

INSTALLATION MANUAL

MODEL: KRH100

4 x DVB-S/S2/T/T2/C to 4 x DVB-T/C



kingray.net.au

1. IMPORTANT SAFETY PRECAUTIONS INFORMATION

READ THE FOLLOWING WARNINGS BEFORE YOU USE YOUR DEVICE

WARNING

The following safety precautions must be observed to prevent fire or electric shock hazard. Safety precautions include but are not restricted to the following:

POWER SUPPLY:

- Operate the unit only within the voltage range defined.
- Occasionally check the power connector and remove dirt or dust that may have accumulated.
- Use only the power supply that comes with your unit.
- Do not operate the unit or plug in the power supply if it is broken, split, or damaged in any way.
- Do not place the power supply next to heating devices.
- Do not pull it, place heavy objects on it or damage it in any way.
- Keep it out of reach of children.
- Always carefully disconnect all plugs by pulling on the plug and not on the cord.
- Make sure the unit's power supply is turned off before removing it from an outlet.
- Disconnect the power supply when the unit is not in use for long periods of time or during storms.
- Do not connect the unit to a multiple-outlet to avoid plug overheating.

DISASSEMBLING:

- This unit contains parts that cannot be repaired by the user.
- Do not disassemble or try to repair it as this will void all warranties.
- Please contact the manufacturer if you experience any problems with your unit.

WATER/HUMIDITY:

- Do not keep the unit in a humid place or near water.
- Do not plug/unplug the unit with wet hands.

FIRE:

- Never place a candle or another source of fire on the unit as it may fall and start a fire.
- If the power supply is damaged or destroyed, or if there is a sudden loss of picture during operation, or if you notice a strange smell or there is smoke, immediately switch the unit off, disconnect the power supply and contact the manufacturer's technical support department.

INSTALLATION / STORAGE:

- This unit contains high precision pieces of electronics. To ensure optimal performance and avoid damage, do not store it in any location where it may collect dirt, duct, lint, etc. Do not expose it to extreme heat or cold (e.g. in direct sunlight, near a heater or in the car during the day). Place the unit in a secure place to avoid falls.
- Before moving the unit, always unplug all cords first.
- When installing the unit, make sure that an outlet is within easy reach. In case of malfunction, switch the unit off and unplug the power supply. When the unit is not in use for a long period of time, make sure that the power supply is disconnected.

CONNECTIVITY:

• Before connecting the unit to other electronic devices, always switch off and unplug all devices.

MAINTENANCE:

• Do not spill liquids on the unit. Do not use any diluents or volatile liquid to clean the unit. Instead, use a soft slightly damp cloth and allow the unit to dry completely before using again.

HANDLING:

- Do not poke your finger into the openings on your unit.
- Never put paper, metal parts or other objects into the openings of your unit. If you suspect that there are foreign parts in your unit, switch it off and unplug the power supply. Contact the manufacturer's technical support department.
- Do not step on or place heavy objects on top of the unit. To avoid hardware damage, handle all buttons, connectors and switches gently.

2. INTRO

Congratulations on purchasing the KRH100. You now own a high quality, professional DTV headend. To get the most out of your purchase, please take the time to carefully read through this manual.

3. INSTRUCTIONS

3.1 - DESCRIPTION:

The KRH100 is a very powerful, all-in-one mini headend device, able to receive up to 4 independent satellite (DVB-S/S2), terrestrial (DVB-T/T2) or cable (DVB-C) signals and convert them either in 4 x DVB-T/C RF output channels. It supports "pool" technology, meaning that the user is able to select any program from any of the 4 inputs and assign them to any of the 4 outputs providing great flexibility. The embedded web server of the KRH100 provides a very friendly user interface as well as the ability of remote or local control of the device via LAN.

Its small size and its powerful features render the KRH100 the ideal solution in case you want to distribute FTA (Free-To-Air) TV programs coming from satellite (DVB-S/S2), terrestrial (DVB-T/T2) or cable (DVB-C) sources to a CATV installation using the DVB-T/C.

3.2 - FEATURES:

- 4 x independent multi-standard inputs DVB-S/S2/T/T2/C
- 1 x RF output containing up to 4 x DVB-T/C channels (software selectable)
- "Pool" technology
- MER value > 42dB
- PID filtering
- Redundancy mode compatible
- Custom NIT/SDT
- Local or remote control via webserver
- User friendly interface
- Wall or rack mount options
- SNMP v2
- Ultra-compact in size
- 5 Year Warranty (KRH100), 3 Year Warranty (Power Supply)

3.2.1 - AUTO-RESET FUNCTIONS AND WATCHDOG

During the normal operation of the KRH100, the main CPU monitors all the internal parts in order to ensure that the device works normally. In case of an internal error or module failure, the KRH100 immediately initiates the recovery procedure by resetting the appropriate module or the device.

Finally, watchdog timers ensure that the device will be reset in case of CPU failure.

3.2.2 - "POOL" TECHNOLOGY

The KRH100 supports "pool" technology, meaning that the user is able to select any TV or Radio program from any input and assign it to any of the 4 output channels providing great flexibility.

3.2.3 - DVB-T OR DVB-C COMPLIANT

The user is able to software select the modulation standard, between DVB-T and DVB-C, of the KRH100 without the need of any firmware upgrade.

3.2.4 – CUSTOM NIT/SDT

Using the KRH100 the user is able to create custom NIT and SDT tables according to their needs.

3.2.5 – DUAL POWER SUPPLIES

The KRH100 is powered from one or two external power supplies of +12VDC/2.5A. In case we connect two external power supplies then they will work in redundancy mode. Thus, in case of failure of one of the two external power supplies the device will continue working without stopping.

3.3 – BLOCK DIAGRAM:



3.4 - PRODUCT DRAWING VIEWS:







4. INSTALLATION

4.1 - GENERAL

The KRH100 has a user friendly interface for programming and monitoring purposes. The user is able to gain access to the embedded webserver, by opening an Internet browser (e.g. Internet Explorer, Firefox or Chrome) and type the following static IP: 192.168.1.205. Before logging into the device, please ensure that the properties of "Internet Protocol Version 4 (TCP/IPv4)" on your PC has been changed to "Use the following IP address", such as the image shown below.

Internet Protocol Version 4 (TCP/IPv4) Properties									
General									
You can get IP settings assigned autor this capability. Otherwise, you need to for the appropriate IP settings.	natically if your network supports ask your network administrator								
Obtain an IP address automatically									
Use the following IP address:									
IP address:	192.168.1.100								
Subnet mask:	255.255.255.0								
Default gateway:									
Obtain DNS server address auton	natically								
Use the following DNS server add	resses:								
Preferred DNS server:									
Alternate DNS server:									
Validate settings upon exit	Advanced								
	OK Cancel								

The factory default username and password are as follows: Username: admin Password: 12345

NOTE:

After connecting to the device via your PC, the user should go to the Regional Settings (page 17) & select the region it is to be installed in prior to setting up the device.

4.2 - EMBEDDED WEBSERVER

Status

4.2.1 - "GENERAL" PAGE

Every time that the user is connected to the device, the "General" page (Figure No.1) is loaded providing a current general status information of the device.

Kingray													KRH10	0
	Status													
Status	Inputs	Status	Mode	TS status	Frequency	Bandwidth	Symbol rate	Band	Polarity	Constellation	DiSEaC			
General Brogram Est					(mriz)		(KSPS)							
Block diagram	Input 1	Locked	DVB-T/T2		177.50	7 MHz								
	Input 2	Locked	DVB-T/T2		184.50	7 MHz								
200	Input 3	Locked	DVB-T/T2		191.50	7 MHz								
setup	Input 4	Locked	DVB-T/T2	•	219.50	7 MHz								
Input TS configuration Program selection					(
• RF output	Outputs	Status	(MHz)	Constellation	Code rate	Guard interval	Channel bandwidth	Modulation						
NIT	Output 1	Running	177.50	64-QAM	7/8	1/32	7 MHz	8K						
• SDT	Output 2	Running	184.50	64-QAM	7/8	1/32	7 MHz	8K						
	Output 3	Running	191.50	64-QAM	7/8	1/32	7 MHz	8K						
vstem	Output 4	Running	198.50	64-QAM	7/8	1/32	7 MHz	8K						
Event lon														
AN		_												
Iministration Istem restart	System	Status												
actory defaults	Multiplexer	OK												
imware update	Modulator mode	DVB-T												
egional settings	CPU temperature	34.75 °C												
10	Status code 1	00 00 00 00												
	Status code 2	00 00 00 00												
	System date & time	2020-08-19, 00:33:11												
	System uptime	0d 1h 18m 58s												

Status - Inputs 1...4

In these fields, the user is able to see the status of each tuner e.g. If it is locked / unlocked or disabled, the working mode e.g.. DVB-S/S2, DVB-T/T2 or DVB-C etc.

Outputs – Modulator 1...4

In these fields, the user is able to see the status of all the RF outputs of the device such as modulator's state, RF output frequencies and modulation settings.

System

This section provides general information of the device, like internal status of all device's modules, CPU temperature and fan state as well as error codes for troubleshooting purposes.

4.2.2 - "PROGRAM LIST" PAGE

In "Program List" page (Figure No. 2) the KRH100 provides information of all programs that are currently being distributed via its four RF outputs.

Program li	st		
Output 1 Out	out 2 O	utput 3	Output 4
Program title	Service I	D LCN	From input
7 Sydney	1312	0	1
7 Sydney	1313	0	1
7 mate Sydney	1314	0	1
7HD Sydney	1316	0	1
7flix Sydney	1317	0	1
openshop	1318	0	1
7mateHD Sydney	1319	0	1
RACING.COM	1320	0	1
	Program tile 7 Sydney 7 Sydney 7 Sydney 7 TNVO Sydney 7 Mate Sydney 7 Mate Sydney 7 Mate Sydney 7 Mate Sydney 7 Mate NGSCOM	Program list Output 1 Output 2 O 7 Sydney 1312 7 7 Sydney 1313 71W0 Sydney 1316 7 TMD Sydney 1316 71K0 Sydney 1316 7 TML Sydney 1316 71K0 Sydney 1316 7 TML Sydney 1317 100 1318 7 TML Sydney 1318 71K0 Sydney 1319 RACING COM 1320 1320	Program tiles Service ID LCN 7 Sydney 1312 0 7 Sydney 1313 0 7 TNO Sydney 1314 0 7TMO Sydney 1315 0 7TNO Sydney 1315 0 7TNO Sydney 1315 0 7Hix Sydney 1315 0 7Hix Sydney 1315 0 7Mix Sydney 1312 0 RACING COM 1320 0

At the same time, the device offers the whole channel list to be exported under the follow file types: **Excel** – All the program list is exported in .xlsx format

CSV – All the program list is exported in .csv format

4.2.3 - "BLOCK DIAGRAM" PAGE

The "Block Diagram" page (Figure No. 3) provides a general view of device's internal modules and architecture.



All icons are clickable providing the ability to the user to go directly to the setup page of all internal modules of the device. The grey icons mean that the current module is disabled.

When selecting bypass mode the information is automatically forwarded/passed through to the output, keeping all the original info like LCN, NIT, PIDS, etc.. This eliminates the requirement to customize the input section & you can go straight to the output settings.

Setup

4.2.4 - "INPUT" PAGE

In the "Input" page (Figure No. 4) the user is able to select the working mode for each input.

Kingray		KRH100
Status	Input	
General Program list Block diagram	Input 1 Input 2 Input 3 Input 4	
Setup	Settings	Status
Input TS configuration Program selection	Tuner DVB-T/T2 🗸	Tuner Locked Re-lock
Output • RF output • TS settings	Frequency 177.5 MHz (44.00 1002.00)	Bit rate
• NIT • SDT	Channel 06 🗸	Signal quality 100%
System	Bandwidth 7 MHz 🐱	
LAN Administration System restart		
Factory defaults Import / Export config. Firmware update		
Regional settings Info	Apply Refresh	
		Refresh Every 5 sec 🗸 Now
	Copyright @ 2020 Kingray	

There are four tabs, one for each input. The user is able to select the working mode of each input as follows:

For Satellite signal reception the user must select DVB-S/S2 mode:

- 1. Tuner Enabled/Disabled Enable or disable the specific tuner
- 2. SAT or IF Frequency Select how to insert the SAT frequency
- 3. Symbol Rate Insert the symbol rate
- 4. LNB Voltage Select the LNB voltage (13V, 18V, OFF)
- 5. Band Select the appropriate SAT band (works only if IF frequency is selected as input method)
- 6. DiSEqC Select DiSEqC A, B, C, D

For Terrestrial signal reception the user must select DVB-T/T2 mode:

- 1. Tuner Enabled/Disabled Enable or disable the specific tuner
- 2. Frequency Insert the input frequency or
- 3. Channel Instead of frequency your can add the channel number
- 4. Bandwidth Insert the input channel bandwidth

For DVB-C mode:

- 1. Tuner Enabled/Disabled Enable or disable the specific tuner
- 2. Frequency Insert the input frequency
- 3. Symbol Rate Insert the symbol rate
- 4. Constellation Insert constellation

Once all settings have been entered, the user must click the "Apply" button to begin the lock process.

TUNER STATUS:

For each input the KRH100 provides several information such as tuner status (Locked/Unlocked), total bitrate, signal strength, quality etc.

4.2.5 - "TS CONFIGURATION" PAGE

In the "TS Configuration" page (Figure No.5) the user is able to set the input channel information to unconditionally pass through all of the program settings to the output channel by pressing the tick box (Figure No. 6).

KRH100

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itus	TS configuration	Logout
eral jram list k diagram	Transport stream distribution	
Sources Sources In selection output settings T	Input 1: Always connected to Multiplexer and optionally to Output 1, unconditionally passing all its programs through this output. Input 2: Always connected to Multiplexer and optionally to Output 2, unconditionally passing all its programs through this output. Input 3: Always connected to Multiplexer and optionally to Output 3, unconditionally passing all its programs through this output. Input 4: Always connected to Multiplexer and optionally to Output 4, unconditionally passing all its programs through this output.	
SM log estation n estat n estat V debuts / C sport config. are update and settings	$ \begin{array}{c} M^{2} \oplus \\ & & \\ $	
	Apply Refresh	FIG

Known K

After selection, press the "Apply" button & the press the "Yes, Apply" button to confirm & save. Once you have done this, all heading numbers will need to be updated as well as the figure no on the pages thereafter.

4.2.6 - "PROGRAM SELECTION" PAGE

In the "Program Selection" page (Figure No. 7) the user is able to select any program from any input and assign it to any output using the "pool" technology.

V										KRH100
Р	rogram selec	tion								
In	put 1 Input 2	Input 3 Input 4								
			Multip	lexer						
	Original program title		Original Service ID		Bandwidth (Kbps)			Output Service ID		
Ħ	7 Sydney	7 Sydney	1312	0	945	1	TS OUT 1 👻	1312		
⊞	7 Sydney	7 Sydney	1313	0	945		TS OUT 1 🗸	1313		
Ð	7TWO Sydney	7TWO Sydney	1314	0	1728	2	TS OUT 1 🗸	1314		
Ŧ	7mate Sydney	7mate Sydney	1315	0	3365	n	TS OUT 1 🗸	1315		
Ħ	7HD Sydney	7HD Sydney	1316	0	2305	9	TS OUT 1 👻	1316		
÷	7flix Sydney	7flix Sydney	1317	0	3250	2	TS OUT 1 👻	1317		
Ŧ	openshop	openshop	1318	0	1198	2	TS OUT 1 🗸	1318		
Ð	7mateHD Sydney	7mateHD Sydney	1319	0	4794	9	TS OUT 1 🗸	1319		
Ħ	RACING.COM	RACING.COM	1320	0	3112	9	TS OUT 1 👻	1320		
ן דז דז דז דז	Status Max. S OUT 1 27709 S OUT 2 27709 S OUT 2 27709 S OUT 3 27709 S OUT 4 27709	Klipp) Peak Current detection 22247 22603 22465 22382 Reset	Apply Payload 80% 82% 81% 81%	R	efresh				Reteals	Every 5 sec 🗸 Nov
Copyri	ight © 2020 Kingsay									

There are 4 tabs, one for each input. Each tab depicts all the TV and Radio programs from the input that has being selected during the "Input page" processes.

KRH100

When the user selects one input, the device's multiplexer does a real time analysis and depicts the program list from this specific input. For each program the KRH100 provides the following information/options:

- **Original Program Title** Which is the name of the program
 - **Program Title** The ability to enter a custom name for this specific program
 - **Original Service ID** Which is the original Service ID number of the program
- Original Set
 LCN No
 - LCN No Which is the logic channel number of the program Bandwidth – Which is the bitrate of the program in Kbps
 - Which is the bitrate of the program in Kbps Which depicts if the program is encrypted or not
- Encrypted –
 Output –
- To select in which the program must be assigned
- **Output Service ID** The user is able to provide custom Service ID number

Each program title has a small cross at the left which can be expanded if the user will click on it. During this procedure, all the available PIDs of this specific program are reveled (Figure No. 8). In this case, the user is able to select/deselect which PID they want to be outputted.

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Program selection	"gray										Interior
text 1 text 2 text 4 1 text 2 text 4 Notifieser 1 1 1 1 1 1 1 1 1 1 1 0 1	rs	Program selec	ction								
Multiplexer To openative To openative Listo Terchood Control Contro Control Contro		Input 1 Input 2	Input 3 Input 4								
Multiplexer Image: State Program this <											
Organities Drogene file Organities Organites Organites Organit				Multip	lexer						1
To Systemy 7 Systemy 1312 0 95 1 10 UT 1 1312 To D 51 WWD FD 531 WWD 1		Original program title		Original Service ID		Bandwidth (Kbps)			Output Service ID		
• 0 • 0 • 0 • 0 • 0 • 0 • 0 <th></th> <td>7 Sydney</td> <td>7 Sydney</td> <td>1312</td> <td>0</td> <td>945</td> <td>1</td> <td>TS OUT 1 👻</td> <td>1312</td> <td></td> <td></td>		7 Sydney	7 Sydney	1312	0	945	1	TS OUT 1 👻	1312		
7 Sydney 7 Sydney 1313 0 945 1 1500 TT v 1313 17 TWO Sydney 1314 0 1728 1 1500 TT v 1313 17 TWO Sydney 1314 0 1728 1 1500 TT v 1314 17 TWO Sydney 1316 0 3055 1 TS OUT 1 v 1315 17 Two Sydney 1316 0 2055 1 TS OUT 1 v 1315 17 Two Sydney 1317 0 2055 1 TS OUT 1 v 1317 17 Sydney 1318 0 199 1 TS OUT 1 v 1318 17 Structure 1285 1 199 1 TS OUT 1 v 1318 18 OUT 2 2775 2246 138 1 138 1 1 1 18 OUT 3 27759 2246 186 185 1		PID 513 VIDEO - Y PID 513 VIDEO - Y PID 514 (1110) - Y PID 516 (1113) - Y PID 518 (1113)	l English								
Image: Systemy TSVO Systemy 1314 0 1728 TS OUT 1 1314 Image: TWO Systemy TSVO Systemy 1315 0 3265 Image: TS OUT 1 1315 Image: TWO Systemy TSVO Systemy 1316 0 2055 Image: TS OUT 1 1316 Image: TVO Systemy TSVO Systemy 1316 0 2055 Image: TS OUT 1 1316 Image: TVO Systemy TSVO Systemy 1318 0 1198 Image: TS OUT 1 1318 Image: TSVO Systemy TSVO Systemy 1318 0 1198 Image: TS OUT 1 1318 Image: TSVO Systemy TSVO Systemy <th></th> <td>7 Sydney</td> <td>7 Sydney</td> <td>1313</td> <td>0</td> <td>945</td> <td></td> <td>TS OUT 1 👻</td> <td>1313</td> <td></td> <td></td>		7 Sydney	7 Sydney	1313	0	945		TS OUT 1 👻	1313		
Image: Sydemy 7 mate Sydemy 1315 0 3365 Image: Sydemy 1315 Image: Sydemy 7 mate Sydemy 1316 0 2365 Image: Sydemy 1315 Image: Sydemy 7 mate Sydemy 1316 0 2365 Image: Sydemy 1316 Image: Sydemy 7 mate Sydemy 1316 0 2365 Image: Sydemy 1316 Image: Sydemy 7 mate Sydemy 1317 0 3250 Image: Sydemy 1317 Image: Sydemy 1318 0 1198 Image: Sydemy 1317 Image: Sydemy Image: Sydemy 1318 0 1198 Image: Sydemy 1317 Image: Sydemy Image: Sydemy 1318 0 1198 Image: Sydemy 1318 Image: Sydemy		TTWO Sydney	7TWO Sydney	1314	0	1728		TS OUT 1 🗸	1314		
Image: Prior Sydemy 1316 0 295 Image: TS OUT T 1316 Image: Prior Sydemy 1317 0 3250 Image: TS OUT T 1317 Image: Prior Sydemy 1317 0 3250 Image: TS OUT T 1317 Image: Prior Sydemy 1318 0 1198 Image: TS OUT T 1318 Image: Prior Prior Prior Refresh Image: TS OUT T 1318 Image: TS OUT T 1318 Image: Prior Prior Prior Prior Prior Pri		7mate Sydney	7mate Sydney	1315	0	3365	2	TS OUT 1 👻	1315		
If 7 fike Sydney 1317 0 250 If S OUT 1 1317 If operation operation 1318 0 1198 If S OUT 1 1318 If operation Referent If S OUT 1 If S OUT 2 If S OUT 2 If S OUT 2 If S OUT 2 If S OUT 3 If S OUT 4 If S OUT 3 <	config.	HD Sydney	7HD Sydney	1316	0	2305		TS OUT 1 👻	1316		
Image: spenshop openshop 1318 0 198 Image: spenshop 1318 Image: spenshop Apply Refeash Status Paylost Project Proj	10 QS	7flix Sydney	7flix Sydney	1317	0	3250	1	TS OUT 1 🗸	1317		
Apply Refresh Satus		openshop	openshop	1318	0	1198	1	TS OUT 1 🗸	1318		
Refer Manual V Nov		Status TS OUT 1 27709 TS OUT 2 27709 TS OUT 2 27709 TS OUT 3 27709 TS OUT 4 27709	(Kbps) Peak Current detection 22284 22840 22840 22840	Apply Payload 80% 82% 81% 81%	Re	fresh					
Copyright & 2000 Kitopay			Reset							Retresh Manual	< NOW
		Copyright @ 2020 Kingray									

Using the Drop-down menu from "Output" column (Figure No. 9) the user is able to assign any program to any of the four output channels. By doing the same process for each program, from all inputs the user is able to create his own custom multiplex in the output.

Status General Program selection Program M Bock Awayom
Verskrål Input1 Input2 Input3 Input4 Rick dagram
Multiplexer
Cocopy Original Original LCN Bandwidth Encrypted Output Output Input Program title Program title Service ID 11023 (Kbps) Encrypted Output Service
15 configuration Programs selection Programs selection 7 Sydney 7 Sydney 1312 0 945 🍋 TS OUT 1 🗸 131
Open Open 150011 *15 windy -57 windy 150011 *15 windy -57 windy 150011 *10 windy -57 windy 150011
System 🗄 7 Sydney 7 Sydney 1313 0 945 🏠 TS OUT 1 🗸 131
Event log 🗄 7TWO Sydney 7TWO Sydney 1314 0 1728 🎴 TS OUT 1 🗸 131
Administration 🕀 7mate Sydney 7mate Sydney 1315 0 3365 🍗 TS OUT 1 🗸 131
Factory defaults Introvit/ Expand comited International In
Finnvære updale 🗄 7filo: Sydney 7filo: Sydney 1317 0 3250 🍋 TS OUT 1 🗸 131
Info 🕀 openshop openshop 1318 0 1198 🍋 TSOUT 1 🗸 131

CAUTION:

The number of programs that the KRH100 is able to distribute depends on the resolution (SD, HD, 4K etc.), the compression (MPEG2, H.264 etc...) and in general from the total bitrate of each program. For example, if we select the following DVB-T setting for the four modulators on KRH100 outputs:

- Constellation: 64 QAM
- Guard Interval: 1/32
- **Code rate:** 7/8
- Bandwidth: 8 MHz

According to Appendix A we will have a total output bitrate of 31.67Mbps/ modulator. That means that we can select as many programs as the user wants but their total bitrate must not exceed the 31.67Mbps, otherwise artifacts may occur.



The status section in (Figure No. 10) provides a general idea to the user of the current payload (according to the selected programs) comparing it to the max. output payload. It is recommended that the user must not exceed the 85% from each output, since all the bitrate are variable according to their specific content.

PEAK DETECTION MECHANISM

As shown in Figure No 10 there is a colored indicator of the peak detection mechanism, for each output transport stream. This indicates if any overflow has occurred on modulator's output bitrate with the following colors:

- Green No overflow occurred
- Yellow No overflow occurred but the input bitrate is close to the output bitrate
- **Red** Overflow occurred. The user must decrease the input bitrate

4.2.7 - "OUTPUT" PAGE

In the "Output" page (Figure No. 11) the user is able to select the output as either DVB-T or DVB-C. The default setting is DVB-T.

Kingray		KRH100
Status	Output configuration	Logout
General Program list	Output mode	
Block diagram Setup	DVB-T	
Input TS configuration Program selection Output • RF output • TS settings • NIT • SDT		
System Event log LAN Administration System restart Factory defaults Import / Export contig Firmware update Regional settings		
Info		FIGURE No. 11

4.2.8 - "RF OUTPUT" PAGE

In the "RF Output" page (Figure No. 12) the user is able to setup the RF output settings of the KRH100.

State Pergential Restaurce FC found For equencity (Mg) Consistencity of the state of th	Kingray											I	KRH100
Constraint Propuest Sectory Programs/Sectory Reductions Sectory Sectory Sectory Sectory Newson Sectory Sectory Newson Sectory Sectory Newson Sectory Sectory Newson Newson Ne	Status	RF ou	tput										
Red degram 0 upup 1 0 upup 7 0 upup 2 <	General Program list		Channel	Frequency (MHz) 110.00 - 900.00	Constellation	Code rate	Guard interval	Channel bandwidth	Modulation	Enabled			
Setup Ougud 2 O7 104 50 64 -0.Mit 7/8 132 7 MHz 6K C Product 3 0.8 191 50 64 -0.AMit 7/8 132 7 MHz 6K C Product 3 0.8 191 50 64 -0.AMit 7/8 132 7 MHz 6K C Ougud 1 0.9 198 50 64 -0.AMit 7/8 132 7 MHz 6K C Status Apply Apply 100 dB C	Block diagram	Output 1	06 🗸	177.50	64-QAM 🗸	7/8 🗸	1/32 🗸	7 MHz 🗸	8K 🗸	V			
Node To doputation Cody - 10 codputation - 10 codputatio - 10 codputation - 10 codputation - 10 codputation - 1	Setup	Output 2	07	184.50	64-QAM	7/8	1/32	7 MHz	8K	S			
Porgus addrom Oudput 4 09 198.50 64-0AM 7/8 1/32 7 MHz 8K • Br addrom Apply • Statistical Statisti Statisti Statistical Statistical Statis Statistical St	Input TS configuration	Output 3	80	191.50	64-QAM	7/8	1/32	7 MHz	8K	S			
 enduli isotationality i	Program selection Output	Output 4	09	198.50	64-QAM	7/8	1/32	7 MHz	8K	S			
System US System Service System Sy	RF output TS settings				Appl	v							
System The Mathematical System and Alternation level Mathematical System and Alternation level System	• NIT • SDT					,							
End to Mark More controls min.	System	Attenuation	1 level										
Souther metal Pervery details Report a tention Boo Status Status Copyret 6 2020 Mages Copyret 6 2020 Mages	Event log LAN Administration	min. output			п 0	nax. utput	R						
Min Status Bit was Current Period TS OUT 1 27709 2246 TS OUT 2 27709 2246 TS OUT 2 27709 2246 Bit% Bit% TS OUT 2 27709 Esset Referent Every 2 act	System restart Factory defaults Import / Export config. Firmware update Regional settings		A	pply attenuation leve	1								
Image Compare Peak Payload TS OUT 27709 2246 80% TS OUT 27709 2246 80% TS OUT 27709 2246 81% TS OUT 27709 2246 81% Reset 81%	Info	Status											
IS GUIT 2/109 22185 TS GUIT 2/109 22186 TS GUIT 2/1709 22468 TS GUIT 2/1709 22468 TS GUIT 2/1709 22468 TS GUIT 2/1709 22468 Refresh Every 2 sec V Now			Bitra Max.	te (Kbps) — Pea Current detect	k tion	Payload							
TIS OUT 2 27109 22114 27709 22407 81% Now		TS OUT 1	27709	22185		80%							
TS OUT 4 27709 22407 Reset Refresh Every 2 sec V Now		TS OUT 2	27709	22/14		82%							
Refresh Every 2 sec V Nov		TS OUT 4	27709	22407		81%							
Copyright & 2000 Kingary				Res	et							Refresh Every 2 see	c 🗸 Now
		Copyright @ 2020	Kingray										

With the use of the radio buttons the user is able to select the mode that the KRH100 will operate as follows:

DVB-T: 4 x modulator working in DVB-T standard DVB-C: 4 x modulator working in DVB-C standard

For each modulator in DVB-T mode the user is able to setup the following parameters:

- The output frequency of the first modulator* Frequency -•
- The constellation of the first modulator* Constellation -•
- Code Rate •
- The coder rate of the first modulator* Guard Interval – The guard interval of the first modulator* •
- Channel Bandwidth The channel bandwidth of the first modulator* •
- Modulation -•
- The modulation type of the first modulator* Enable/Disable -Enable or disable the current modulator. •
- Attenuation Level -The maximum output level can be attenuated by 30dB using the slide bar.

4.2.8 - "RF OUTPUT" PAGE (CONTINUED)

*All 4 output channels of the KRH100 operate as adjacent RF output channels.

This means that will only need to set up the first modulator and all the other three modulators will have the same settings and will be automatically programmed in adjacent channels.

E.g. If the user sets the CH28 in UHF band on modulator No.1 the other three modulators will be automatically set to CH29, CH30 and CH31, respectively.

Status							
	Bitrate Max.	(Kbps)	Peak detection	Payload			
TS OUT 1	27709	22204	-	80%			
TS OUT 2	27709	22702		82%			
TS OUT 3	27709	22480	-	81%			
TS OUT 4	27709	22413	-	81%			
			Reset		Refresh Every 2 sec	✓ Now	FIGURE No.

The status section in (Figure No. 13) provides a general idea to the user of the current payload (according to the selected programs) comparing to the max. output payload.

It is recommended that the user must not exceed the 85% from each output, since all the bitrates are variable according to their specific content.

4.2.9 - "TS SETTINGS" PAGE

In this section (Figure No.14), the user is able to setup all the TS settings of the four multiplex outputs in KRH100.



For each multiplex output the user can setup the following settings:

TS ID:	Which is the ID No of the specific multiplex (165535)
Net ID:	Which is the Net ID No of the specific multiplex (165535)
Original Net ID:	Which is the Org. Net ID No of the specific multiplex (165535)
Network Name:	Which is the network name of the specific multiplex
NIT:	Choose from Global, Basic, Default and Custom
LCN Provider:	Choose the appropriate LCN provider (European, NorDig v1, ITC / UK)

*For installation within Australia & New Zealand, please select NorDig v1

System

4.2.10 - "NIT" PAGE

Note: For use in Australia & New Zealand please select NorDig

In this section (Figure No. 15), the user is able to create custom NIT table for each of the four output channels of the device.

Moreover, this section offers the ability to export / import a NIT table.

Kingray **KRH100** NIT - Network Information Table utput 1 General Program list Block diagra NIT mode Default DTV NIT version 1 Network name 102 LCN provider European Network ID Current settings SDT ystem ent log Ilation Transmission Orig. Net ID Freq (MHz) Code Private data # # LCN Visible M 1 101 103 177.50 7 MHz V 64-QAM 8K ~ 7/8 ~ 1/32 ~ 00000028 1 1312 01 ~ 8 80 2 1313 01 ~ 8 . 3 1314 01 ~ . 8 4 01 8 1315 ~ . 5 1316 19 ~ 8 iii 01 ~ 8 6 1317 . 7 1318 01 ~ 8 . 8 19 ~ 8 1319 . 9 1320 16 ~ . 80 FIGURE No. 15

4.2.11 - "SDT" PAGE

In this section (Figure No. 16), the user is able to create custom SDT table for each of the four output channels of the device. Moreover, this section offers the ability to export / import a SDT table.

Status General Program BP Block disgram Sptim	Output 2 Output 3	tion Table										
General Program lief Block disgram SDT mode : E	Output 2 Output 3											
Block diagram SDT mode : D												
Setup	Default											
#	TSID Orig.	Table	Version	#	Svc ID	Service name	Provider name	Svo	type	Manage		
s configuration	101 103	Actual ~	1	1	1312	7 Sydney	Seven Network	01	v v			
pramiselection put RE-subset				2	1313	7 Sydney	Seven Network	01	~	8		
TS settings NIT				3	1314	7TWO Sydney	Seven Network	01	~	8		
• SDT				4	1315	7mate Sydney	Seven Network	01	~	8		
iystem				5	1316	7HD Sydney	Seven Network	19	~	8		
nt log 4				6	1317	7flix Sydney	Seven Network	01	*	8		
ministration stem restart				7	1318	openshop	Seven Network	01	•	8		
port / Export config. mware update				8	1319	7mateHD Sydney	Seven Network	19	*	8		
onal settings				9	1320	RACING.COM	Seven Network	16	~			

4.2.12 - "EVENT LOG" PAGE

In "Event Log" page (Figure No. 17) the system logs all the events occurs in the device during its operation. These logs are divided in three different categories based on their priority as follow:

- Using the red color the system logs the events which are of high priority. High -
- Using the orange color the system logs the events which are of medium priority. • Medium –
- Using the red color the system logs the events which are of low priority. Low –

		KRH100
System log		
Filter by severity 🗸 High 🗹 Medium 🗹 Low 🗹 Info		
Delete selected events.		
Note: You cannot select arbitrary or individual events. All events older than the selected event are automatically selected.		
Date & time Severity Description		
2020-08-19, 01:03:57 Info User logged in	A	
2020-08-19, 01:03:27 Info User logged out		
2020-08-19, 01:02:15 Info User logged in		
 2020-08-19, 01:00:12 Info User logged out 		
2020-08-19, 00:59:02 Info User logged in		
2020-08-19, 00:58:42 Info User logged out		
2020-08-19, 00:57:34 Info User logged in		
2020-08-19, 00:54:21 Info User logged out		
2020-08-19, 00:53:12 Into User logged in		
2020-08-19, 00:46:49 Into User logged out		
2020-08-19, 00:40:04 Info User logged in		
2020-08-19, 00.42.17 Into User logged out		
2020-00-19, 00-41-00 Info User logged in		
2020-08-10 00:30-01 Info User logged but		
2020-08-19 00:38:38 Info User logged aut		
2020-08-19.00:37:30 Info User logged in		
2020-08-19. 00:36:11 Info User logged out		
2020-08-19, 00:35:03 Info User logged in		
110 hoppel and 1 00.00 - 22 - 00 00 00	•	
	System log Filter by seventy ✔ High ✔ Medium ✔ Low ✔ Info Extent Selected events. Naka Naka </td <td>System log Filter by seventy ✓ High ✓ Medium ✓ Low ✓ Info Detest selected events: Name Name All events older than the selected event are automatically selected. Date Selected event are automatically selected. Date & time Seveription </td>	System log Filter by seventy ✓ High ✓ Medium ✓ Low ✓ Info Detest selected events: Name Name All events older than the selected event are automatically selected. Date Selected event are automatically selected. Date & time Seveription

The user has the ability to select which kind of events to display as well as the device gives the opportunity to export these logs as follow:

No. 17

- **Excel** All the program list is exported in .xlsx format •
- **CSV** All the program list is exported in .csv format •

4.2.13 - "LAN" PAGE

In "LAN" page (Figure No. 18) the user is able to setup all the parameters of the LAN control of the device as follows: Kingray **KRH100**

Status	IP address	configuration
General Program list	All fields are re	quired if DHCP is disabled.
Diock diagram	Enable DHCP	
Setup	IP address	192.168.1.205
TS configuration Program selection	Subnet mask	255.255.255.0
Output • RF output	Gateway	192.168.1.1
TS settings NIT	Primary DNS	192.168.1.1
• SDT	Secondary DNS	0.0.0.0
System	Port	80
LAN Administration System restart Factory defaults Import / Expert config. Firmware update Regional settings	MAC address	68:27:19:0a:74:7e Apply
Info	Copyright © 2020 Kingray	

Set a static IP address for controlling the device

- DHCP: •
- IP address:
- Subnet mask: Set the specific Subnet mask •
- Gateway:
- Set the gateway's IP address Set the IP address of the primary DNS Primary DNS: •
- Secondary DNS: Set the IP address of the secondary DNS •
- Port: Assign the control port
- MAC address: Depicts the MAC address of the LAN control

Enable or disable DHCP

4.2.14 - "ADMINISTRATION" PAGE

In "Administration" section (Figure No. 19) the user is able to change the default password of the webserver.

Kingray		KRH100
Adminis	tration	
Ceneral Enter a new	vusername and password in the fields below:	
IP New usernam IP New passwort vidguardina Confirm new prod of Fradqual S settings Confirm new prod of Fradqual S vettings After applying of tog Nationals waterback Keep usernam waterback Keep usernam waterback Keep usernam waterback Keep usernam waterback Keep usernam	e admin ad id admin admi	
Copyright @ 2020 King	ay	

CAUTION:

In case of factory default procedure, the username and password will be reset unless the check box is selected "Keep username & password after applying factory defaults".

4.2.15 - "SYSTEM RESTART" PAGE

In "System Restart" section (Figure No. 20) the user is able to apply a full reset to the device.

Kingray	KRH	1100
Status	System restart	
General Program list	Click the <u>Restart</u> button below to cause the device to perform a software restart.	
Setup Input 15 configuration Program netection Output • RF export • TS settings • NT • SOT	Wait a minute before logging into the device again. Restart	
System Event log		
LAN Administration System restart Factory defaults Import / Export config. Firmware update Regional settings Info		
	Copyright & 2020 Kingsy	

4.2.16 - "FACTORY DEFAULT" PAGE

In "Factory Default" section (Figure No. 21) the user is able to apply a factory default reset either as DVB-T or DVB-C.

State Factor defaults Cashe Cashe following buttom to cause the device to revert all settings to factory defaults Cashe Cashe device for evert all settings to factory defaults Cashe Cashe device for evert all settings to factory defaults Cashe Cashe device for evert all settings to factory defaults Cashe Cashe device for evert all settings to factory defaults State Cashe device for evert all settings to factory defaults State Cashe device for evert all settings to factory defaults State Cashe device for evert all settings to factory defaults	Kingray	KRH1	00
Prove Age Click the following but the to cause the device to revert all settings to factory defaults. Stape Click the following but the to cause the device to revert all settings to factory defaults. Brady Bordparting Control Frase all event logs after applying factory defaults. Stape Frase all event logs after applying factory defaults. Stape Stape Brady Bordparting Control Stape Stape Stape	Status	Factory defaults	
Subject Lod factory defaults Program stations - Erase all event logs after applying factory defaults. Systems - Erase all event logs after applying factory defaults. Systems - Erase all event logs after applying factory defaults.	General Program list	Click the following button to cause the device to revert all settings to factory defaults.	
Conversion of the option of	Setup Input TS configuration Program selection	Load factory defaults Erase all event logs after applying factory defaults.	
System Sent Ng LAA Admanatakan System solid Fabry Safety Rappad Haftyg Rappad Haftyg Carphyle 2020 Kogay	• RF output • TS settings • NT • SDT		
LAF Marinetadion System sealad Factory defaults Ingorf Logad config Finance studies Regional withings Info	System Event log		
Cupying 6 2000 found	LAN Administration System restart Factory defaults Import / Export config. Firmware update Regional sottings Info		
		Capyopt & 2020 Kapay	

4.2.17 - "IMPORT/EXPORT CONFIG" PAGE

In "Import/Export Config" section (Figure No 22) the user is able to do the following:

- 1. Export: Save all the configuration is as specific file
- 2. Import: Upload a previously saved configuration file.

Export configuration Great In generation Sectory Click the configuration file from the device to your computer. Sectory Device in generation
Cheven M Proper Mit Nove dayare Click the icon below to download the configuration file from the device to your computer. Setup Image: Click the icon below to download the configuration file from the device to your computer. Setup Image: Click the icon below to download the configuration file from the device to your computer. Setup Image: Click the icon below to download the configuration file from the device to your computer. Setup Image: Click the icon below to download the configuration file from the device to your computer. Setup Image: Click the icon below to download the configuration file from the device to your computer. Setup Image: Click the icon below to download the configuration file from the device to your computer. Setup Image: Click the icon below to download the configuration file from the device to your computer. Image: Click the icon below to download the configuration file from the device to your computer. Image: Click the icon below to download the configuration file from the device to your computer. Image: Click the icon below to download the configuration file from the device to your computer. Image: Click the icon below to your computer. Image: Click the icon below to your computer. Image: Click the icon below to your computer. Image: Click the icon below to your computer. Image: Click the icon below to your computer. Image: Click the icon b
Biock daym Settup Social day Progen a social day Progen a social day Progen a social day Progen a social day Settup Progen a social day Settup Setup Set
- Is sumple - If Import configuration - If
System text top 1. Select file (No file chosen)
LAA Admensionation Syntem estant Carbony detection
Import Engine Configuration (Terminanismuch and the Confirmation, The device will restart.
Crystylin & 2005 Kogny

4.2.18 - "FIRMWARE UPDATE" PAGE

In "Firmware Update" (Figure No. 23) section the user is able to update the firmware should there be a new version available.



WARNING:

The existing configuration should not change as part of the firmware update process, however, it is always good practice to save the existing configuration prior to a firmware update.

4.2.19 - "REGIONAL SETTINGS" PAGE

In "Regional Settings" (Figure No. 24) section the user is able to select the NTP server in order for the device to receive the date and time as well as to set the timezone of their country.

State Regional settings State Ise State Description Settings State Settings	Kingray		KRH100
March Part A funct Program System date & time: 2000-01-01, 00:10-42 Program System date & time: 2000-01-01, 00:10-42 Program Program	Status	Regional settings	
Rote System date. kine: System date. kine: System date. kine: System date. kine: System date. kine: Power state. Clock source Power state. Pin: Power s	General Program list	Date & time	
Processor Clock source Provided Provided	Block diagram Setup	System date & time: 2000-01-01, 00:10:42 System uptime: 0d 0h 10m 26s	
Programskikkov Prom NLP server Prom NLP server Podalut Oustom Timezone ULC • Repringe teginge Repringe Repringe teginge Rep	Input TS configuration	Clock source	
 Standard Standard<	Program selection Output	From Input 1 v	
Syndam Traczone UTC Syndam Tr	TS settings NIT SDT	Country are served Default Castom	
Even by LM Androit of the Factor station to by Apply Premewer updie Torson station to by Region Region Australia Apply	System	Timezone UTC -	
New Constraints Region Representation Please select your region Apply	Event log LAN Administration System restart Eactory defaults	Apply	
Please select your region Australia Please select your region Australia Apply Compare 1 200 Youry	Import / Export config. Firmware update Regional actinos	Region	
Apply Dewrysis 3.000 rougely	info (Please select your region Australia 🗸	
Capyoy 4 9203 Opay		Apply	
		Copylight & 2020 Kingary	

4.2.20 - "INFO" PAGE

In "Info" (Figure No. 25) section the user is able to see the serial number of the device as well as firmware and hardware versions.



5. TECHNICAL SPECIFICATIONS

INPUT SPECIFICATIONS

	Туре	4 x DVB-S/S2/T/T2/C				
INPUT	Frequencies	9502150 MHz DVB-S/S2 118900MHz DVB-T/T2/C				
	Connector	75Ω - F, female				
	Voltage	OFF / 13V / 18V				
	Current	< 400mA				
LNB	22 KHz Signal	On / Off				
	– Voltage	0.65V ±0.35V 22 KHz ±4Hz				
	– DisEqC	1.0 (Port A, B, C, D)				
	· · ·					
	Standard	EN 300-421 V1.1.2				
	Symbol Rate	1 - 55 MBaud				
DVB-S	Roll Off Factor	0.2, 0.25, 0.35				
	Code Rate	1/2, 2/3, 3/4, 5/6, 7/8 (automatic)				
	Spectral Inversion	Reverse, Non-reverse (automatic)				
	Standard	EN 307-421 V1.2.1				
	Constellation	QPSK, 8PSK (automatic)				
	Symbol Rate	1 - 55 MBaud (QPSK) 1 - 45 MBaud (8PSK)				
DVR-S2	Roll Off Factor	0.2, 0.25, 0.35 (automatic)				
	Code Rate	1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 8/10 (QPSK- automatic) 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 (8PSK- automatic)				
	Spectral Inversion	Reverse, Non-reverse (automatic)				
	Standard	EN 300-744 V1.6.1				
	Bandwidth	6, 7, 8 MHz				
	Mode	2K, 8K				
	Constellation	QPSK, 16QAM, 64QAM				
	Guard Interval	1/4, 1/8, 1/16, 1/32				
	Code Rate	1/2, 2/3, 3/4, 5/6, 7/8				
	Standard	EN 302-755 V1.3.1				
	Bandwidth	5, 6, 7, 8 MHz				
DVB-T2 / T2 Lite	Mode	1K, 2K, 4K, 8K, 16K, 32K (Included extended mode)				
	Constellation	QPSK, 16QAM, 64QAM, 256QAM				
	Code Rate	1/2, 3/5, 2/3, 3/4, 4/5, 5/6				
	Standard	Annex A(DVB-C), B(US cable),C				
	Bandwidth	5, 6, 7, 8 MHz				
ITU-T J.83	Mode	Automatic modulation detection				

16QAM, 32QAM, 64QAM, 128QAM,

256QAM

Constellation

OUTPUT SPECIFICATIONS

	Standard	EN 300-744
	Bandwidth	5, 6, 7, 8 MHz
	Mode	2K, 8K
DVD-1	Constellation	QPSK, 16QAM, 64QAM
	Guard Interval	1/4, 1/8, 1/16, 1/32
	Code Rate	1/2, 2/3, 3/4, 5/6, 7/8

	Standard	Annex A(DVB-C)
	Bandwidth	5, 6, 7, 8 MHz
ITII_T 83	Mode	2K, 8K
110-13.05	Constellation	16QAM, 32QAM, 64QAM, 128QAM, 256QAM
	Symbol rate	1-7.2 Ms/s

	Туре	4 x RF out in adjacent channels
	Output Frequencies	110950 MHz (1 Hz step)
	Output Level	90dBµV
RF	Connector	75Ω - F, female
001101	Output Attenuator	020dB
	MER	>42dB
	Output Loop-through Loss	<1dB

Transport Stream Processing	Services	User selection by service names	
	Automatic Regeneration	PAT, CAT, SDT, PMTs, EITs tables	
	NIT/SDT	Pass-through, Custom, Automatic	
	PCR	Re-Stamping	
	LCN Support	Yes	

Programming Interface	Ethernet Webserver	Yes, embedded webserver		
	Speed	10/100 Mbps		
	Connector	RJ45		
	Browser Compatibility	Chrome, Firefox, Safari, Opera, Edge e (Must support HTML v5.0)		
	SNMP Support	Yes		
	SNMP Version	v2.0		

General	Power Supply	2 x +12VDC	
	Power Supply Consumption	1.8A max.	
	Operating Temperature	0 °C to 40 °C	
	Storage Temperature	-10 °C to +70 °C	
	Humidity	Up to 90%	
	Dimensions	235 x 115 x 48 mm	
	Weight	0.45 Kg	

6. DIMENSIONS







6. WARNINGS

APPENDIX A

DVB-T bitrates (Mbit/s) for 8 MHz bandwidth (non-hierarchical systems)

Madulation	Coding Rate	Guard Interval			
Wodulation		1/4	1/8	1/16	1/32
	1/2	4.976	5.529	5.855	6.032
	2/3	6.635	7.373	7.806	8.043
QPSK	3/4	7.465	8.294	8.782	9.048
	5/6	8.294	9.216	9.758	10.053
	7/8	8.709	9.676	10.246	10.556
	1/2	9.953	11.059	11.709	12.064
	2/3	13.271	14.745	15.612	16.086
16-QAM	3/4	14.929	16.588	17.564	18.096
	5/6	16.588	18.431	19.516	20.107
	7/8	17.418	19.353	20.491	21.112
	1/2	14.929	16.588	17.564	18.096
64-QAM	2/3	19.906	22.118	23.419	24.128
	3/4	22.394	24.882	26.346	27.144
	5/6	24.882	27.647	29.273	30.160
	7/8	26.126	29.029	30.737	31.668

DVB-T bitrates (Mbit/s) for 7 MHz bandwidth (non-hierarchical systems)

Modulation	Coding Rate	Guard Interval			
		1/4	1/8	1/16	1/32
	1/2	4.354	4.838	5.123	5.278
	2/3	5.806	6.451	6.830	7.037
QPSK	3/4	6.532	7.257	7.684	7.917
	5/6	7.257	8.064	8.538	8.797
	7/8	7.620	8.467	8.965	9.237
	1/2	8.709	9.676	10.246	10.556
	2/3	11.612	12.902	13.661	14.075
16-QAM	3/4	13.063	14.515	15.369	15.834
	5/6	14.515	16.127	17.076	17.594
	7/8	15.240	16.934	17.930	18.473
64-QAM	1/2	13.063	14.515	15.369	15.834
	2/3	17.418	19.353	20.491	21.112
	3/4	19.595	21.772	23.053	23.751
	5/6	21.772	24.191	25.614	26.390
	7/8	22.861	25.401	26.895	27.710

VB-T bitrates (Mbit/s) for 6 MHz bandwidth (non-hierarchical systems)

Modulation	Coding Rate	Guard Interval			
		1/4	1/8	1/16	1/32
	1/2	3.732	4.147	4.391	4.524
	2/3	4.976	5.529	5.855	6.032
QPSK	3/4	5.599	6.221	6.587	6.786
	5/6	6.221	6.912	7.318	7.540
	7/8	6.532	7.257	7.684	7.917
	1/2	7.465	8.294	8.782	9.048
	2/3	9.953	11.059	11.709	12.064
16-QAM	3/4	11.197	12.441	13.173	13.572
	5/6	12.441	13.824	14.637	15.080
	7/8	13.063	14.515	15.369	15.834
64-QAM	1/2	11.197	12.441	13.193	13.572
	2/3	14.929	16.588	17.564	18.096
	3/4	16.796	18.662	19.760	20.358
	5/6	18.662	20.735	21.995	22.620
	7/8	19.595	21.772	23.053	23.751

This warranty against defects is given by Standard Communications Pty Ltd ACN 000 346 814 (We, us, our or GME). Our contact details are set out in clause 2.7. This warranty statement only applies to products purchased in Australia. Please contact your local GME distributor for products sold outside of Australia.

Local distributor details at www.gme.net.au/export.

1. Consumer guarantees

- 1.1 Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
- 1.2 To the extent we are able, we exclude all other conditions, warranties and obligations which would otherwise be implied.

2. Warranty against defects

- 2.1 This warranty is in addition to and does not limit, exclude or restrict your rights under the Competition and Consumer Act 2010 (Australia) or any other mandatory protection laws that may apply.
- 2.2 We warrant our goods to be free from defects in materials and workmanship for the warranty period (see warranty table) from the date of original sale (or another period we agree to in writing). Subject to our obligations under clause 1.2, we will at our option, either repair or replace goods which we are satisfied are defective. We warrant any replacement parts for the remainder of the period of warranty for the goods into which they are incorporated.
- 2.3 To the extent permitted by law, our sole liability for breach of a condition, warranty or other obligation implied by law is limited
 - (a) in the case of goods we supply, to any one of the following as we decide -
 - (i) the replacement of the goods or the supply of equivalent goods;
 - (ii) the repair of the goods;
 - (iii) the cost of repairing the goods or of acquiring equivalent goods;
 - (b) in the case of services we supply, to any one of the following as we decide -
 - (i) the supplying of the services again;
 - (ii) the cost of having the services supplied again.

- 2.4 For repairs outside the warranty period, we warrant our repairs to be free from defects in materials and workmanship for three months from the date of the original repair. We agree to re-repair or replace (at our option) any materials or workmanship which we are satisfied are defective.
- 2.5 We warrant that we will perform services with reasonable care and skill and agree to investigate any complaint regarding our services made in good faith. If we are satisfied that the complaint is justified, and as our sole liability to you under this warranty (to the extent permitted at law), we agree to supply those services again at no extra charge to you.
- 2.6 To make a warranty claim you must before the end of the applicable warranty period (see warranty table), at your own cost, return the goods you allege are defective, provide written details of the defect, and give us an original or copy of the sales invoice or some other evidence showing details of the transaction.
- 2.7 Send your claim to: Standard Communications Pty Ltd. 17Gibbon Road, Winston Hills, NSW 2153, Australia. Tel: (02)8867 6000,

Fax: (02) 8867 6199

Email: servadmin@gme.net.au

2.8 If we determine that your goods are defective, we will pay for the cost of returning the repaired or replaced goods to you, and reimburse you for your reasonable expenses of sending your warranty claim to us.

3. What this warranty does not cover

- 3.1 This warranty will not apply in relation to:
 - (a) goods modified or altered in any way;
 - (b) defects and damage caused by use with non Standard Communications products;
 - (c) repairs performed other than by our authorised representative;
 - (d) defects or damage resulting from misuse, accident, impact or neglect;
 - (e) goods improperly installed or used in a manner contrary to the relevant instruction manual; or
- (f) goods where the serial number has been removed or made illegible.

4. Warranty period

4.1 We provide a 5 year warranty on the KRH100 and 3 year warranty on power supply. No repair or replacement during the warranty period will renew or extend the warranty period past the period from original date of purchase.