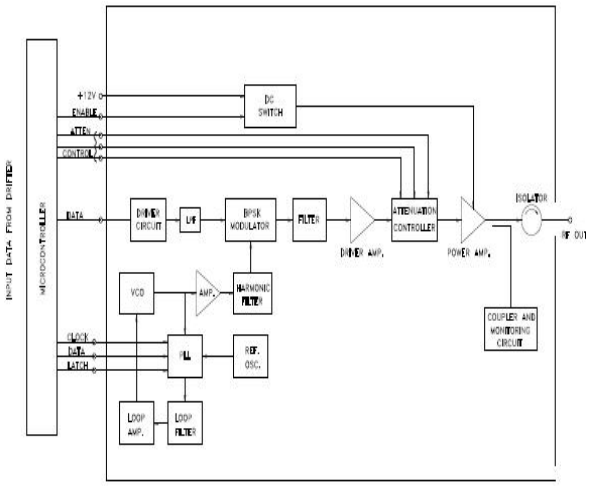

Fig 1. The block diagram of Transmitter system system

IV. TESTING

1. Make the set up as per below fig.
2. Set +12V in the regulator power supply.
3. Set th frequency to 402.65 MHz in the frequency synthesizer by pressing transmitter setup key and the frequency by using number keypad and press enter and also set the power level to “Full power”
4. Set the frequency to 402.65 MHz in the spectrum analyzer and measure the transmitting frequency.
5. Press self-test debug and go the ‘Continuous Transmission mode’.
6. Measure the power level of the carrier.
7. Measure the power of second (805.30 MHz) & third harmonic and spurious within 100 KHz & 1 MHz.
8. Take the phase noise reading in the latest version spectrum analyzer having the additional module for measurement of phase noise, for all the frequencies at 100 Hz and 1 KHz.
9. Set the data rate to 300 bps in the function generator. Measure the carrier suppression at full power.
10. Measure the amplitude balance at full power only.
11. Repeat steps 3 to 10 for power level -3dB, -5dB & -7dB at frequencies 402.75 MHz & 402.85 MHz

TEST SETUP OF UHF TRANSMITTER

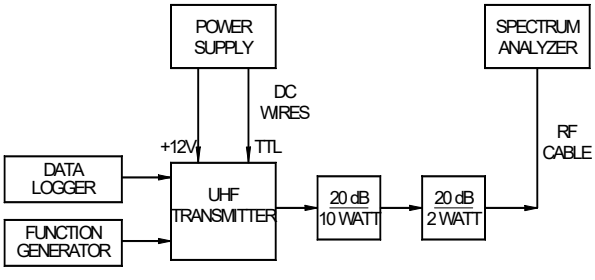

FIG : 3

fig: Test Setup

Check for Specifications of UHF Transmitter as per Data sheet filled by the testing team.

Evaluate the UHF Transmitter randomly for temperature testing, soak them at maximum temperature (i.e60°C) and at minimum temperature (i.e. 0°C) for 2 Hours. & soak them at maximum temperature (i.e-40°C) and at minimum temperature (i.e. 30°C) for 2 Hours.

V. RESULTS

This data received from AMP earth station through satellite. The transmitting data same as receiving data. Input frequency 402.71 MHz Power 5 Watt. I am used in TDMA technique so times slot 20min, 30 sec. Insat 3a satellite used. Starting ending character used $.

Data format: $ NIOT UHF TRANSMITTER AMPL BURNING UNIT $

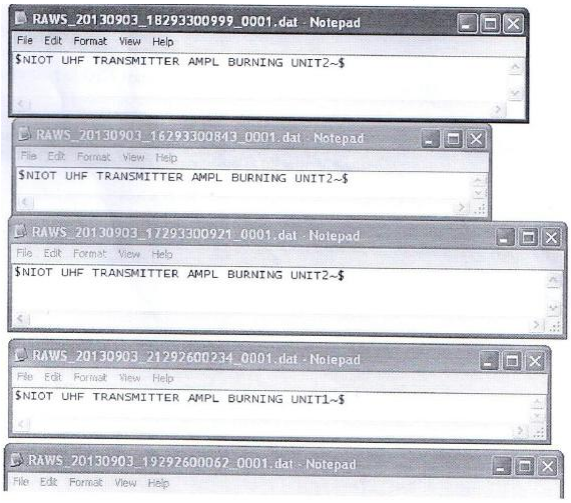

Fig: Results Earth receiving station

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