SIGNAL-350 SD Encoder & Modulator

CVBS to DVB-T Digital RF

--- Home Use

User Manual

Thank you for buying this encoder modulator.

Please read this manual carefully to install, use and maintain the encoder modulator in the best conditions of performance. Keep this manual for future reference.

Directory

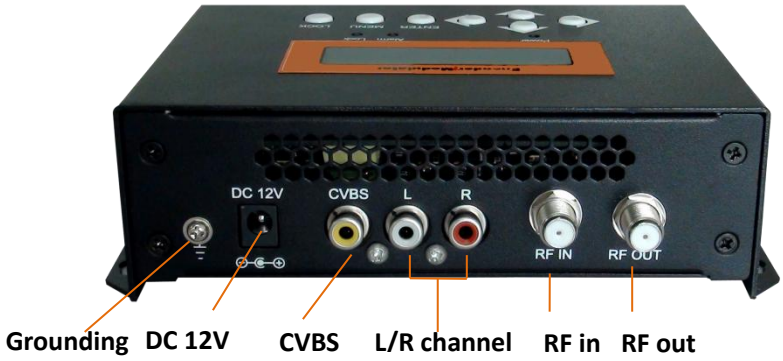
CHAPTER 1 Product Introductions

General Description

SIGNAL-350 series encoder & modulator is DIPOL's consumer electronics which allow audio/video signal input in TV distributions and video recorded and playback from a USB port with applications in home entertainment, surveillance control, hotel Digital Signage, shops etc.

It is an all-in-one device integrating MPEG-2 encoding and modulating to convert audio/video signals into DVB-T RF out.

The signals source could be from satellite receivers, closed-circuit television cameras, Blue-ray players, and antenna etc. its output signal is to be received by a DVB-T standard TV, DVB-T STB etc.



Grounding: to connect the earth cable

DC 12V: power input

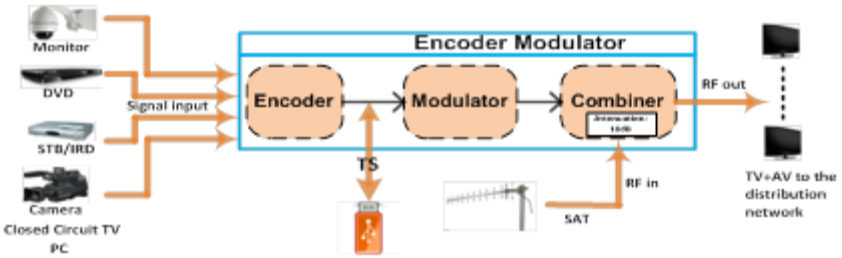
CVBS: composited video input supporting NTSC and PAL

L/R channel: Stereo Left and Right audio channels

RF in: to combine input RF signal (10 dB attenuation)

RF out: to distribute modulated signal (30-960 MHz, 71~91 dbμV)

System Connection Chart



Technical Specifications

Encoding Section		
Video	Encoding	MPEG-2 MP@ML(4:2:0)
	Interface	CVBS *1
	Resolution	720x576_50i (PAL); 720x480_60i (NTSC)
	Bit rate	1.000~19.500 Mbps
Audio	Encoding	MPEG1 Layer II
	Interface	1*Stereo /mono
	Sample rate	48KHz
	Bit rate	64, 96, 128, 192, 256, 320, 384kbps

Modulator Section	
Standard	DVB-T COFDM
Bandwidth	6M, 7M, 8M
Constellation	QPSK, 16QAM, 64QAM,
Code rate	1/2, 2/3, 3/4, 5/6, 7/8.
Guard Interval	1/32, 1/16, 1/8, 1/4.
Transmission Mode:	2K
MER	≥42dB
RF frequency	30~960 MHz, 1KHz step
RF output level	-16~ -36 dBm (71~91 dbμV), 0.1db step

System	
Management	Local control: LCD + control buttons
Language	English
LCN Insertion	yes
Upgrade	JTAG or USB

General	
Power supply	DC 12V
Dimensions	153*110*50mm
Weight	< 1kg
Operation temperature	0~45℃

CHAPTER 2 Safety Instruction and Installations

Safety Instructions

 WARNING: Hot plug is not allowed since it may cause system halted.

To prevent fire or electrical shock, do not expose the device to rain or moisture.

 The encoder modulator is powered with a voltage of 12V DC. The power supply voltage must not exceed the recommended voltage, which otherwise may cause irreparable damage to the device and the invalidation of the warranty. Therefore:

- Do not replace power supply with a voltage greater than 12V DC.
- Do not connect the device to the power if the power cord is damaged.
- Do not plug the device into mains supply until all cables have been connected correctly.
- Do not cut the cord.

 Avoid placing the device next to central heating components and in areas of high humidity.

Do not cover the device with elements that obstruct the ventilation slots.

If the encoder modulator has been kept in cold conditions for a long time, keep it in a warm room minimum 2 hours before plugging into the mains.

Mount the device in vertical position with the connectors located on the top side.

When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutes may result in fire, electric shock or other hazards.

Safety check- Upon completion of any service or repairs to this device, ask the service technician to perform safety checks to determine that the device is in proper condition.

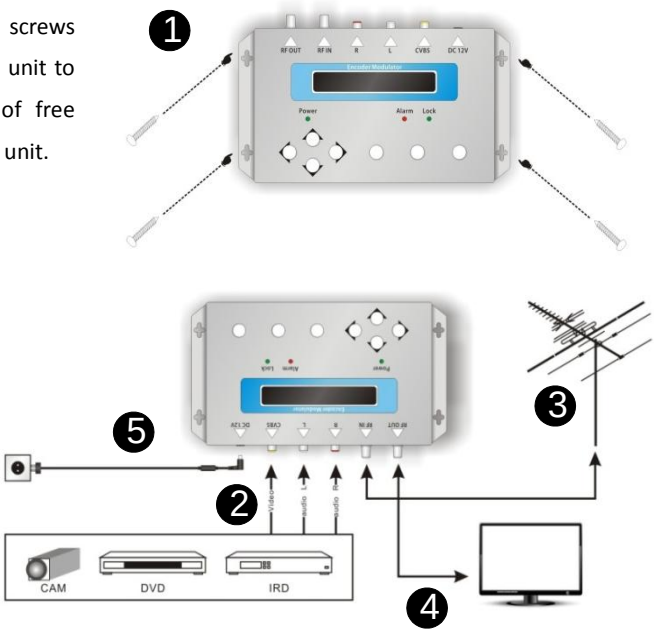
Installations

 **RISK OF damage to the unit**

Mechanically handling the unit may result in damage. Do not connect the unit to the power supply before or during assembly. Connect the unit as below instructed.

 NO HOT PLUG!

1. Mount and tighten the screws and plugs to secure the unit to the wall. Left 10 cm of free space around from each unit.
2. Connect cables to audio/video source. The signal source can be from a surveillance monitor, DVD, set-top box, CCTV and etc.
3. Optionally, connect the loop-through RF input coaxial cable.

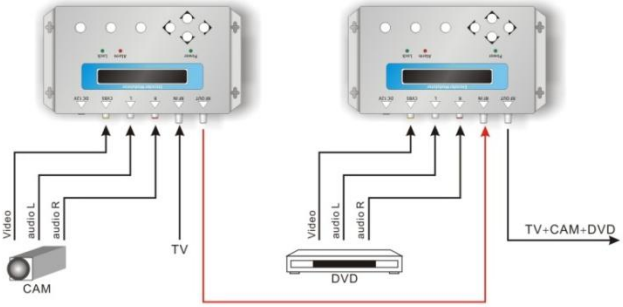


4. Connect cable to RF output to STB/TV.
5. Power supply connection: a) Connect the earth cable; b) Connect the power plug to the unit mains connector; c) Connect the power plug to the mains socket.

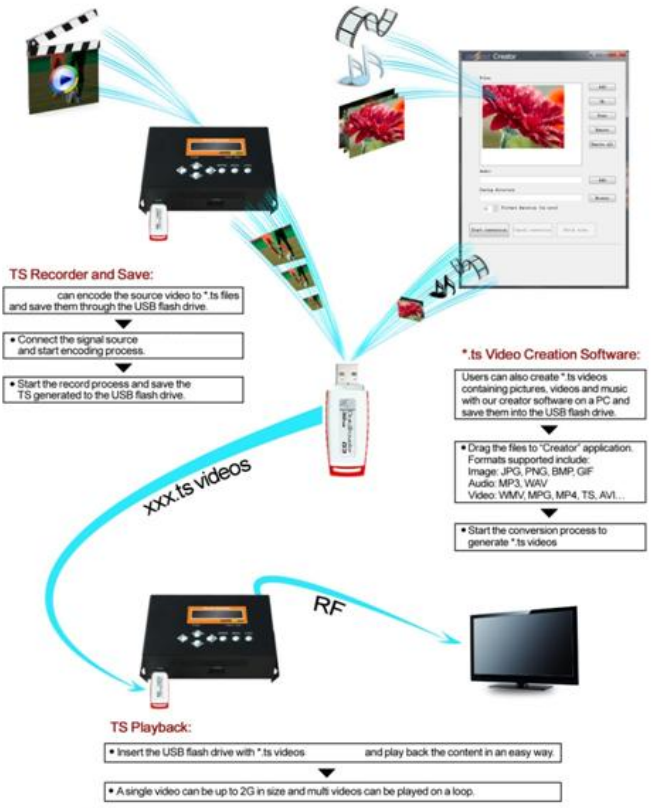
Cascade installation

SIGNAL-350 unit has 1 AV analogue TV signal to RF output encoded as DVB-T Digital TV signal.

Several SIGNAL-350 units can be cascaded in order to increase the capacity. The maximum capacity of a series of N units is 1xN incorporated TV signals. To cascade 2 or more units, connect the RF output of the preceding unit to the TV input (loop-through) of the next unit (see below illustration).



USB Recoder & Player



USB Flash Drive Specifications Required:
• **Standard**: High Speed 2.0 • **File System**: FAT 32 • **Memory**: 32G is suggested

Chapter 3 Operations of TS Creator Software

SIGNAL-350 encoder modulator has a function to create TS videos with the software supplied with the product. Users can create *.ts files containing images, videos and audios in a simple and intuitive way, and play them on a television through SIGNAL-350's USB port.

File format supported include:

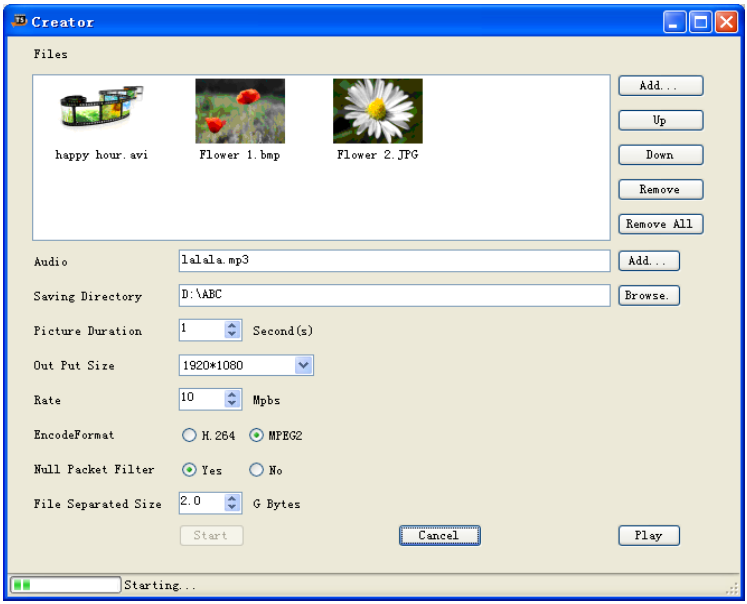
Image: JPG, PNG, BMP, GIF/**Video**: MP4, WMV, AVI, MPG, TS, MKV… /**Audio**: MP3, WAV

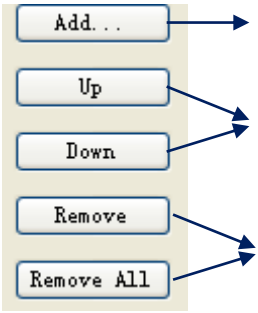
Installation

1. Download our "TS Creator" software package on your PC to get the installer and its auxiliary routine.
2. Occasionally, if your PC hasn't installed "Net Frame 2.0" yet, double-click "NetFx20SP2_x86.exe" until complete the installation.
3. Double-click "Setup.exe" application to install the "Creator" and generate a desktop shortcut.

Operations of "Creator"

Double-click the "Creator" shortcut icon, it will trigger an operation interface like below:

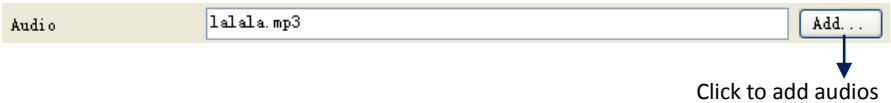




Click to add Images and videos

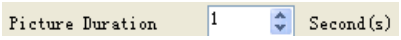
Click to adjust the order of Images/videos

Click to delete the Images/videos

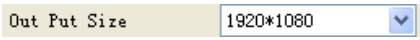


Click to add audios

Click to set a save path for the TS video to be created.



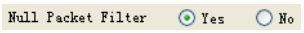
To set time duration for every picture when playing the video



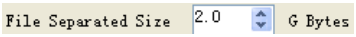
To set the resolution for the output video

The video is transformed based on VBR (Variable Bit Rate). The number set here represents the **highest bit rate** for the output video and bit rate will varies under the number.

Users can select a encode format here according to the standard of receiving terminal.



Users can filter the null packet to boost the video's effect bit rate.



A single video can be maximum 2.0 GB in size. (SIGNAL-350 cannot play a video bigger than 2GB.)

After setting all the parameters, click 

to start the transformation. Click "OK" when it prompts "The operation completed normally."

Click this button to stop the transformation **before** the operation completed.

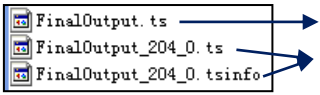
After finishing the transform operation, users can click this button to play the generated TS video.

File Management

After finishing the transformation, users can find out the videos files generated according the Saving Directory. For example, we save the video in “D:\ABC” so we can find it in Disk D\Folder ABC.

Management:

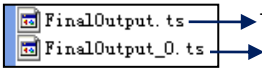
1. Three files will be generated if the Null Packet has been filtered.



TS video for preview through the “Creator” interface by clicking “Play” button

TS video and information files: Users need to save the two files together in the USB memory, and then SIGNAL-350 can read them and play the video.

2. Two files will be generated if the Null Packet has **not** been filtered.



TS video for preview through the “Creator” interface by clicking “Play” button

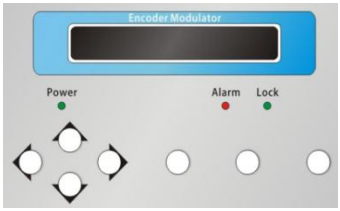
TS video: Users need to save it in the USB memory, and then SIGNAL-350 can read it and play the video.

Remarks:

- All the file names are automatically generated.
- Rename the files before creating a new video to avoid covering the previous files.
- If you rename “FinalOutput-204-0.ts” or “FinalOutput-204-0.tsinfo”, always keep the names the same (Extension excluded) and then SIGNAL-350 can read them and play the video.

CHAPTER 4 Devices Operations and Management

SIGNAL-350 is controlled and managed through the key board and LCD display.



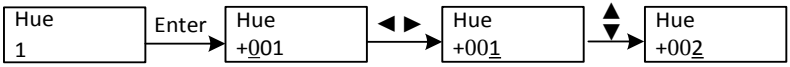
LCD Display – It presents the selected menu and the parameter settings. The backlight in the display is on when the power is applied.

LED – These lights indicate the working status

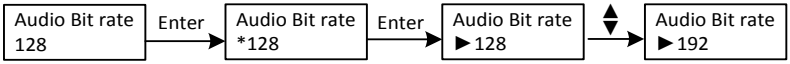
- Power: It lights on when the power supply is connected.
- Alarm: It lights on when the there is error, such as the signal source loss.
- Lock: It lights on when the signal source connected and goes off when the signal lose.

Left/Right/Up/Down buttons – Use these buttons to turn the screen pages, shift the target items by moving the triangle, or change the parameter settings in the program mode.

Enter – Use this button to enter a submenu or save a new setting after adjustment; press it to start adjusting the value of certain items when the corresponding underline flash with Up and Down buttons;



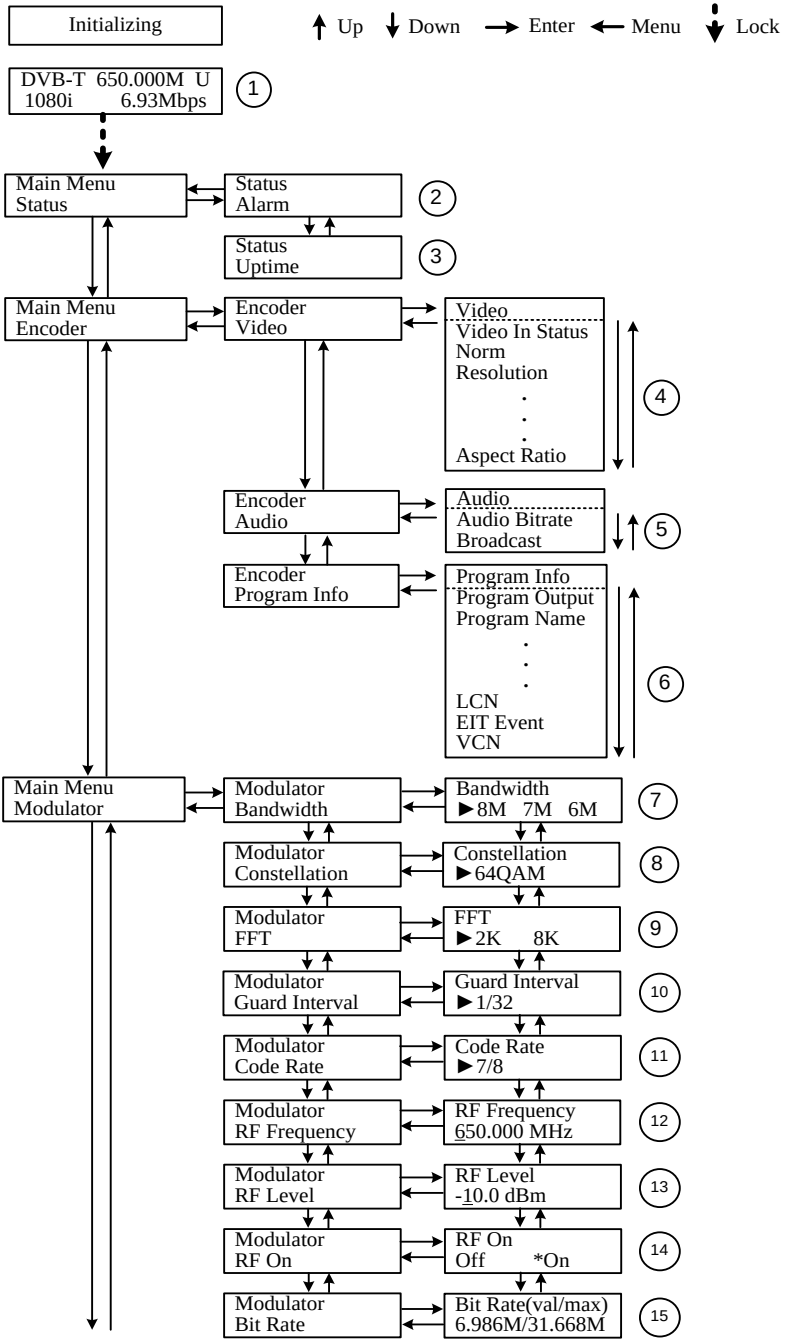
Press it to activate the hidden selections and change the setting with Up and Down (or Left and Right) buttons.

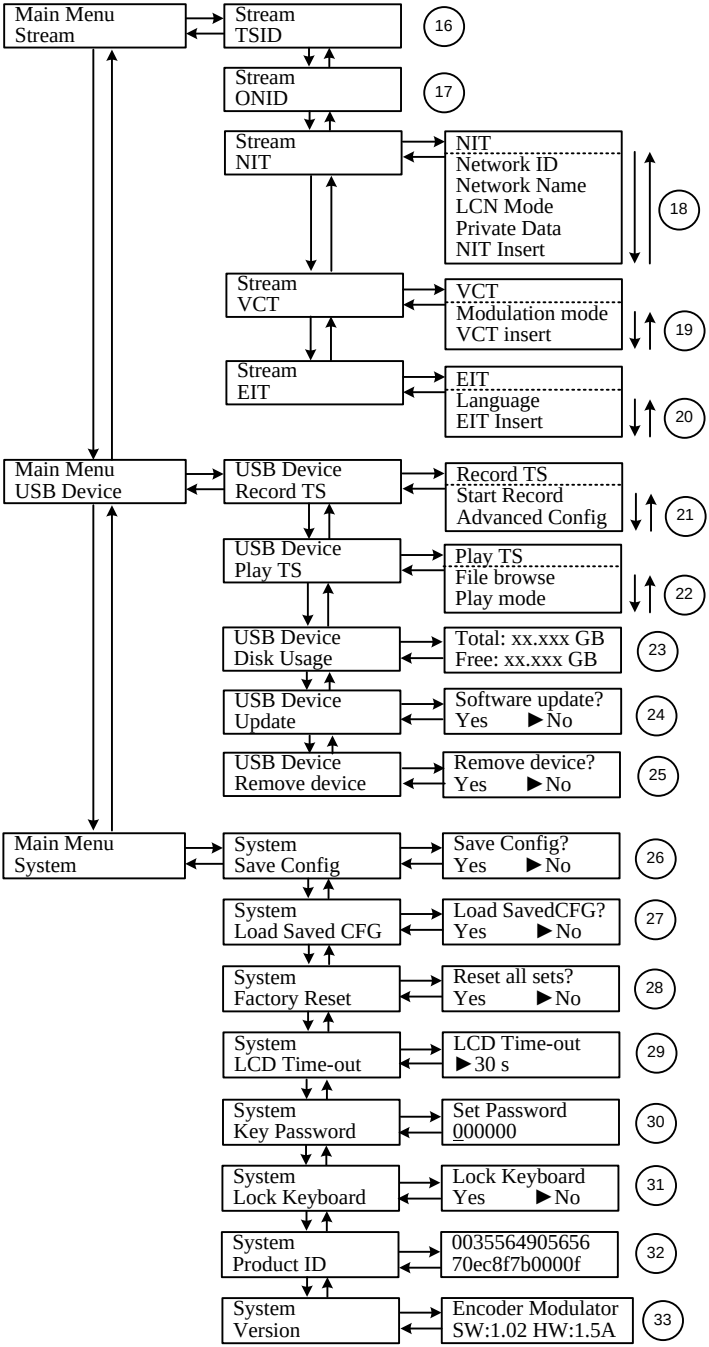


Menu – Press this button to step back

Lock – Locking the screen / cancelling the lock state, and entering the main menu after the initialization of the device. After pressing lock key, the system will question the users to save present setting or not. If not, the LCD will display the current configuration state.

When the power is connected, the LCD will start to initialize the program. The LCD menu goes as below chart.


Initializing
Up
Down
Enter
Menu
Lock
DVB-T 650.000M U
1080i 6.93Mbps
1
Main Menu
Status
Status
Alarm
2
Status
Uptime
3
Main Menu
Encoder
Encoder
Video
Video
Video In Status
Norm
Resolution
Aspect Ratio
4
Encoder
Audio
Audio
Audio Bitrate
Broadcast
5
Encoder
Program Info
Program Info
Program Output
Program Name
LCN
EIT Event
VCN
6
Main Menu
Modulator
Modulator
Bandwidth
Bandwidth
▶8M 7M 6M
7
Modulator
Constellation
Constellation
▶64QAM
8
Modulator
FFT
FFT
▶2K 8K
9
Modulator
Guard Interval
Guard Interval
▶1/32
10
Modulator
Code Rate
Code Rate
▶7/8
11
Modulator
RF Frequency
RF Frequency
650.000 MHz
12
Modulator
RF Level
RF Level
-10.0 dBm
13
Modulator
RF On
RF On
Off *On
14
Modulator
Bit Rate
Bit Rate(val/max)
6.986M/31.668M
15


Main Menu
Stream
Stream
TSID
16
Stream
ONID
17
Stream
NIT
NIT
Network ID
Network Name
LCN Mode
Private Data
NIT Insert
18
Stream
VCT
VCT
Modulation mode
VCT insert
19
Stream
EIT
EIT
Language
EIT Insert
20
Main Menu
USB Device
USB Device
Record TS
Record TS
Start Record
Advanced Config
21
USB Device
Play TS
Play TS
File browse
Play mode
22
USB Device
Disk Usage
Total: xx.xxx GB
Free: xx.xxx GB
23
USB Device
Update
Software update?
Yes ▶No
24
USB Device
Remove device
Remove device?
Yes ▶No
25
Main Menu
System
System
Save Config
Save Config?
Yes ▶No
26
System
Load Saved CFG
Load SavedCFG?
Yes ▶No
27
System
Factory Reset
Reset all sets?
Yes ▶No
28
System
LCD Time-out
LCD Time-out
▶30 s
29
System
Key Password
Set Password
000000
30
System
Lock Keyboard
Lock Keyboard
Yes ▶No
31
System
Product ID
0035564905656
70ec8f7b0000f
32
System
Version
Encoder Modulator
SW:1.02 HW:1.5A
33

1) DVB-T: modulating standard; XX.XXX M: the current output frequency; U: symbol of the USB disk insertion; 1080i: video resolution of signal source; X.XX Mbps: the current encoding bit rate

2) Alarm Status: For example, if the signal cable disconnected, it will display *Video 1 Not Lock* under this menu.

3) Uptime: It displays the working time duration of the device. It times upon power on.

4) Video Parameters: User can enter the items respectively to view the video status and set video norm. User can also adjust values of rest items (Bit rate: 0.500~19.500 Mbps; Brightness & Contrast & Saturation: 0-255; Hue: -128 - +127).

5) Audio Bit rate: Select audio bit rate among 64, 96, 128, 192, 256, 320, 384 kbps.

Audio Broadcast: Enable – the output program will broadcast only audio without the picture; Disable – cancel broadcast mode to resume both audio and video.

6) Program Information: User can enable or disable the program output under menu *Program Output*. User can also enter the other items to edit the *Service Name, Program Name, Program Number*, and PIDs of *PMT, PCR*, *Video* and *Audio,* and edit LCN (Logical channel number). *EIT Event* – User can enter this menu to setup EIT (Event Information Table) for the current and next program event. The EIT contains Start Year, Start Time, Duration, and Event Name of the event. All the EIT information can be displayed on the TV screen on condition that the EIT is chosen to insert (see explanation 18.). *VCN* – virtual channel number

7) Bandwidth: choose between 6M, 7M and 8M.

8) Constellation: DVB-T modulator contains 3 constellation modes – 64 QAM, QPSK and 16 QAM.

9) FFT (Transmission Mode): 2K

10) Guard Interval: Select among 1/32, 1/16, 1/8 and 1/4.

11) Code Rate: It refers to FEC-Forward Error Correction rate. It contains 1/2, 2/3, 3/4, 5/6 and 7/8.

- **NOTE**: The different combination of bandwidth, constellation, guard interval and code rate (FEC) will form a different output code rate. Please refer to appendix table 2.

12) RF Frequency: Adjust it at range of 30 to 999 MHz. Set it according your regional situation or inquire your local services.

13) RF Level: Adjust it at range of -16~ -36dBm.

14) RF On: User can choose to turn on or turn off the RF under this menu.

15) Bit Rate: User can read the current modulating bit rate and the maximum bit rate

16) TSID: (Transport Stream ID) User can view or adjust after enter this menu.

17) ONID: (Original Network ID)-User can view or adjust after enter this menu.

18) NIT: (Network Information Table) NIT table is a very important table for describing the network and TS. User can enter the submenus displayed and edit the values or select the LCN (Logical channel number) mode, and choose whether to insert the NIT. If user chooses to insert the NIT, information (Network ID, Network Name, LCN Mode, Private Data and LCN number of the program mentioned in explanation 6) will be added to the transport stream.

- **NOTE**: when the Private Data is set as 0*0, it is invalid.

19) VCT: Virtual Channel Table. This menu contains two sub-menus, Modulation Mode and VCT Insert. User can edit modulation mode at the range of 0-255.

20) EIT: EIT Insert - As mentioned above (6), the event information table can be chosen whether to insert into the TS or not under this menu. If yes, the EIT information set above (6) will be displayed on the TV screen. Language Code – to set the EIT language For example, code of the English language is *eng*. If you set the code as *eng*, the EIT displayed will be in English language.

21) – 25) Please refer to ***Chapter 5*** for details.

26) Save Config: *Yes/No*-to save/give up the adjustment of setting.

27) Load Saved CFG: *Yes/No*-to load/ not to load the saved configuration.

28) Reset all sets: *Yes/No*-choose/not choose the factory's default configuration.

29) LCD Time out: A time limit that LCD will light off. Choose among 5s, 10s, 45s, 60s, 90s and 120s (seconds).

30) Key Password: User can set a 6-digital password used to unlock the keyboard.

31) Lock Keyboard: Choose *Yes* to lock the keyboard, then the keyboard cannot be applicable. It is required to input the password to unlock the key board. This operation is one-off. (If forgetting your password, please use the universal code "*005599*".)

32) Product ID: User can view the serial number of this device. It is read-only and unique

33) Version: It displays the version information of this device. *Encoder Modulator*: the name of the device; *SW*: software version number; *HW*: hardware version number. User can also press ENTER again to view the published time of this device.

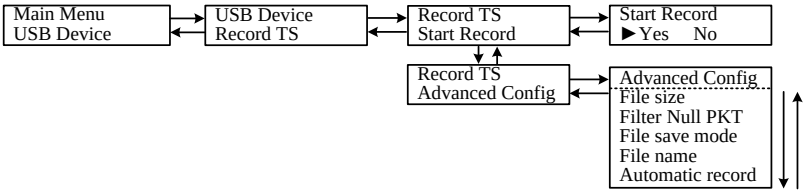
Chapter 5 Operations of Record TS and Play TS through USB Disk

The SIGNAL-350 encoder modulator has new functions of:

1. *.ts Video Creation

See Chapter 3.

2. TS Record and Save



1) Connect the signal source, enter “Start Record” and choose “Yes” to start recording the encoded TS.

2) Advanced Config:

File size: users can set the file size for the *.ts to be recorded. A single file can be maximum 2000M in size.

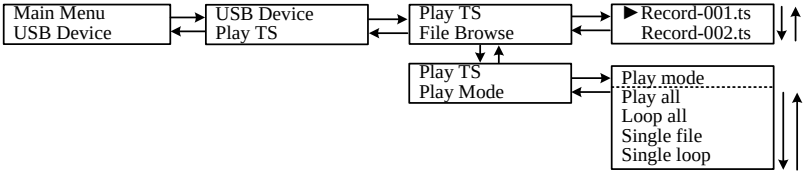
Filter null PKT: Users can decide whether to filter the null packet for the *.ts files to be recorded.

File save mode: there are 3 modes provided: “single file” (For example, when the file size is set as 1000M and the *.ts is recorded up to 1000M, it automatically stops recording TS.). “Segmented file” (For example, when the file size is set as 1000M and the *.ts is recorded up to 1000M, it automatically saves the files and continues to record TS and save it to next file until the USB memory is full.) . “Loop record”: (it automatically saves the files and continues to record TS and save it to next file. When the USB memory is full, it replaces the previous files.)

File name: Users can enter this menu to edit name for the *.ts files to be recorded. For example, if users name it “Record-”, it will give name to the saved *.ts files “Record-001.ts”, “Record-002.ts”… “Record-00N.ts”.

Automatic Record: Users can choose whether to set SIGNAL-350 record the TS automatically or manually.

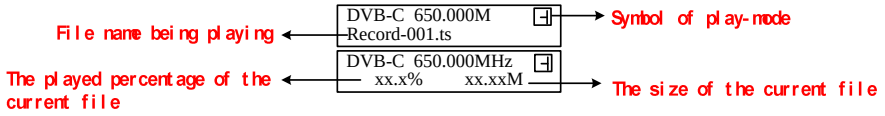
3. TS Playback



1) File browse: There is a video list under this menu, choose one file and press “Enter” button to start play.

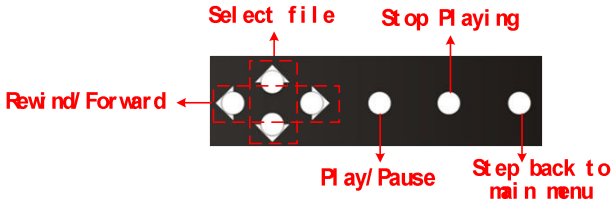
2) Play mode: User can select a play mode for the saved *.ts files as needed before playing the *.ts file.

When the *.ts is being playing, SIGNAL-350 LCD will present a playing interface as shown below.

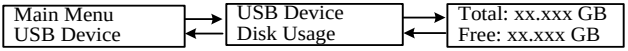


single loop; play all; loop all; single file

At this time, the key board also plays a different rule

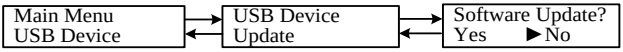


4. Disk Usage



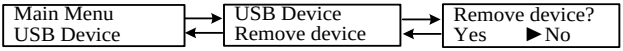
Users can enter this menu to view the USB disk’s capacity left.

5. Update



Choose “Yes” to update the SIGNAL-350 with the update file stored in the USB disk.

6. Remove Device



Choose “Yes” to safely remove the USB disk. SIGNAL-350 will then automatically resume encoding and playing the program input from the encoder module.

Appendix

Australia Air Channels			
Ch.	Frequency		
	Start	Center	End
VHF			
C00	45	48.5	52
C01	56	59.5	63
C02	63	66.5	70
C03	85	88.5	92
C04	94	97.5	101
C05	101	104.5	108
C5A	137	140.5	144
C06	174	177.5	181
C07	181	184.5	188
C08	188	191.5	195
C09	195	198.5	202
C9A	202	205.5	209
C10	209	212.5	216
C11	216	219.5	223
C12	223	226.5	230
UHF			
C20	470	473.5	477
C21	477	480.5	484
C22	484	487.5	491
C23	491	494.5	498
C24	498	501.5	505
C25	505	508.5	512
C26	512	515.5	519
C27	519	522.5	526
C28	526	529.5	533
C29	533	536.5	540
C30	540	543.5	547
C31	547	550.5	554
C32	554	557.5	561
C33	561	564.5	568
C34	568	571.5	575
C35	575	578.5	582
C36	582	585.5	589
C37	589	592.5	596

Australia Air Channels			
Ch.	Frequency		
	Start	Center	End
C38	596	599.5	603
C39	603	606.5	610
C40	610	613.5	617
C41	617	620.5	624
C42	624	627.5	631
C43	631	634.5	638
C44	638	641.5	645
C45	645	648.5	652
C46	652	655.5	659
C47	659	662.5	666
C48	666	669.5	673
C49	673	676.5	680
C50	680	683.5	687
C51	687	690.5	694
C52	694	697.5	701
C53	701	704.5	708
C54	708	711.5	715
C55	715	718.5	722
C56	722	725.5	729
C57	729	732.5	736
C58	736	739.5	743
C59	743	746.5	750
C60	750	753.5	757
C61	757	760.5	764
C62	764	767.5	771
C63	771	774.5	778
C64	778	781.5	785
C65	785	788.5	792
C66	792	795.5	799
C67	799	802.5	806
C68	806	809.5	813
C69	813	816.5	820
C70	820	823.5	827
C71	827	830.5	834
C72	834	837.5	841
C73	841	844.5	848
C74	848	851.5	855
C75	855	858.5	862

Table 1 Australia Television Frequency/Channels (MHz)

Modulation Constellation	FEC	6MHz Bandwidth				7MHz Bandwidth				8MHz Bandwidth			
		Guard Interval				Guard Interval				Guard Interval			
		1/4	1/8	1/16	1/32	1/4	1/8	1/16	1/32	1/4	1/8	1/16	1/32
QPSK	1/2	**The weak ability of error-correcting and anti-interference in this area**											6.03
	2/3				6.03	5.80	6.45	6.83	7.03	6.64	7.37	7.81	8.04
	3/4		6.22	6.58	6.78	6.53	7.25	7.68	7.91	7.46	8.29	8.78	9.05
	5/6	6.22	6.91	7.31	7.54	7.25	8.06	8.53	8.79	8.29	9.22	9.76	10.05
	7/8	6.53	7.25	7.68	7.91	7.62	8.46	8.96	9.23	8.71	9.68	10.25	10.56
16QAM	1/2	7.46	8.29	8.78	9.04	8.70	9.67	10.24	10.55	9.95	11.06	11.71	12.06
	2/3	9.95	11.05	11.70	12.06	11.61	12.90	13.66	14.07	13.27	14.75	15.61	16.09
	3/4	11.19	12.44	13.17	13.57	13.06	14.51	15.36	15.83	14.93	16.59	17.56	18.10
	5/6	12.44	13.82	14.63	15.08	14.51	16.12	17.07	17.59	16.59	18.43	19.52	20.11
	7/8	13.06	14.51	15.36	15.83	15.24	16.93	17.93	18.47	17.42	19.35	20.49	21.11
64QAM	1/2	11.19	12.44	13.17	13.57	13.06	14.51	15.36	15.83	14.93	16.59	17.56	18.10
	2/3	14.92	16.58	17.56	18.09	17.41	19.35	20.49	21.11	19.91	22.12	23.42	24.13
	3/4	16.79	18.66	19.76	20.35	19.59	21.77	23.05	23.75	22.39	24.88	26.35	27.14
	5/6	18.66	20.73	21.95	22.62	21.77	24.19	25.61	26.39	24.88	27.65	29.27	30.16
	7/8	19.59	21.77	23.05	23.75	22.86	25.40	26.89	27.71	26.13	29.03	30.74	31.67

Table 2 Recommended MPEG-2 Code Rate