

6500A-001

ISDB-T FRONT-END DECODER



General

This unit is the device to output TS by receiving ISDB-T terrestrial digital TV broadcasting (Conforming to ARIB TR-B14 Ver. 1.2 of Terrestrial Digital Television Broadcasting Operation Rules). Any stream of multiplexed TS, specific layer TS and format corresponding to broadcasting TS described in Chapter 5 of ARIB STD-B31" Annex Operation Guideline of Terrestrial Digital Television Broadcasting "can be output. Also, by input of this broadcasting TS to Eiden s OFDM Modulator 3501C, re-modulation system can be constructed.

Features

- Receiving TV channel is UHF band 13CH ~ 62CH.
- Corresponding to Mode 2 (Guard interval rate 1/4, 1/8) and Mode 3 (Guard interval rate 1/4, 1/8, 1/16) of ISDB-T system.
- On each layer, terrestrial digital television broadcasting signal, of which each transmission parameter set for carrier modulation scheme of QPSK (Convolution coding rate of 1/2, 2/3), 16QAM (Convolution coding rate of 1/2, 2/3), 64QAM (Convolution coding rate of 1/2, 2/3, 3/4, 5/6, 7/8), time interleave length Mode 2 (2, 4, 8), Mode 3 (1, 2, 4) and number of segment, can be received.
- It can be confirmed that if signal power is within receivable area by input signal level indication.
- Operation can be confirmed by indication of signals of booting flag for emergency warning broadcasting and count down.
- For TS output, interfaces of DVB-SPI, DVB-ASI and serial are equipped.
- TS output of 3 kinds (1. Broadcasting TS, 2. Multiplexed TS, 3. Specific layer TS) can be selected.
- Output of broadcasting TS added transmission control information is possible. Re-modulation output system of the same layer configuration with received modulated signal is possible by input of this broadcasting TS to OFDM modulator.
- Bit error rate before / after Viterbi correction can be measured in each layer.
- TMCC information can be indicated.
- For remote control, GP-IB interface and LAN interface are equipped as the standard.
- DC power drive is possible.

Composition

Main Unit	1
Dimensions	425(W) x 99(H) x 380(D) mm (Excluding projections)	
Weight	Approx. 8 kg	
Accessories		
Power Cable (Including 3pin 2pin converter)	1
Rack Mount Adapter	1set
Instruction Manual and Test Result Sheet	1
Power Source		
Single phase AC		
Input Voltage Allowable Range	: AC90V ~ AC250V (50Hz/60Hz)	
Power Consumption	: Approx. 50VA	
DC		
Input Voltage Allowable Range	: DC 10V ~ DC18V	
Connection	: Terminal Base (M3 screw)	
Power Consumption	: Approx. 4A (at 12V input)	

Operating Environment

Temperature	: +5 ~ + 40
Humidity	: 45% ~ 85%RH (No dew generation)

Rating

RF Input

- **Input Connector**
BNC-R (75 Ω), 1 route
- **Receiving Channel**
UHF band 13CH ~ 62CH
- **Input Level**
Within - 70dBm ~ - 20dBm
- **Transmission Parameter to be able to receive**
Conforming to Terrestrial Digital Television Broadcasting Operation Rule (ARIB TR-B14 Ver. 1.2).

Transmission Parameter to be able to receive

Mode	Mode 2	Mode 3
Guard Interval Rate	1/4, 1/8	1/4, 1/8, 1/16
Time Interleave Length	2, 4, 8	1, 2, 4
Carrier Modulation Scheme (Convolution Coding Rate)	QPSK(1/2, 2/3) 16QAM(1/2, 2/3) 64QAM(1/2, 2/3, 3/4, 5/6, 7/8)	

SYSTEM Clock Output

- **Output Connector**
BNC-R (50 Ω) 1 route
Synchronized with received FFT sample frequency.
- **Output Level**
TTL/50

FRAME Output

- **Output Connector**
BNC-R (50 Ω) 1 route
- **Output Level**
TTL/50

ASI Output

- **Output Connector**
BNC-R (75 Ω) 1 route
- **Interface**
Conforming to DVB-ASI

Output Format

- **Output Format**
204bytes Packet

SPI Output

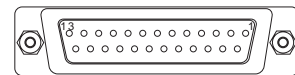
- **Output Connector**
Dsub-25pin (Female, Fixing Base 4-#40 Inch screw) 1 route
- **Interface**
Based on LVDS/DVB-SPI (Conforming to TIA/EIA-644)

Output Format

- **Output Format**
204bytes packet

Connector Pin Assignment

- **Connector Pin Assignment**
Following List



Pin Connection List

Pin No.	Signal Name	Pin No.	Signal Name
1	CLK +	14	CLK -
2	System Gnd.	15	System Gnd.
3	Data 7 +	16	DATA 7 -
4	Data 6 +	17	DATA 6 -
5	Data 5 +	18	DATA 5 -
6	Data 4 +	19	DATA 4 -
7	Data 3 +	20	DATA 3 -
8	Data 2 +	21	DATA 2 -
9	Data 1 +	22	DATA 1 -
10	Data 0 +	23	DATA 0 -
11	DVALID +	24	DVALID -
12	PSYNC +	25	PSYNC -
13	Cable Shield		

• Connector Pin Assignment at the time of LVDS serial input Following List.

Pin No.	Signal Name	Pin No.	Signal Name
1	SERIAL CLK +	14	SERIAL CLK -
2	System Gnd.	15	System Gnd.
3	SERIAL DATA +	16	SERIAL DATA -
4	INVALID DATA	17	INVALID DATA
5	INVALID DATA	18	INVALID DATA
6	INVALID DATA	19	INVALID DATA
7	INVALID DATA	20	INVALID DATA
8	INVALID DATA	21	INVALID DATA
9	INVALID DATA	22	INVALID DATA
10	INVALID DATA	23	INVALID DATA
11	DVALID +	24	DVALID -
12	PSYNC +	25	PSYNC -
13	Cable Shield		

When TS output setting is LVDS serial data, LVDS serial BER measurement or LVDS after Viterbi correction, serial data are output from SPI output connector. Also, at this time, ASI output becomes invalid data.

Output TS Format

Specific Layer TS
Selection of layer (LAYER A ~ C) is possible. Layer selected by enable signal becomes valid.

Multiplexed TS
TSs of all layers are output as valid data. Data of 3 layers are output in unit of TS packet.

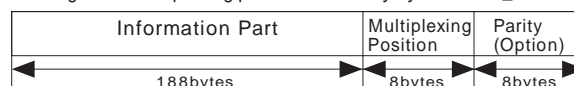
Broadcasting TS

• Transmission Format

In compliance with Broadcasting TS of ARIB STD-B31 Annex Terrestrial Digital Television Operation Guideline Chapter 5.

• Multiplexing Position in Dummy Byte

Figure of multiplexing position of dummy byte ISDB-T_INFOMATION



• Parity Process (Option)

Shortened Reed-Solomon Coding (204, 196)

Primitive Polynomial $p(x) = x^8 + x^4 + x^3 + x^2 + 1$

Generating Polynomial

$G(x) = (x^8 - 1)(x^4 - 1)(x^2 - 1)(x - 1)(x - \alpha)(x - \alpha^2)(x - \alpha^3)(x - \alpha^4)(x - \alpha^5)(x - \alpha^6)(x - \alpha^7)$

But = 02HEX

• Multiplexing Position in Dummy Byte

There is no network information (network_synchronization_information) in IIP (ISDB-T Information Packet).

PID (Packet ID) of IIP is to be 0x1FF0.

GP-IB

- GP-IB Connector 1 route For control.
- Input/Output Conforming to IEEE488

LAN Interface

- Remote Communication Interface 10BASE-T
- Remote Communication Connector Conforming to IEEE488
- Communication System TCP/IP
- Connector Pin Assignment Following List

Pin No.	Signal Name	Pin No.	Signal Name
1	TD (+)	6	Not used
2	TD (-)	7	RD (-)
3	RD (+)	8	Not used
4	Not used	9	Not used

Serial Output

- Output Connector Dsub-9pin (Female, Fixing Base 4-#40 Inch screw) 1 route
- Interface TTL/50
- Output Format 204bytes packet
- Connector Pin Assignment Following List

Pin No.	Signal Name	Pin No.	Signal Name
1	CLK	6	CLK Gnd
2	Data	7	Data Gnd
3	Enable	8	Enable Gnd
4	PSYNC	9	PSYNC Gnd
5	Not used		

• Transfer item of communication control information and multiplexing position

	Transfer Item	Explanation	Multiplexing Position	
			Dummy Byte ISDB-T_information	Invalid Layer IIP
1	TMCC identification	00 : BS digital 10 : Terrestrial digital TV 11 : Terrestrial digital audio		
2	Buffer reset flag	Synchronizing device buffer reset control	x	
3	Booting control for emergency broadcasting	Designation for execution term of emergency broadcasting		
4	TMCC changed head packet flag	Designation for changed head packet		
5	Frame head packet flag	Designation for multiplexed frame head packet		
6	Frame synchronization identification (w0, w1)	Designation for term of even, odd frame		
7	Layer information of each TSP	Indication of distinction of layer A, B, C and Null, IIP packet and AC packet		
8	Index of transmission parameter switching			
9	TSP counter	Head packet of multiplexed frame is to be 0 and make increment in order of packet.		
10	TMCC (Including mode, GI)	TMCC and control information for modulator		
11	Control information for broadcasting network	Control information such as delay and etc. at the time of SFN		x
12	AC signal		x	x

: Corresponded by this unit.

x : Not corresponded by this unit.

: No.4 TMCC changed head packet flag : This is not coincided with actual switch timing.

No. 8 Index of transmission parameter switching: This is not coincided with actual switch timing

No. 6 Frame synchronization identification (w0, w1): This is not always coincided with input signal condition.