INRA-5301
QPSK to QAM modulator
USER'S MANUAL

INITEL TELECOMMUNICATIONS

C O N T E N T S

1 Safety instruction

1.1 Before starting using this unit, please be sure to refer to this manual.

1.2 Do not to open the cabinet, otherwise the guarantee to repair are not available. Meanwhile touching the inside makes you in great danger of electric shock.

1.3 Please make sure to cut off the power supply if you will not use this unit in long term, and do not use any broken jack, which could result in fire or electric shock.

1.4 Wet hands are forbidden to touch the power jack, to avoid risk of electric shock.

1.5 Please pull the plug itself instead of the wire when you pull out power plug,.

1.6 Any thing flammable and metal or liquid, which will destroy the unit, must be kept out the box.

1.7 Do not place this unit in a location near a heat source such as radiator or air ducts, or in a place exposed to direct sunlight, excessive dust, moisture, rain, mechanical vibration.

1.8 Keep the device working in a good ventilative environment, if not the destruction will occur.

1.9 Please keep the packaging for the safety of transit.

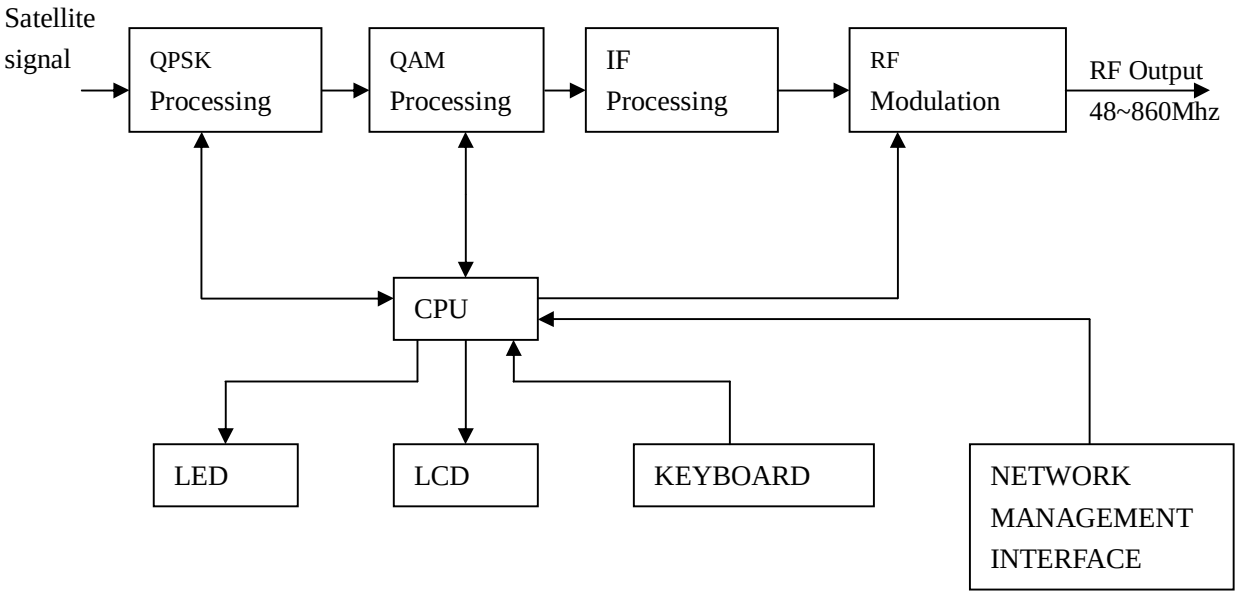
NOTE: After all parameters are set up, please press the LOCK button. When LCD display is dark, the protection function takes effect.

2. Composition of system and operating principle

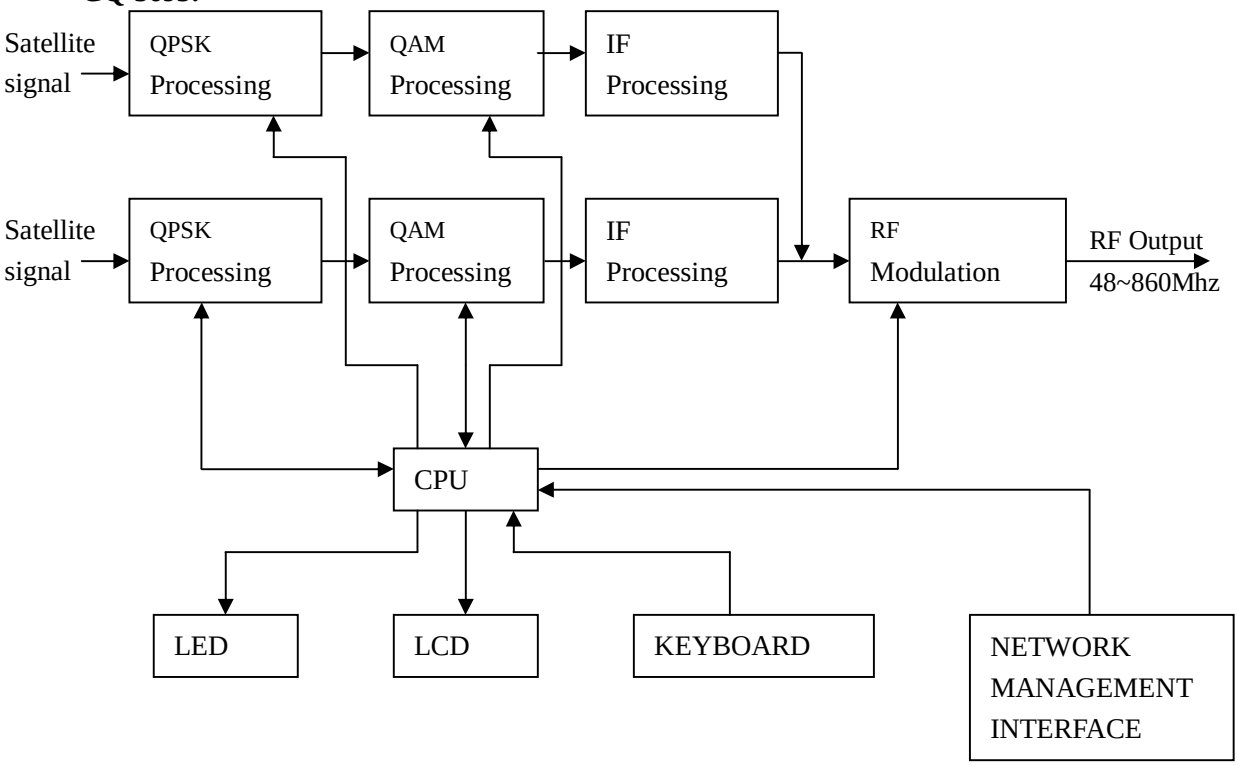
2.1 Composition of system

THE SYSTEM CONSISTS UNITS OF THE FOLLOWING CHART

INRA-5301



GQ-3693:



INRA-5301 QPSK to QAM Modulator is mainly composed of the following modules:

- QPSK processing unit

The unit demodulates the satellite signal

- QAM modulating unit

The unit modulates data stream into spectrum signal.

- RF modulating unit

The unit up-converts IF signals to RF signals from 48MHz to 860MHz.

- CPU/LCD/LED/Keyboard unit

The unit carries out keyboard input, LED display and intelligent control, etc.

2.2 Operating principle

INRA-5301 meets to DVB-C standard. Processed satellite signals were sent into QAM modulator. QAM encoding is based on DVB standard, such as interlacing, RS error correction encoding, etc. After IF processing and up-converting to the frequency range of TV channels, signals can be transmitted in HFC and MMDS networks.

3. Main features

- Constellation: QPSK/16QAM/ 32QAM/ 64QAM/ 128QAM/ 256QAM.
- The bite rate range of input data: 1.5~51.6Mbps
- The bite rate range of output data: 2~56Mbps
- The bandwidth range of output signal: 1.15~8.05Mhz
- The symbol rate range of output data: 1~7Mbaud/s
- RF range: 48~860MHz(segmented optional)
- Output level range: 100~115dBuv(step adjustable)
- Failure alarming
- RF test output interface for inspecting
- LCD display
- RJ45 ETHERNET interface(network management software is optional)
- Power off memory

4. Technical specification

4.1 RF input

Input frequency: 950~2150MHz

Level: -79 ~ -11dBm

IF Bandwidth: 27~36MHz
Demodulation: QPSK
Impedance: 75Ω

4.2 RF interface

A. RF output:
Connector: BNC
Impedance: 75Ω
Output Frequency: 48~860MHz (segmented optional)
Reflect loss ≥15dB
Output level: 105~115dBuV (adjustable)
Carrier rejection: > 55dB
SNR(out of band):≥50dB

B: RF output for test
Connector: BNC
Impedance: 75Ω
Output level: 75dBuV~95dBuV (adjustable)

4.3 Channel signal encoding

Demodulation: QPSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM.
Channel encoding: RS encoding meet to DVB standard
MER:≥36dB
SNR(out of band):≥50dB

4.4 Power supply

Voltage: 165~265V AC or 85V~265V AC(Optional)
Frequency: 50Hz±2%
Power consumption: 35W

4.5 Operation environment

Operation temperature: +5~45°C;
Storage temperature: -25~+55°C.
Relative humidity: 10~75%

4.6 Radiation and safety

Up to GB13837-92 and GB8898-88 standards

4.7 Mechanic characteristics

Dimension: 44.5mm(1U)*483mm*(19")*400mm
Weight: 7kg

Note: The information contained herein is subject to change without notice.

5. Equipment connection

5.1 Panel display and keyboard

A. Panel display

a. LED instruction

Power

Sync

Alarm

b: LCD display

B: Keyboard

ARROW KEYS (UP/DOWN/LEFT/RIGHT)

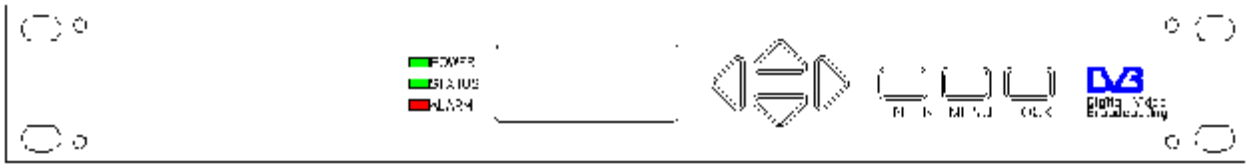
ENTER

LOCK: press once to lock; press once again to unlock

MENU

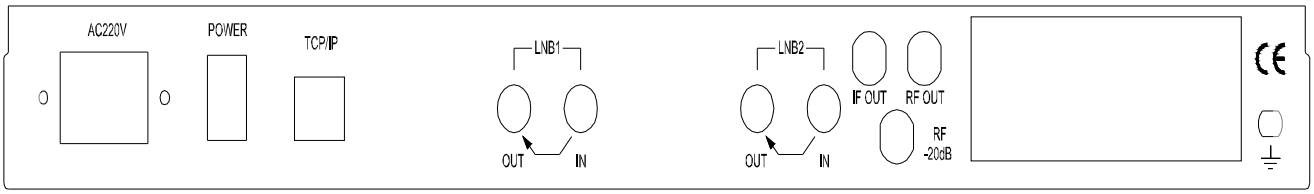
.

5.2 Front panel sketch



5-1: Front panel

5.3 Rear panel sketch



5-2: Rear panel

6. Parameter check and setup

6.1 Keyboard Function

Move Right/Left key: choose sub-menu/move cursor
Move up/down key: set cursor/change parameters
Enter: confirm operations
Lock: lock/unlock the keyboard /remote-control/exit menu
MODE: Recycle menu and cancel operations

Note: 1.Be sure to press ENTER key after setup the parameters, all new parameters will take effect only without *, otherwise the old parameters will be kept.
2. Under any status of setting parameters, press LOCK key will make unit return to the status of showing operating parameters.
3.In non-operation status the keyboard will be automatically locked

6.2 Operation mode select (keyboard unlocked)

6.2.1 Press MENU to display main menu circularly

ONCE:	1.0 VIEW ALARMS 20 CH2 BUFFER FULL.
TWICE:	2.0 QAM MODE 64 QAM
THRICE	3.0 RF OUT FREQUENCY 500MHz
FOUR TIMES	4.0 TUNER STATUS NOT LOCKED
FIVE TIMES	5.0 BYPASS SWITCH OFF
SIX TIMES	6.0 NIT TABLE MODE KEEP ORIGINAL NIT
SEVEN TIMES	7.0 DVBT PROGRAM ALL HAVE: 000
EIGHT TIMES	8.0 TS prog NUM NO SIGNAL
FIVE TIMES	9.0 OUTPUT TS OUT PROGRAM:000
TEN TIMES	10.0 QAM OUTPUT MODE DVBT CHANNEL PASS

6.3 How to set and change parameters

6.3.1 Set system parameters

A: Press MODE once: display as follows

1.0 VIEW ALARMS

ALARMS LIST EMPTY or NO INPUT SIGNAL or RF UNLOCK or BUFFER FULL or SYSTEM ERROR

B: Press UP/DOWN key to view/change parameters /select functions

▼ 1.0VIEW ALARMS

CLEAR ALL ALARMS

C: Press ENTER to store change or confirm operation

1.0 VIEW ALARMS

ALL ALARMS BE CLEARED

D: Press LEFT/RIGHT to recycle sub-menu

▶ 1 1.1 SET IP ADDR.

120.120.120.160

▶ 2 1.2 SET NET MASK

255.255.255.000

▶ 3 1.3 SET NET GATE

120.120.120.001

▶ 4 1.4 NET STATUS

NOT CONNECTED or CONNECTED

▶ 5 1.5 SERIAL No.:

XXXXXXXXXXXXXXXXX (18-digits)

▶ 6 1.6 VERSION

H: XX.XX S: XX.XX

▶ 7 1.7 GET PRESET PARA

*FACTORY PRESET

Press ENTER to save the operations.

▶ 8 1.8 RELOAD IN INFO.

*RELOAD ALL CHANNEL

▶ 9 1.9 QAM WORK MODE

6*ITU-T J.83 ANNEX A

6*ITU-T J.83 ANNEX B

E. In any status, press LOCK to exit

6.3.2 Set satellite parameters of channel 01

A: Press MODE twice: display as follows

2.0 CH01 TUNER STA.

SIGNAL BE LOCKED/NOT LOCKED (read only)

B: Press LEFT/RIGHT to recycle sub-menu

▶ 1 2.1 CH01 DOWN FREQ (Set satellite receiving frequency)

00480.000MHz

While setup new frequency, press UP/DOWN key, cursor displays in the front or at the ends, then press LEFT/RIGHT key to move cursor to the required position, and press UP/DOWN again to setup parameters, at last press ENTER to change and save.

▶2 2.2 CH01 PROGRAM SYM (Set satellite symbol rate)

32.000Mbuad

The operation is the same as above.

▶3 2.3 CH01 LOCAL FREQ (L.O of LNB)

00000MHz

The operation is the same as above.

▶4 2.4 CH01 POLE (Power supply indication)

HAVE POWER (read only)

▶5 2.5 CH01 LNB SIGNAL (Signal indication)

P: 000 S/N: 000 (read only)

P means signal intensity, S/N means signal quality.

6.3.3 Set QAM parameters of channel 01

A: Press MODE thrice: display as follows

3.0 CH01 QAM MODE

64 QAM

B: Press UP/DOWN to view/change parameters or select function

2.0 QAM MODE

▲*128 QAM ▲ *256 QAM ▲ * QPSK ▲* 16 QAM ▲ * 32 QAM ▲ * 64 QAM

C: Press ENTER to save change or confirm operation

D: Press LEFT/RIGHT to recycle sub-menu

★ 4 1 3.1 CH01 SYM [the first one is QAM output symbol rate(MBd), the other one is IF frequency(MHz)]

6.875MBd 07.906MHz](read only)

While setup new frequency, press UP/DOWN key, cursor displays in the front or at the ends, then press LEFT/RIGHT key to move cursor to the required position, and press UP/DOWN again to setup parameters, at last press ENTER to change and save.

☆ 4 1 3.1 CH01 SYM [36.15] (QAM output symbol rate, [36.00] is IF output frequency[MHz])

6.875MBd 07.906MHz

The operation is the same as above.

▶ 2 3.2 CH01 BW UNIT

uc Bitrate

Press UP/DOWN to display on the second line: *Bandwidth

★ ▶3 3.3 CH01 BW MODE

6MHz BW

Press UP/DOWN to display on the second line: *8MHz BW

☆ 4 3 3.3 CH01 IF OUT FREQ

36.15MHz/36.65MHz

Press UP/DOWN to display on the second line: *36.00MHz

4 4 3.4 CH01 SPEC. INV.

OFF 6 *ON

4 5 3.5 MODULATION

ON 6 *OFF

6.3.4 Set BYPASS PID of channel 01

A: Press MODE four times：display as follow:

4.0 CH01 BYPASS PID

OFF 6 *ON

B: Press ENTER to save change or confirm operation

C: Press LEFT/RIGHT to recycle sub-menu

4 1 4.1 CH01 MAP PID00

8191 -> 8191(DEC)

While setup new frequency, press UP/DOWN key, cursor displays in the front or at the ends, then press LEFT/RIGHT key to move cursor to the required position, and press UP/DOWN again to setup parameters, at last press ENTER to change and save.

4 2 4.2 CH01 MAP PID01

8191 -> 8191(DEC)

The operation is the same as above.

4 3 4.3 CH01 MAP PID02

8191 -> 8191(DEC)

The operation is the same as above.

4 4 4.4 CH01 MAP PID03

8191 -> 8191(DEC)

The operation is the same as above.

4 5 4.5 CH01 MAP PID04

8191 -> 8191(DEC)

The operation is the same as above.

4 6 4.6 CH01 MAP PID05

8191 -> 8191(DEC)

The operation is the same as above.

4 7 4.7 CH01 MAP PID06

8191 -> 8191(DEC)

The operation is the same as above.

4 8 4.8 CH01 MAP PID07

8191 -> 8191(DEC)

The operation is the same as above.

★6.3.5 Set satellite parameters of channel 02

A、Press MODE five times：display as follow:

5.0 CH02 TUNER STA.

SIGNAL BE LOCKED/NOT LOCKED (read only)

B、Press LEFT/RIGHT to recycle sub-menu

4 1 5.1 CH02 DOWN FREQ. (Set satellite receiving frequency)

00480.000MHz

While setup new frequency, press UP/DOWN key, cursor displays in the front or at the ends, then press LEFT/RIGHT key to move cursor to the required position, and press UP/DOWN again to setup parameters, at last press ENTER to change and save.

4 2 5.2 CH02 PROGRAM SYM. (Set satellite symbol rate)

32.000MBd

The operation is the same as above.

4 3 5.3 CH02 LOCAL FREQ. (L.O of LNB)

00000MHz

The operation is the same as above.

4 4 5.4 CH02 POLE (Power supply indication)

HAVE POWER（read only）

4 5 5.5 CH02 LNB SIGNAL (Signal indication)

P:000 S/N:000（read only）

P means signal intensity, S/N means signal quality.

★6.3.6 Set QAM parameters of channel 02

A、Press MODE six times：display as follow:

6.0 CH02 QAM MODE

64 QAM

B、Press UP/DOWN to view/change parameters or select function

5 *128 QAM 5 *256 QAM 5 *QPSK 5 *16 QAM 5 *32 QAM 5 64 QAM

C: Press ENTER to save change or confirm operation

D: Press LEFT/RIGHT to recycle sub-menu

4 1 6.1 CH02 SYM [the first one is QAM output symbol rate(MBd), the other one is IF frequency(MHz)]

6.875MBd 07.906MHz](read only)

While setup new frequency, press UP/DOWN key, cursor displays in the front or at the ends, then press LEFT/RIGHT key to move cursor to the required position, and press UP/DOWN again to setup parameters, at last press ENTER to change and save.

4 2 6.2 CH02 BW UNIT

uc Bitrate

Press UP/DOWN to display on the second line:

*Bandwidth

4 3 6.3 CH02 BW MODE

6MHz BW
Press UP/DOWN to display on the second line:
*8MHz BW
Press ENTER to save change.

4 4 6.4 CH02 SPEC. INV.
OFF 6 *ON

4 5 6.5 CH02 MODULATION
ON 6 *OFF

★6.3.7 Set BYPASS PID of channel 02

A、Press MODE seven times：display as follow:
7.0 CH02 BYPASS PID
OFF 6 *ON

B: Press ENTER to save change or confirm operation

C: Press LEFT/RIGHT to recycle sub-menu

4 1 7.1 CH02 MAP PID00
8191 -> 8191(DEC)

While setup new frequency, press UP/DOWN key, cursor displays in the front or at the ends, then press LEFT/RIGHT key to move cursor to the required position, and press UP/DOWN again to setup parameters, at last press ENTER to change and save.

4 2 7.2 CH02 MAP PID01
8191 -> 8191(DEC)
The operation is the same as above.

4 3 7.3 CH02 MAP PID02
8191 -> 8191(DEC)
The operation is the same as above.

4 4 7.4 CH02 MAP PID03
8191 -> 8191(DEC)
The operation is the same as above.

4 5 7.5 CH02 MAP PID04
8191 -> 8191(DEC)
The operation is the same as above.

4 6 7.6 CH02 MAP PID05
8191 -> 8191(DEC)
The operation is the same as above.

4 7 7.7 CH02 MAP PID06
8191 -> 8191(DEC)
The operation is the same as above.

4 8 7.8 CH02 MAP PID07
8191 -> 8191(DEC)
The operation is the same as above.

6.3.8 Set RF parameters

★A: Press eight times：display as follow:

8.0 RF OUT FREQUENCY：

1:500.5　2:506.5MHz

If new frequency setting , please see also the symbol rate setting.

☆A: Press MODE five times：display as follow:

8.0 RF OUT FREQUENCY：

500.5MHz

If new frequency setting , please see also the symbol rate setting.

B: Press LEFT/RIGHT to recycle sub-menu

4 1　8.1 RF OUTPUT LEVEL：

RF POWER OFF (read only)

4 3　8.3 RF POWER SWITCH

ON 6 *OFF

D: Press ENTER to store exchange or confirm operation.

E: In any status, press LOCK to exit.

NOTICE: The items are the manuals of GQ-3693 which are marked with ★, the ones are the manuals of INRA-5301 **which are marked with ☆, others are mutual manuals.**

7. System errors and debugging

7.1 Indicator lights

There are three LED indicator lights.

1) "POWER" lights up (Red) means power switch on and working orderly.

2) " STATUS" lights up(Green) means synchronization clock working orderly.

3) "ALARM" lights up(Green) means unit working orderly.

7.2 Trouble Shooting

7.2.1 The "POWER" indicator light does not illuminate.

Please check the wire to make sure the wire is connected to the socket properly and the power switch is on.

7.2.2 "STATUS" illuminates (in red)

This means lack of synchronal signals or input data abnormal or no valid data input, please check

the input data cable is connected properly, and the input interface is selected correctly. If the answer is yes, it means the unit is broken, needs to be replaced.

7.2.3 “AlARM”flashes

This means the equipment is out of order for some faults. Please debug according to the instruction from LCD.