MODULE B

EDUCATION SATELLITE (EDUSAT) SATELLITE INTERACTIVE TERMINAL (SIT) OPERATIONAL MANUAL
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1. INTRODUCTION

EDUSAT, a satellite specially designed for facilitating distance education in India has been launched in September 2004. This satellite using Ku band covers the whole country. ISRO has setup this satellite based interactive network, to meet the requirements of various users in education sector.

In this network each Hub that meets the needs of a teaching end support many Remote student end classrooms, each having a Satellite Interactive Terminal (SIT). The teacher at the teaching end uses PC based multimedia system for delivering a lecture. He can also use teaching aids like black/green board, touch screen, DVD player etc. The live lecture is telecast using suitable cameras or recorded programme transmitted by other means.

The Network Operation Centre (NOC) or main teaching end of this network is located at the Jharkhand Space Applications Center, Ranchi (JSAC) and the SITs are located at the Remote locations in the districts.

Schematic diagram of the network is give below:

Figure 1 : Scheme of Edusat network
2. SIT EQUIPMENTS

The major equipments of the SIT are:

1). Uninterrupted Power Supply (UPS)
2). Out Door Unit (ODU)
3). In Door Unit (IDU)
4). Student End Equipments

2.1 Uninterrupted Power Supply (UPS)

The UPS System is APC on line 1 KVA Single Phase system with 30 minutes battery back up.

2.2 OUT DOOR UNIT

The Out Door Unit has 2 RG-11 coaxial cables to connect indoor and outdoor Units. The Receive IFL interface on the indoor unit is connected to the LNB via one coaxial cable
and receives the modulated satellite signal from the HN NOC. The Transmit IFL interface on the indoor unit is connected to the Radio (RFT i.e. Radio Frequency Terminal) via the other coaxial cable and transmits the modulated satellite signal to the HN NOC.

The Hughes HN remote terminals are equipped with the following outdoor equipment:

- **Antenna size – 120 cm circular or bigger** is depending on the geographic location where the remote is installed.
- **Single Low Noise Block (LNB)** that receives data from the satellite.
- **Radio** to transmit data to the satellite (in satellite return configurations).

### 2.3 INDOOR UNIT

The Hughes HN remote terminal is the primary interface point for all remote traffic. The DW7700 is a high performance broadband satellite router that operates with all Hughes systems and. With a fast built- in processor, and extended memory, the DW7700 offers the throughput up to 45 Mbps over two LAN ports. The modem has physical interfaces: 2 High- speed 10/100BaseT Ethernet LAN interfaces (RJ- 45) and 2 IFL connections: Transmit/ Receive.
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Chart 1: LED appearance and their meaning

- LAN - The LAN indicator shows whether the LAN is connected and usable, and whether there is receive or transmit activity.
- Transmit - The Transmit indicator shows whether the remote terminal can transmit or is transmitting, or if some condition is preventing transmission.
- Receive - The Receive indicator shows whether the remote terminal has acquired the correct outroute, is receiving, or if some condition is preventing reception.
- System - The System indicator shows whether the remote terminal is operational or not. This indicator may also indicate a DW7700 is operating in DVADB mode.
- Power - The Power indicator shows if the remote terminal is powered on and operating normally.

2.4 Student End Equipments

The followings are the Student end equipments
1. Computer
2. Video Handy Cam
3. Wireless Microphone
4. Amplifier & Speakers
5. Osprey Card (Installed in the Computer)
6. nVidia Card (Installed in the computer)
7. Projector & Screen

**COMPUTER:** used for converting Audio and Video signals into IP packets. This computer is loaded with Windows XP Operating system and Trainnet Client License software. It also has a Video Computer card with a VGA Pal converter card fixed in it.

**VIDEO HANDY CAM:** Sony Video handy cam captures the movements & provides the digital video output and is connected to the Osprey card. It also has the battery back up for an hour.

**WIRELESS MICROPHONE:** The Mipro wireless microphone gives Balanced (XLR) and Unbalanced (RCA) output. It is for capturing the audio signals.

**AMPLIFIERS & SPEAKERS:** The Bosch amplifier with a set of speakers is used as PA system in room.

**OSPREY CARD:** The Osprey Card is used for Video & Audio enhancement.
nVIDIA CARD: The nVidia Card converts the VGA output to PAL, so we can connect the TV to view.

PROJECTOR: It is used to project the monitor on wide screen.

### 3. Equipments Switching (ON/OFF) Procedure

UPS: Press the On/OFF switch to Power ON the UPS, as shown in figure-5.

![Figure 5: UPS](image.png)

DW7700/HN7700 Modem: Switch ON the DW 7700 modem, wait for 2 minutes & check whether Power, System, Receive & Transmit LEDs are glowing as shown in figure-6.
Figure 6: Modem
CPU & Monitor: Press the ON/OFF Switch in CPU & Monitor and check for the Power Indicator glowing as shown in figure-7 & 8. Wait till the computer boots and monitor shows the desktop as per the figure-8. Now check for LAN LED in DW7700 as shown in figure-6.

Figure 7: CPU switch

Figure 8: Monitor switch

Handy Cam (Camera): Press the ON/OFF Switch & pull down the switch to power on the Video Handy Cam as shown in figure-9 and check for the Power indicator glowing. Also check the capture of picture as directed in the display as shown in figure-9.
Microphone System: Press the ON/OFF Switch in the Mipro base unit as shown in figure-10 and check for Power indicator glowing. Now switch on the cordless Microphone as shown in figure-11. When switched on the Cordless microphone, the RED LED glows for 3 seconds and drops automatically as shown in figure-11. Now check the Mipro base unit whether all SIGNAL LEVEL LEDs are glowing as shown in figure-11. Then speak in cordless microphone and check in the Mipro Base Unit, the variation of AUDIO LEVEL INDICATOR glowing according to your Vocal as shown in figure-11.
Figure 10: MIPRO unit

![MIPRO unit](image)

Figure 11: Cordless Mike

Amplifier: Switch on the Amplifier by pressing the ON/OFF switch & check whether the Power LED is glowing in the front panel as shown in figure-12.

![Amplifier](image)

Figure 12: Amplifier

Projector: Switch On the Projector by pressing ON/OFF switch at the backside.
Figure 13: LCD Projector 1
4. Launching the Student Application

For launching the student application double click on the STUDENT icon on the desktop as shown in figure-14. The train net logo appears on the screen (Fig 15).

Figure 14

Figure 15
1. **Entering into the lesson**: Click on the ENTER LESSON icon as shown in figure 16 below.

![Click Here](image)

Figure 16

2. **Entering Student ID**: Enter your STUDENT ID (Provided by Central HUB Engineer) and click on the (Green) tick Mark as shown in figure 17.
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3. **Select Course/Session to attend**: Select the COURSE & click on (Green) Tick Mark as shown in figure-18 and the EDUSAT screen opens for sessions (Fig 19).
Once you are logged in with ISRO Hub this welcome screen will appear.

![Welcome Screen](image1)

**Figure 19**

After few seconds another popup (Video Server) will appear which will display video of remote end (your video).

![Video Server](image2)

**Figure 20**

4. **Asking Queries** : For queries enter question or just click the Tick mark in the figure 22.
5. **Exiting from the Session**: To exit from the session see figure 22-23.
Figure 23
5. Connection Details

1. Video output to Osprey

Figure 24

Figure 24 A
2. **Video Input from Osprey**: Connected to Osprey Card on backside of PC.

![Video Input from Osprey](image)

*Figure 25*

*Video out from Handy Cam (Camera)*
3. Audio output to Osprey

4. Audio input from CPU
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Figure 28

Figure 28 A
5. Video Output from PC

Figure 29

6. Keyboard and Mouse
7. Amplifier Settings

6. Troubleshooting Tips

Using the remote terminal LEDs: Light-emitting diodes (LEDs) are often used as small indicator lights on electronic devices. The color of the emitted light depends on the
composition and condition of the semiconducting material used, and can be infrared, visible, or ultraviolet. LEDs are used as signals for troubleshooting.

6.1 LAN - LED not glowing
- Check the LAN cable connected on the backside of the IDU and the Computer.
- Check the LAN card properties of the Computer as shown in figure 40.
- Go on DOS Prompt and check the ping to the gateway IP address by command `<ping X.X.X.X>` (Replace X with gateway IP address) if it works then check ping 192.168.11.100.

Figure 32

6.2 Receive LED not glowing:
- After Switching “ON” wait for 20 seconds for LED to Come UP.
- Check the Receive cable on the back side of the IDU.
- Disconnect and reconnect the Satellite IN cable connector on the backside of IDU.

6.3 Transmit LED not glowing
- After switching ON wait for 30 seconds for LED to Come UP.
- Check the Transmit cable at the backside of the IDU.
- Disconnect and reconnect the Satellite OUT cable connector on the backside of IDU.

6.4 Power LED not glowing:
- Check the Power cable.

6.5 Using the web browser
Using the Web browser open the Internet Explorer and put the IP address of the DW 7700 modem in the browser.

Figure 33

7. Type of Possible failure/errors

7.1 Communication failure error

While logging in the student session if after putting the student ID we get the error as shown in figure 35 then go through the troubleshooting tips.
7.2 Audio Problem

- Check the audio video connections, amplifier as per the connection details
- If the Signal level indicator light of the MIPRO base unit is not glowing and audio is not reaching the far side then change the battery of microphone.
- Open control panel screen and select as shown in figure 36

![Figure 35](image)

![Figure 36](image)
Figure 39
Check Osprey Card settings as shown in figure 40.
In case of audio recording problem: In case of problem in audio recording check the following settings in control panel.

Figure 42
8. Maintenance

a. **Reflector**: The reflector does not require any maintenance. The composite construction of the reflector is virtually impervious to any damages that could be caused by weather or atmospheric conditions.

b. **Mount and Reflector Support**: The mount and reflector support structure supplied with this antenna is of steel construction and has a galvanized finish. If there are any signs of structural failure, the mount members that are damaged should be repaired or replaced. Any corrosion on steel members may be repaired with a cold, zinc-rich galvanizing paint.

c. **FEED AND FEED SUPPORT**: The feed support and feed rods should be inspected to insure that all hardware is secure. The feed horn window should be inspected to insure that it is intact (not torn) so that no moisture can collect inside the feed horn.

d. **UPS**: As such there is no maintenance for UPS, only thing is to be taken care is not to put any metallic material on the battery to avoid any short circuit.

e. **DW7700**: No maintenance required, only thing taken care is not to block the air vents of the IDU box. Computer: No maintenance required.

f. **Handy Cam**: Protect the lens of handy cam from dust, clean it with soft cloth.
DO'S

1. Maintain the room temperature.
2. Use On line UPS.
3. Good quality earthing (E-N=<2 volt) to be maintained.
4. Dust free environment to be maintained.
5. Sufficient air circulation & access to IDU be there.
6. Switch on the VSAT first and switch on other accessories.
7. Follow the switch on Sequence strictly.
9. While doing so report full problems and complete observations to Hub.
10. Use the computer only for Edusat live interaction applications.
11. Illuminate the classroom such that faces of the participants are clear visible.
12. Switch on the Microphone only when you want to speak.
13. Log all activities related to equipment failures engineer visits in a Log Book.
14. Sign all site visit reports of HCIL Engineer visits to site.
15. In case of external power failure off the systems with in 20 minutes.
16. Allow authorized and trained people only to operate the system.
Don’ts

1. Do not switch on the VSAT immediately after switch off.
2. Do not move the IDU after installation.
3. Do not keep any article on IDU.
4. Do not obstruct the air vents in front of the IDU.
5. Do not keep any copier / printer in IDU room.
6. Do not Use air cooler (water) for cooling.
7. Do not bend IFL cable.
8. Do not use the SIT Computer for any other application/purpose.
9. Do not do any local servicing of the equipments.
10. Do not make any direct sun light or reflection through the window to fall on the face of students.
11. Do not shift the equipments from one place to another in the absence of HCIL Engineer.
12. Do not keep your Microphone ON all the time. Switch off as soon as you complete your question. When logged in multi-conference switch off your microphone whenever another SIT is in active conversation.
13. Do not abruptly switch off the computer and projector. Follow the Shut down sequence.
9. HELP-DESK NUMBERS

For Logging Complaint
1. Phone 0120-6718080/4091515
2. Mail vcc@hughes.in
3. Web www.hughessupport.com

JSAC Hub Engineer: Shri AQIB ALAM
Mobile: 9939087346, Landline: 0651-2401720

Contact Persons from HUGHES
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