# DSNG SYSTEM



**DIGITAL SATTELLITE NEWS GATHERING SYSTEM**

# WHAT IS DSNG?

- Satellite news gathering (SNG) is the use of mobile communications equipment for the purpose of worldwide news-casting. Mobile units are usually vans equipped with advanced, two-way audio and video transmitters and receivers, using dish antennas that can be aimed at geostationary satellites.

# Cont....

- A modern DSNG van is a sophisticated affair, capable of deployment practically anywhere in the civilized world. Signals are beamed between a geostationary satellite and the van, and between the satellite and a control room run by a broadcast station or network.
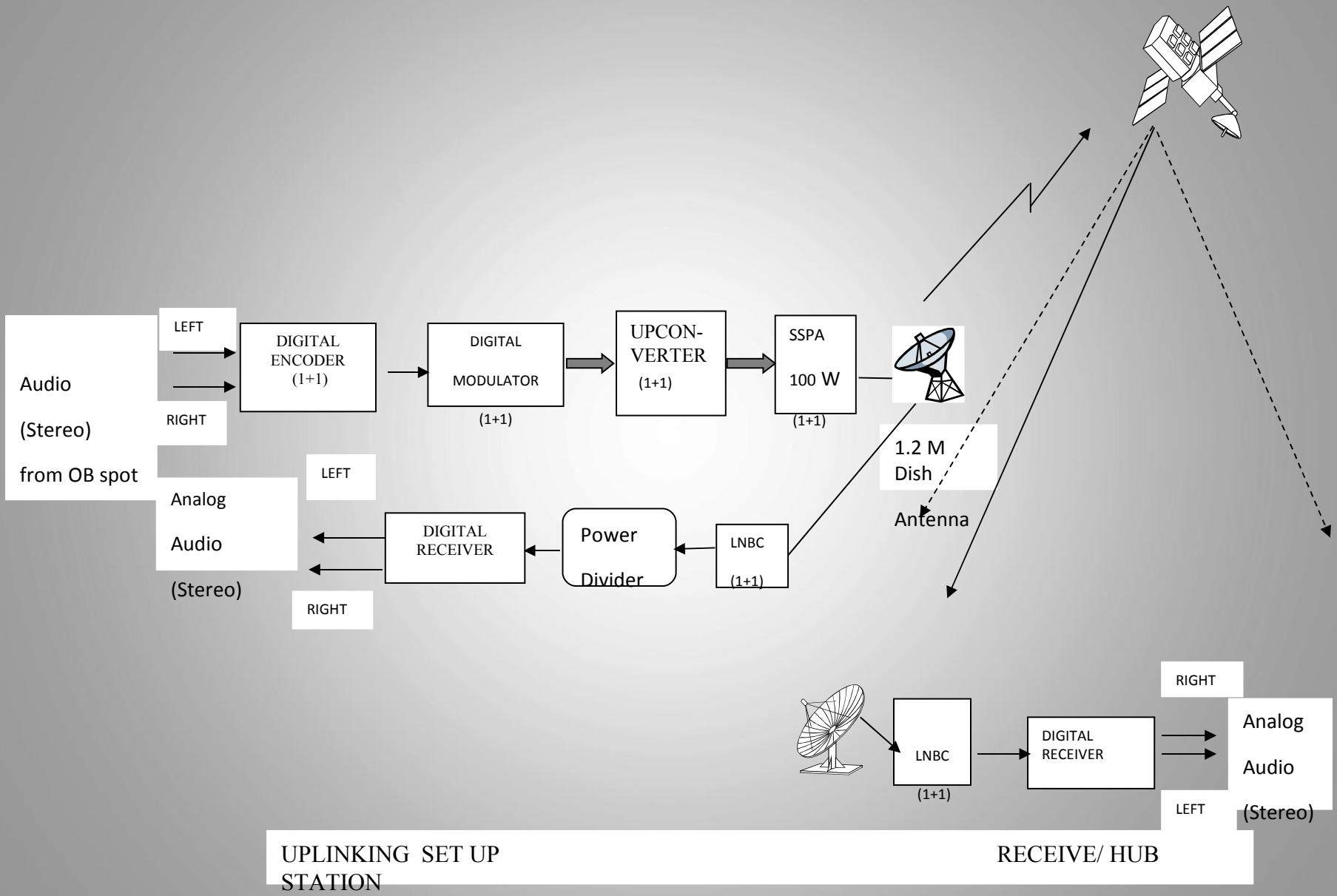
# TYPES OF DSNG IN
# AIR NETWORK

- **MOBILE DSNG SYSTEM**

  **Equipments are mounted within a vehicle.**





- **FLYAWAY DSNG SYSTEM**

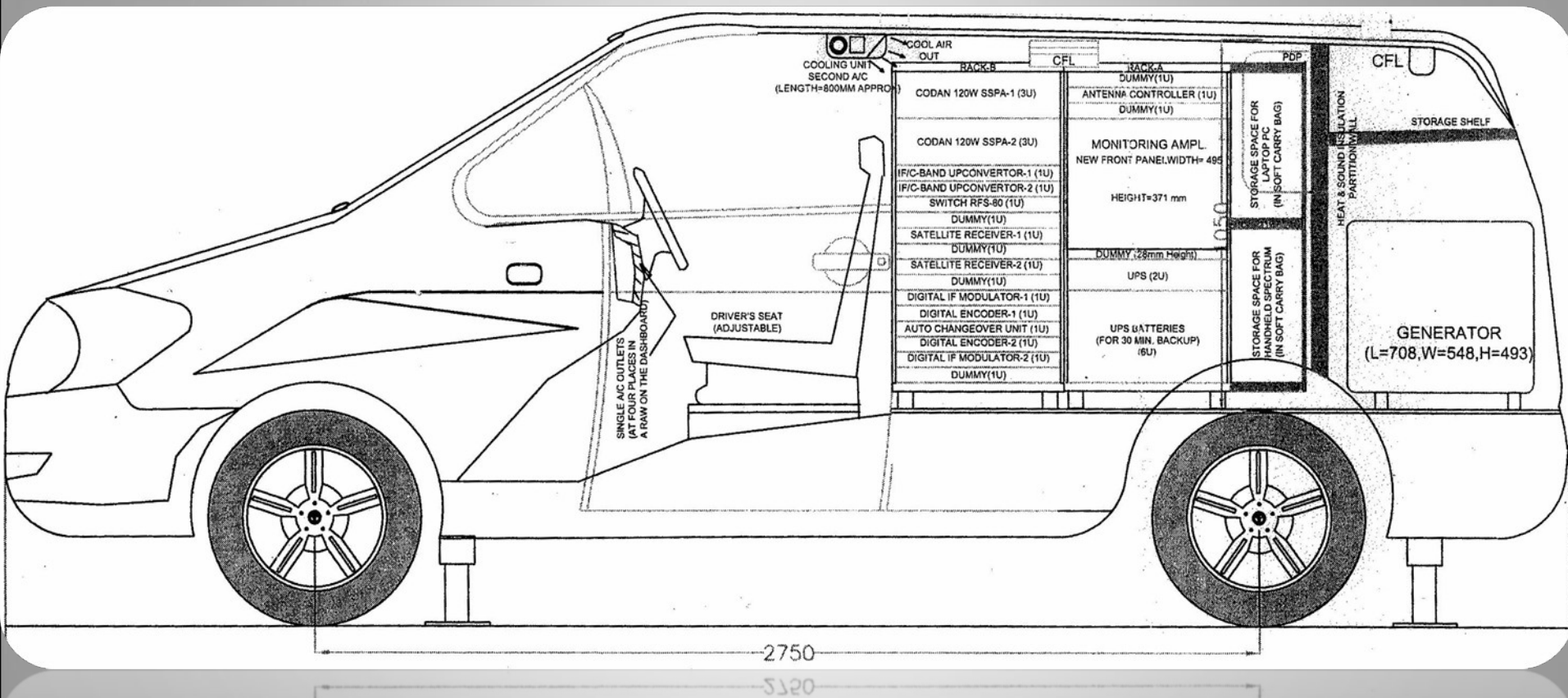  **Equipments are mounted within carry away suitcases.**

**UPLINKING SET UP STATION**

**RECEIVE/ HUB**

Audio (Stereo) from OB spot

LEFT

RIGHT

DIGITAL ENCODER (1+1)

DIGITAL MODULATOR (1+1)

UPCON-VERTER (1+1)

SSPA 100 W (1+1)

1.2 M Dish Antenna

Analog Audio (Stereo)

LEFT

RIGHT

DIGITAL RECEIVER

Power Divider

LNBC (1+1)

LNBC (1+1)

DIGITAL RECEIVER

RIGHT

LEFT

Analog Audio (Stereo)

# TYPICAL MOBILE DSNG SYSTEM LOOKS LIKE
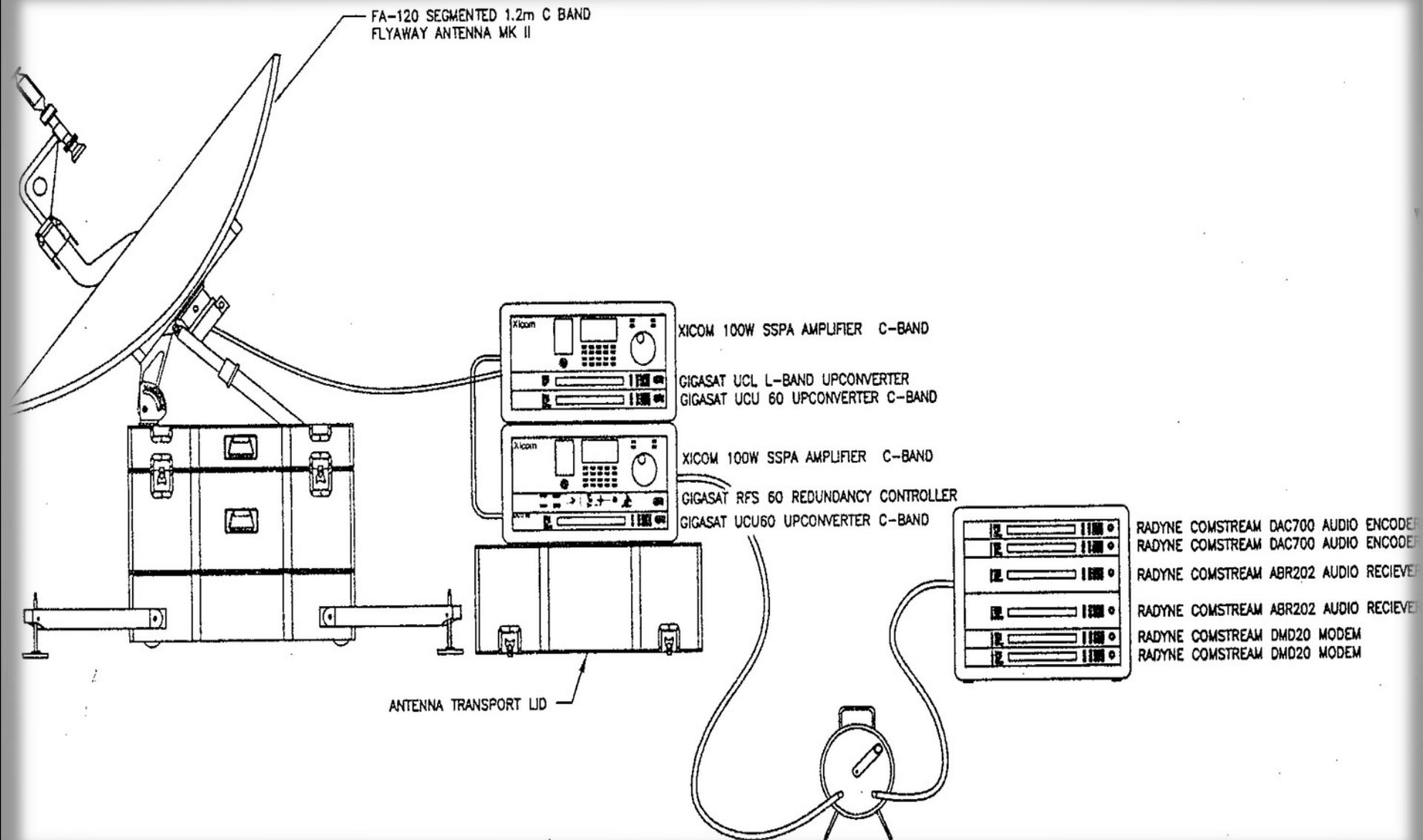
# Lay out of Mobile DSNG System

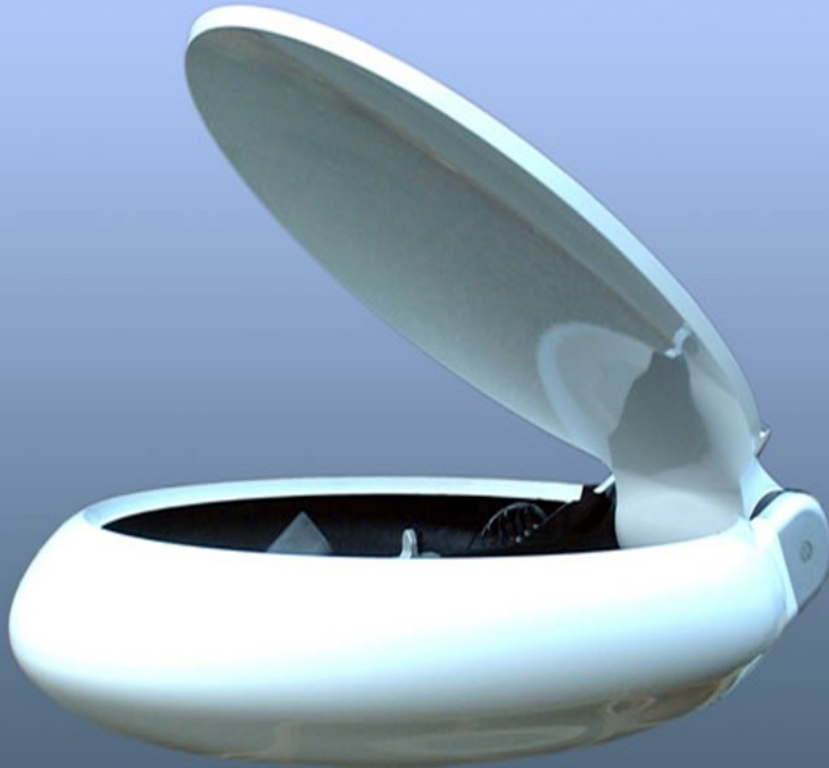# TYPICAL FLYAWAY DSNG SYSTEM LOOKS LIKE

# Lay out of Fly Away DSNG System

# COMPONENTS OF DSNG SYSTEM

- **MOBILE DSNG OUTDOOR UNIT : EASILY DEPLOYABLE 1.2M ANTENNA UNIT MOUNTED ON TOP OF THE VEHICLE ALONG WITH ACCESSORIES LIKE LNBC**

- # INDOOR UNITS :
  - BASEBAND UNITS LIKE ENCODER,MODULATOR.
  - UPCOVERTERS,SSPA
  - UPS, PETROL GENERATOR.

# DESIGN CONSIDERATION

- **Weight consideration.**
- **Link Budget calculation.**

# 1. LINK BUDGET CALCULATIONS

1. Antenna Gain : $G = 10 \, Log \, \eta \left( \frac{\pi D}{\lambda} \right)^2$

      G = Gain of Antenna

      D = Diameter of Antenna

      D = Wave length

      = = Efficiency (usually 0.5 to 0.65)

The gain if the antenna under consideration

= 37 dBi.

# LINK BUDGET CALCULATIONS

2.  Transmit Station EIRP: $10 \log (P_t \times G_t)$

    $P_t$ = Out put Power of SSPA/HPA in Watts.
    (Say : 10Watts = 10 dBw)

    $G_t$ = Gain of Antenna ( 37 dBi)

    EIRP = 10 dBw + 37 dB = **47 dBw**

# LINK BUDGET CALCULATIONS

3. Flux density at Satellite Antenna Input :

   = EIRP -162.2 (47 - 162.2 = 115.2 dBw/M$^2$)

3. Path Loss :     $Lp = 10\,Log\left(\dfrac{\lambda}{4\pi d}\right)^2$

   *Lp* = Path Loss

   *d* = Distance between uplink site & Satellite

   (approx 36,000,000 meters)

   ( = Wave length

   In our case it is about 200 dB at 6 GHz

# LINK BUDGET CALCULATIONS

- C/No (uplink) = EIRP + G/T$_{(sat)}$ + Lp − $k$

  $$= 47 + (-2) + (-200) - (- 228.6)$$

  $$= 73.6 \text{ dB-Hz}$$

- EIRP$_{(downlink)}$ = Sat. flux density$_{(operating)}$

  + (Sat. EIRP $_{Saturated}$ − O/P Back-off)

  + (S.F.D. - I/P Back-off)

  $$= -115.2 + (38 - 4) - (- 85 - 6.5)$$

  $$= 10.3 \text{ dBw}$$

# LINK BUDGET CALCULATIONS

1. Down Link Path Loss :    $Lp = 10\,Log\left(\dfrac{\lambda}{4\pi d}\right)^{2}$
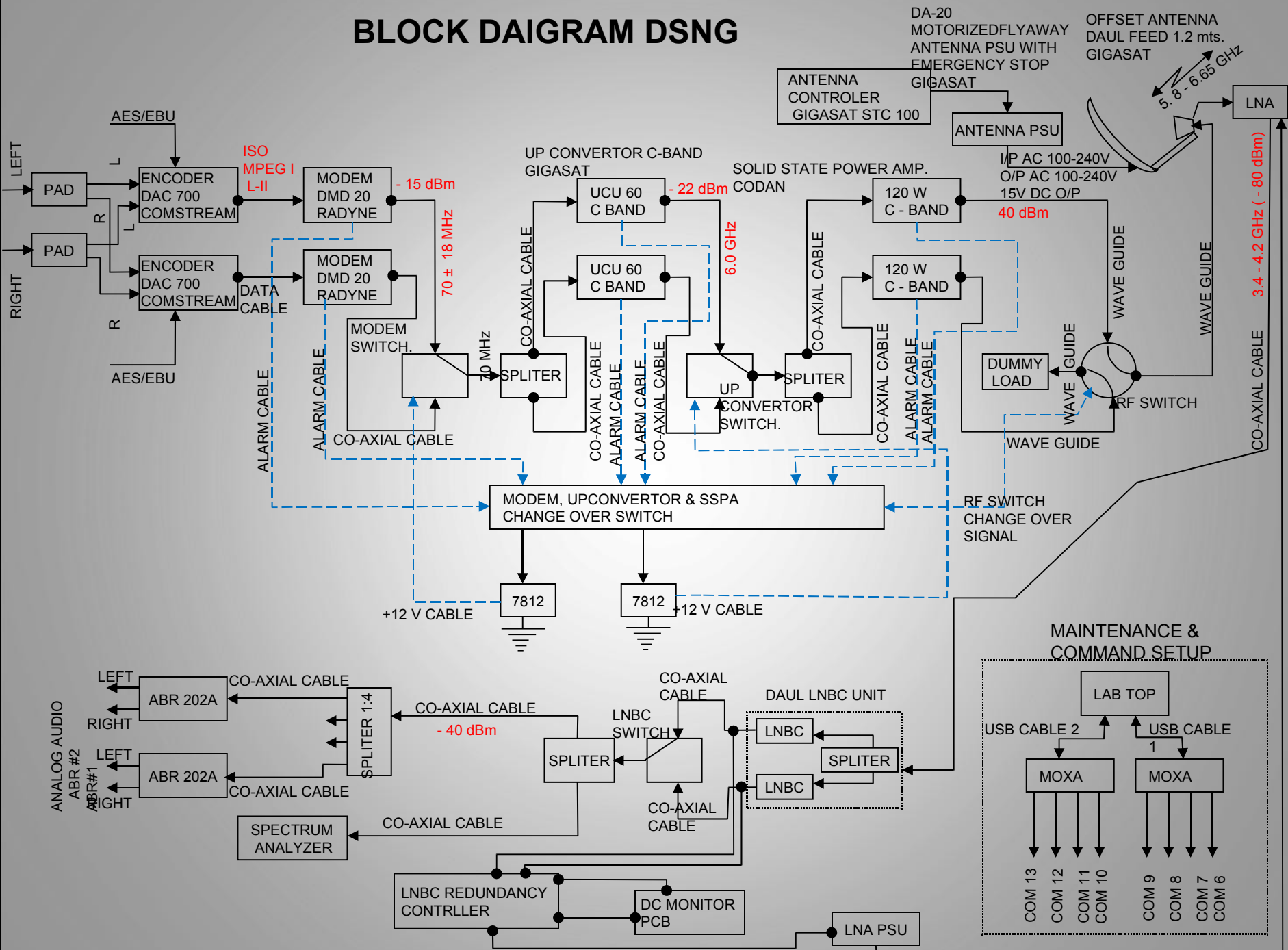
   (In our case it is about 196 dB at 4 GHz)

- Receive G/T (6 m antenna) = 25.5 dB/°K

- C/No (downlink) = EIRP + G/T$_{(CES)}$ + Lp − $k$

$$= 10.3 + 25.5 - 196 + 228.6$$

$$= 68.4 \text{ dB-Hz}$$

7. Eb/No. = C/No − 10 Log (Data Rate) [256kbps]

$$= 68.4 - 54.1 = 14.3 \text{ dB.}$$

# BLOCK DAIGRAM DSNG

# SUBSYTEMS OF DSNG

## DSNG ANTENNA:  Gigasat make

### Features:

- Carbon Fiber make antenna . Weight is less than 90Kg
- High **efficiency offset** feed design providing maximum gain – 37dBi
- Antenna can be stowed.
- STC-100 antenna **controller enables antenn**a to acquire and track satellites.
- Manual and motorized operatio**n of all** the three antenna motors.

## Antenna Controller:

- **STC 100 is a comprehensive controller available in 1RU providing all facilities including**
    - **Stow/Deploy**
    - **Jog Control**
    - **Auto positioning**
    - **GPS Receiver**
    - **Flux Gate Compass**
    - **Store/Recall Memory.**

- **Communication between STC-100 and Antenna is through an RS485 cross-site connection to the Local Antenna Control unit situated in the antenna cowl.**
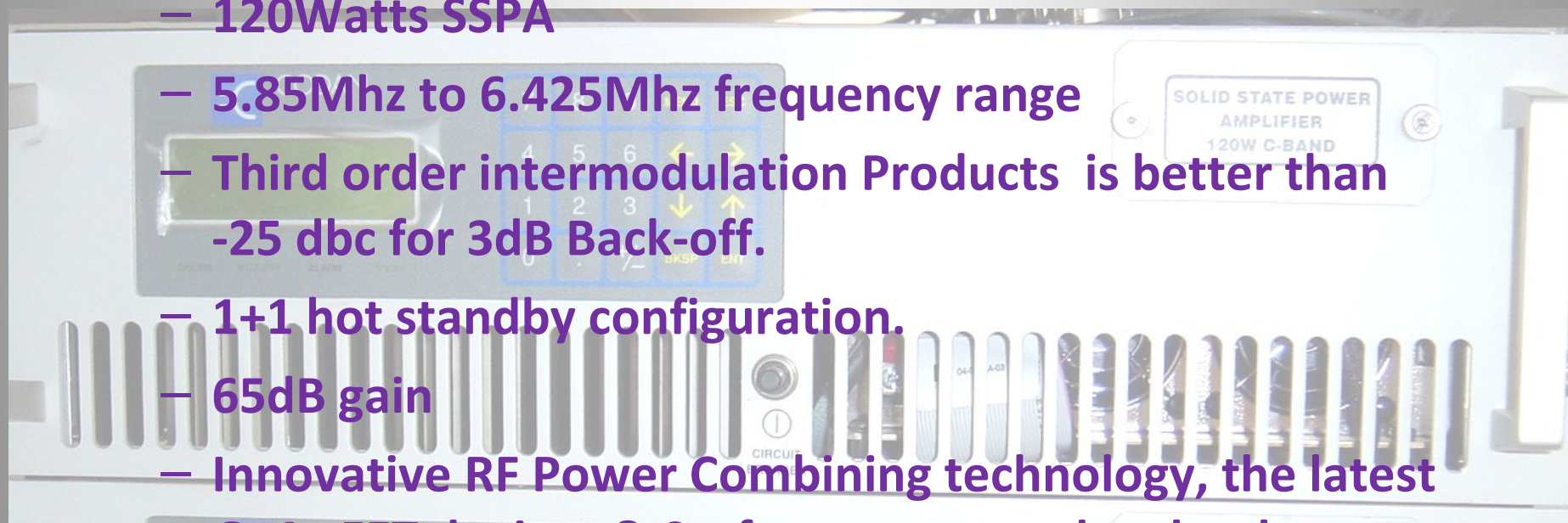
# Antenna Controller Interface diagram:
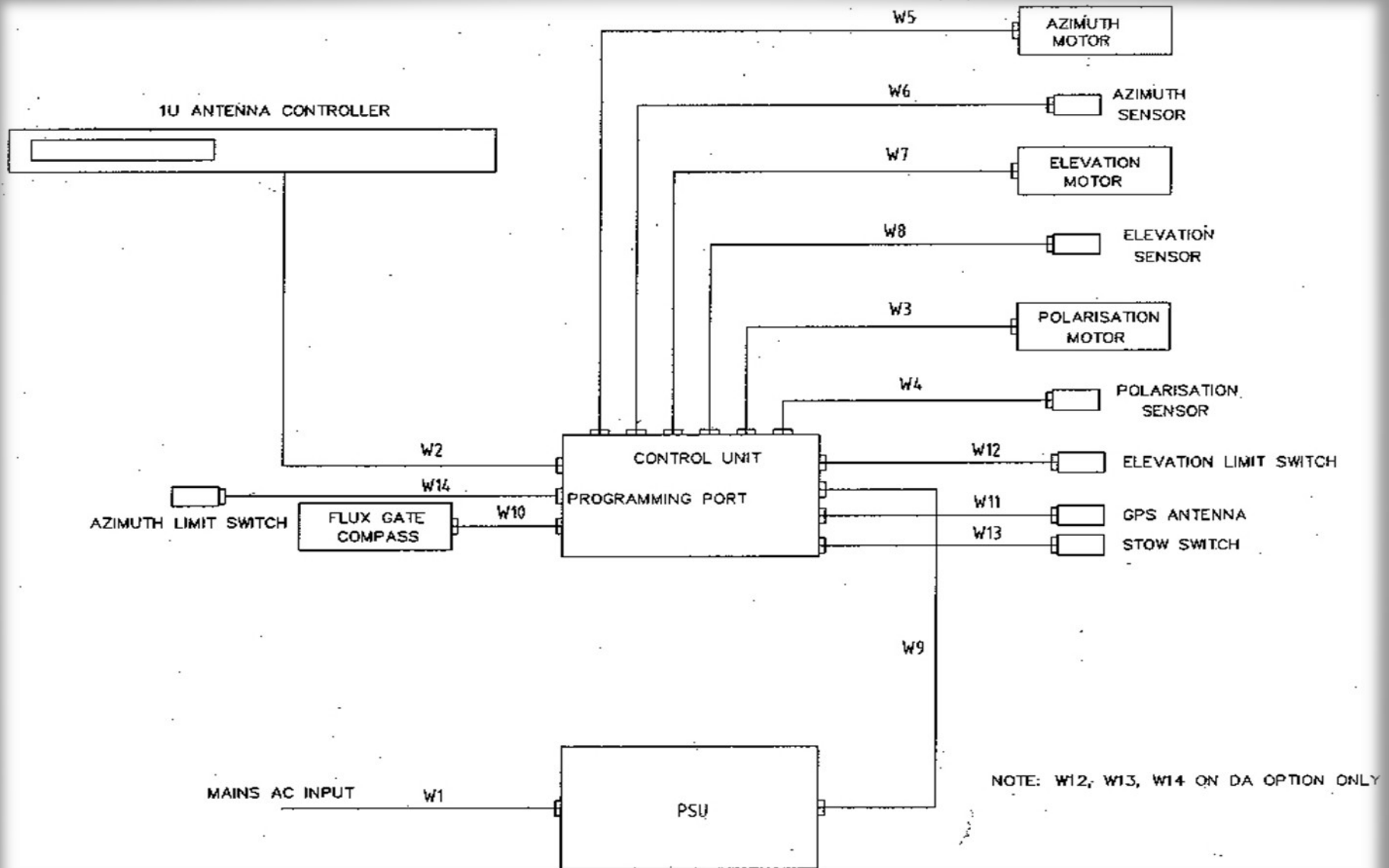
## 120W SSPA. CODAN Make

### Features:

- 120Watts SSPA
- 5.85Mhz to 6.425Mhz frequency range
- Third order intermodulation Products is better than -25 dbc for 3dB Back-off.
- 1+1 hot standby configuration.
- 65dB gain
- Innovative RF Power Combining technology, the latest GaAs FET devices & Surface – mounted technology are used in this SSPA

## C-Band Upconverter :  Gigasat Make

### Features:

- IF to C-Band Upconverter

- Output power :  +9dBm (max.)

- Gain adjustments :  >40dB in 0.5dBsteps

- Two stage Upconversion    i) from 70MHZ to L-Band

  ii) from L-Band to C-Band

- RF flatness across the band  ±1dB max

**IF Modulator: Radyne Comstream Make DMD20L**

- Modem provides the operation of different parameters such as variable data rates, FEC code rate, modulation type, IF frequencies, interface type can be readily set & changed at the front panel.

- This allow the remote control from computer using RS232.

- This modem contains a selectable RS232 or RS485 asynchronous Com Port for Earth Station – to – Earth Station communications. The baud rate & protocol can be selected from the front panel.

## IF Modulator: Radyne Comstream Make DMD20L

### Features:

- IF Frequency Range    52MHZ to 88MHZ

- Transmit Power:  -5dBm to -25dBm

- Supports Data Rates:  64kbps to 256 kbps

- Supports QPSK and BPSK

- FEC – Viterbi ½

- Supports monitoring and Controlling

**Cont…**

## Encoder: Radyne Comstream DAC700



## Features:

- **Digital Audio Codec**
- **ISO MPEG I Layer-II Compression**
- **Supports Data Rates:  64kbps to 256 kbps**
- **Accepts Analog and Digital AES/EBU input**
- **Supports monitoring and Controlling**

# Digital Satellite Receiver



# Radyne Comstream ABR202A

## REDUNDANCY CONTROLLER UNIT, RFS - 60

- RFS – 60, Make GIGASAT is used to control 3 switches: One switch for encoders / modulators, one switch for the up converters and one wave guide switch for the amplifier.

- The front of the controller has LEDs that display the status of each pair of equipment.

- In normal use the switches are set in automatic position.

- For any failure the unit will automatically switch away from the faulty peace of equipment.

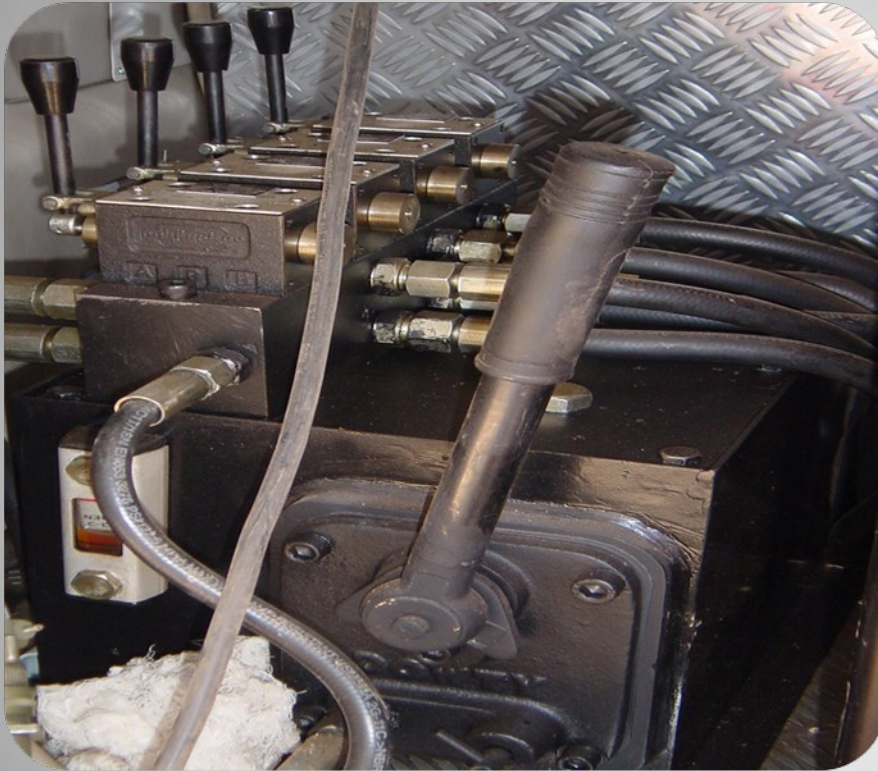- If both chains of equipment are normal either chain can be selected.
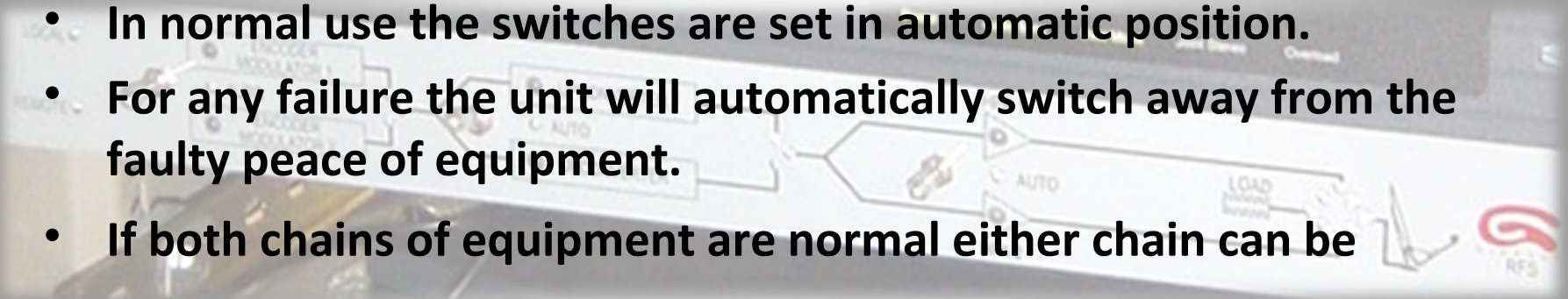
- **5KVA Petrol generator**
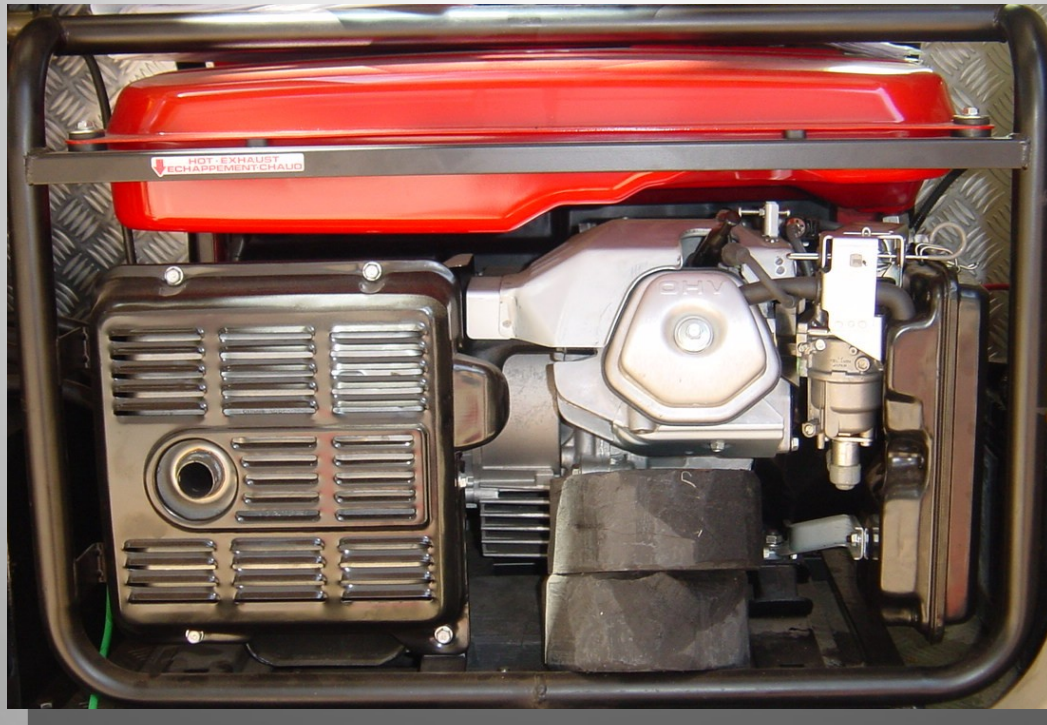
# Hydraulic Jack System

# *THANK YOU*