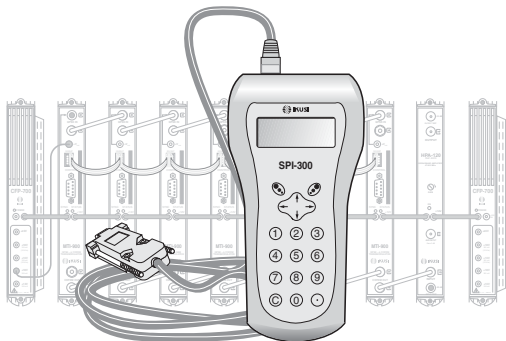


SPI-300

EN



**SETUP GUIDE
FOR
«MTI» xPSK-COFDM TRANSMODULATORS**

DVB-S/S2 → DVB-T/H



IKUSI

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1. THE START SCREENS


1.1 - Module Basic Information

As explained in the Basic Handling guide supplied with the SPI-300, when you connect it to the module all data for identification, configuration and status of the module are loaded on the SPI-300. A detection screen appears for a short time, and next the display shows the Basic Information screen, which identifies the module and presents its most representative configuration and status data:

MTI-900	Alarm:No
F01.00	f01.08
Acq:X	BER: 4.29E-5
	OK

These are the meanings of the expressions and data displayed :

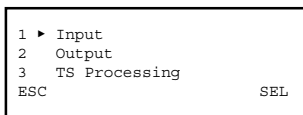
- Name of the module.
- "Alarm" : Informs about the existence or not of module operating failures.
- "F-." : Version of the main firmware of the module (the firmware is the software stored in the module that manages its basic running).
- "f-." : Firmware version of the internal FPGA device.
- "Acq" : "X" means that synchronization with the input signal is acquired. Absence of synchronization is signalled with "0".
- "BER" : Is the BER of the input signal channel.

The screen closes using the OK command (key ). Then the Main Menu Screen appears (page 8 of the Basic Handling guide).

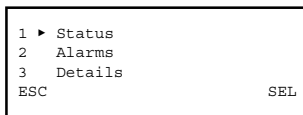
1.2 - Main Menus

As explained in the Basic Handling guide, the **General** menu is identical for all the ClassA modules and its content was described on page 8. The **Settings** and **Info** menus include, however, options and information which are peculiar to each type of module. Those for the MTI transmodulators are the following:

- **Settings** Menu: Contains all the setting parameters of the connected module, grouped by sections or categories which are displayed on one screen:
 - *Input* : You must select it to set the parameter values related to the input section of the module.
 - *Output* : Idem to the input section.
 - *TS Processing* : It must be selected to carry out the Transport Stream processing operations.




- **Info** Menu: Provides detailed information about the operation of the module, further on the one provided by the basic information screen (see previous page). Information is distributed in three screens, each one related to a menu option:
 - *Status* : Informs about the module operating conditions.
 - *Alarms* : Informs whether the module has any alarms activated and their type.
 - *Details* : Identifies the module and displays important data.



2. THE SETTING SCREENS

2.1 - The Input Signal Parameters Screen

This screen appears when you select the *Input* option in the **Settings** menu. It is used to enter the values of the following parameters:

- "Frequency" : Is the central frequency of the input channel, in MHz. There is a numerical field where you must enter the number by any one of the ways that were described in paragraph 1.3 of the Basic Handling guide (Entering Data, page 9).
- "Symbol Rate" : Is the symbol rate of the input channel, in MS/s. The number is entered in the same way.
- "Standard" : Is the DVB system type of received signal. Use the SEL command (key ) and perform the appropriate selection (AUTO, DVB-S, DVB-S2) at the pick list that appears.

```

1 ► Frequency      : 1550
2   SymbolRate     : 27.500
3   Standard       : DVB-S
SEND ◀ ▶                               SEL

```

2.2 - The Output Signal Parameters Screen


This screen appears when you select the *Output* option in the **Settings** menu. It has two pages. The first one is the following:

```

1 ► Frequency      : 658.000
2   Mode           : 8K
3   Bandwidth      : 7
SEND ◀ ▶ ▼                               SEL

```

The setting values to be entered are the following:

- "Frequency" : Is the central frequency of the output channel, in MHz. There is a numerical field where you must enter the number by any one of the ways that were described in paragraph 1.3 of the Basic Handling guide (Entering Data, page 9).
- "Mode" : It refers to the number of subcarriers of the output channel. Open the pick list by using the SEL command (key ) and choose the mode: 2K, 8K or 4K (the latter is for using with DVB-H standard only).
- "Bandwidth" : Is the bandwidth of the output channel, in MHz. It is selected in the same way from a pick list that offers these options: 8, 7, 6 and 5 MHz (the latter is for using with DVB-H standard only).

Press the key ↓ . The second page of the Output Signal Parameters screen appears:

```

4 ► GuardInterv : 1/32
5  Constella.  : 64QAM
6  Code Rate   : 3/4
SEND ◀ ▶ ▼ ▲ SEL
    
```

The following data are selected:


- "Guard Interval" : Select from the pick list the desired value: 1/4, 1/8, 1/16 or 1/32.
- "Constellation" : Is the modulation scheme of the subcarriers of the output channel. Select QPSK, 16QAM or 64QAM from the pick list.
- "Code Rate" : It refers to the convolutional code of the FEC encoder. Select 1/2, 2/3, 3/4, 5/6 or 7/8 from the pick list.

Press the key ↓ . The third page of the Output Signal Parameters screen appears:

```

7 ► Attenua : |||||◀|||
8  IQ Inv.  : X
9  Cell ID  : 65535
SEND ◀ ▶ ▼ ▲ SEL
    
```

The following settings are performed here:

- "Attenuation" : Is the attenuation for the COFDM channel output level. A slider bar is available. Setting is carried out in real time: when you move the slider with the keys ← and → the new value is instantaneously established in the module, that is to say, you don't have to use the SEND command. To state exactly the value in dB you need a spectrum analyzer or a field strength meter.
- "IQ inversion" : Is the I-Q format of the output channel spectrum. The character "0" means normal spectrum and "X" means inverted spectrum. To change from one to the other you have to use the SEL command (key ).
- "Cell ID" : This is a datum dedicated mainly to DVB-H. It is a cell number to be assigned to the COFDM output channel. Enter one zero ("0") if no assignation is desired.



Press the key ↓ . The fourth page of the Output Signal Parameters screen appears:

```

i ▶ DVB-H MPE-FEC : X
j   DVB-H Time Slic : 0
k   DVB-H Interleav : 0
SEND ◀ ▶ ▼ ▲ SEL

```

The following data are entered in this screen:

- "DVB-H MPE-FEC" : Here must be indicated whether the source transport stream has applied the DVB-H's MPE-FEC (multi-protocol encapsulation forward error correction) code or not. Application will be marked with "X" and nonapplication with "0". To change from one to the other use the SEL command (key ).
- "DVB-H Time Slicing" : In a similar way, here must be indicated whether the transport stream uses DVB-H's Time Slicing or not.
- "DVB-H Interleaving" : It refers to an *in-depth* interleaving, particular for DVB-H, applicable with 2K and 4K modes. When applied, it gives greater mobility and impulse noise tolerance to the receivers. Select "X" to apply and "0" to not apply. To change from one to the other use the SEL command (key .

Press the key ↓ . The fifth and last page of the Output Signal Parameters screen appears:

```

1 ▶ FFTwind : |||||◀
SEND ◀ ▶ ▲ SEL

```

A DVB-H's exclusive use datum is entered here:

- "FFT Window" : This setting (fast Fourier transform window) is applicable when there is an adjacent analogue channel. Setting is carried out, in real time, with the keys ← and →. On displacing the slider towards the left, both edges of the COFDM output spectrum are retracted—therefore interference on the adjacent channel lowers—, but at the same time, attention, guard interval effectiveness lowers proportionately, which, in the presence of echoes, may get to make the synchronization of receivers impossible.
With no adjacent channel the slider must be kept at the right end.



2.3 - The Transport Stream Processing Screen

It appears when you select the *TS Processing* option in the **Settings** menu. It has three pages. This is the first one:

```

1 ► Control Module: X
2   UnRef.PIDs: Block
3   All Serv.: Allow
SEND ◀ ▶ ▼                                SEL

```

- "Control Module" : Here you must indicate whether the connected transmodulator performs or not the control function of the headend (the control transmodulator must be compulsorily the last one at the right end of the IKUSUP bus cascade). You must enter the character "X" if the module is the control module or the "0" if it is not. Changing from one character to other is done using the SEL command (key ).
- "Unreferenced PIDs" : Open the pick list by using the SEL command. A list appears with the following three options:
 - Auto : The transmodulator itself decides what to do with the unreferenced PIDs of the input channel transport stream, either to block or to let pass them. (Unreferenced PIDs are those that are not related with any service, table or CA).
 - Block : All the unreferenced PIDS are blocked.
 - Allow : All the unreferenced PIDs are let pass (are unblocked).
- "All Services" : Open the pick list by using the SEL command (key ). A list appears with the following two options:
 - Block : All the services (TV programmes) present at the transport stream are blocked. When a service is blocked, all the related PIDs —video, audio, teletext and others— are blocked.
 - Allow : All the services of the transport stream are let pass, unblocking those that were blocked. When a service is unblocked, all the related PIDs —video, audio, teletext and others— are unblocked and the tables are updated.

ATTENTION : The two aforementioned options are "reset" actions that erase all the blocking or unblocking settings that have been done before ⁽¹⁾ for concrete services.

⁽¹⁾ From the next screen page which is described now.


Press the key ↓ . The second page of the Transport Stream Processing screen appears :


```

4 ► Action      : Unblock Srv
5  Identif.    : 45566
6  List for identif.
SEND ◀ ▶      ▼ ▲                SEL

```

Here you can do the following selections :

- "Action" : Open the pick list by using the SEL command (key ). A list appears with the following options:
 - Unblock Service : It must be selected to unblock a service whose number you have to enter in the "identification" option (second line of this screen page).
 - Block Service : Idem to block a service.
 - Unblock PID : Idem to unblock a PID. (The tables are not updated).
 - Block PID : Idem to block a PID.
 - Force PID : It must be selected to enable a concrete PID, either referenced or not, which could be blocked as a consequence of the blockade action for a determined service or CA, or the blockade of unreferenced PIDs. This action may also be used to invalidate a by-default regenerated PSI/SI table, and to restore the original one.
 - Unblock Conditional Access : It must be selected to unblock a CA whose number will have to be entered in the "Identification" option. When a CA is unblocked, the PIDs of the ECM and EMM are unblocked and the tables are updated.
 - Block Conditional Access : Idem to block a CA.
 - De-encrypt Service (*only for MTI-900*) : It must be selected to de-encrypt a service (TV programme) whose number you have to enter in the "identification" option.
- Important:** the de-encrypting action only can be carried out for a blocked service; to de-encrypt an unblocked service, you must block it before. The service will be automatically unblocked on de-encrypting it.
- Stop Service De-encrypting (*only for MTI-900*) : Idem to stop the current de-encrypting action for a service. The service returns to its original encrypting status and comes to be blocked.

- "Identification" : You have to enter here the number (*) of the service, or the PID, or the conditional access, to which you want to apply the action selected in the previous "Action" option. Once the appropriate number is entered, use the SEND command (key ) to perform the action.
(*) If you don't know the number, use the next option: "List for Identification".
- "List for Identification" : This option gives the number of a service, PID or conditional access (CA) based on its name or description. When you use the SEL command, a pick list appears. This list will include service names, or PID descriptions, or conditional access names, according to the selection you chose previously in the "Action" option. (For example, if you chose *Unblock Service*, the pick list will show the names of the services that are currently blocked). Choose in the pick list the name of the Service, PID or CA, as the case may be. Its number will appear automatically above, in the "Identification" option.

Press the key ↓ . The third and last page of the Transport Stream Processing screen appears

```

7 ► NITmode: NIT-pass
8   Net  : ASTRA
9   NID  : 65537
SEND ◀ ▶ ▲                               SEL
    
```

Here you can do the following selections :

- "NITmode" : Open the pick list by using the SEL command. A list appears with the three following options:
 - NIT-auto : When this option is selected in the transmodulator that performs control function, the input NIT (which may change or not) is regenerated in an automatic way to a new NIT that contains, amongst other parameters, the output frequencies of the transmodulators of the headend, the LCN descriptors (if any) and the Transport Stream id, with the corresponding changes that could have been made (see next page). This new NIT (or output NIT) belongs to a new network whose name and identification number are defined in the next 8 and 9 options. The new NIT is sent continuously via IKUSUP bus to the rest of transmodulators of the headend, where it remains stored (and updated as either the input NIT or the headend parameters change) if in these modules the "NIT-auto" option has been also selected.
 - NIT-fixed : If you select this option, the current NIT stored in the module stays locked, unaware of the input NIT. (On future versions of the MTI-800 and MTI-900, an external, expressly created NIT will be able to be loaded).

- NIT-pass : If you select this option, the output NIT is at any time the same as the input NIT. The option can be applied individually to each transmodulator; any NIT stored in the module is erased.
- "Net" : Is the name that you want to assign to the new network generated by the MTI headend.
- "NID" : Network IDentifier. It is the identification number that you want to assign to the new network.

NOTE : If you enter the number "0" for the NID parameter, both the name and the NID of the output network will be the same as those of the input network.

- "TS-ID" : Allows assigning a new id to the Transport Stream. This Option is useful when there are two modules in the headend processing data from the same Transport Stream.
- "ON-ID" : Allows assigning a new id to the ONID.
- "LCN Mode" : Logical Channel Number Mode. The LCN system allows DVT tuners to automatically tune stations on certain channel numbers. This option indicates the module what to do with the received LCN. The list of options is the following:
 - Pass: The module does no processing to the possible LCN that could be found.
 - Block: Found LCN are removed and will not appear on the new stream.
 - Europe
 - Nordig 1
 - Nordig 2
 - GenericThese last four options insert LCN descriptors with the corresponding format starting from the number set in the next option.
- "Star.LCN" : Indicates the channel number from which new stations will be tuned. Europe, Nordig1, Nordig2 or Generic must be selected in the previous option.

IMPORTANT : The "Net", "NID", "LCN Mode" and "Star.LCN" options are applicable only to the transmodulator that performs control function (last module at the right end of the IKUSUP bus cascade). Data being entered in other transmodulators don't take effect.

Abbreviations

CA : Conditional Access

CAT : Conditional Access Table

ECM : Entitlement Control Messages

EIT : Event Information Table

EMM : Entitlement Management Messages

MPTS : Multiple Program Transport Stream

NIT : Network Information Table

PAT : Program Association Table

PID : Packet Identifier

PMT : Program Map Table

PSI : Program Specific Information

SDT : Service Description Table

SI : Service Information

SPTS : Single Program Transport Stream

TDT : Time and Date Table

TS : Transport Stream

PSI tables : PAT , PMT , CAT

SI tables : NIT , SDT , EIT , TDT

3. THE INFORMATION SCREENS


They provide information about the operation of the connected module. Information is distributed in three screens which are related to the three options of the **Info** menu: *Status*, *Alarms* and *Details*.

3.1 - The Status Screen

Informs about the module operating conditions:

```
Acq:X      Mod:X      SI:X
%Free: 5 < 45 < 99
          T:+30C
BER: 1.02E-5          STOP
```

- "Signal Acquired" : Informs about the synchronization with the input signal. Affirmative answer is pointed out with "X" and negative answer with "0".
- "Modulator" : Indicates whether the output COFDM modulator works correctly ("X") or not ("0").
- "SI" : It refers to DVB-SI (Service Information). Indicates whether the DVB signalling of the output transport stream is correct ("X") or incorrect ("0").
- "%Free" : The number in the middle expresses the percentage of null PIDs (without information) that currently exists in the output transport stream; the higher is the number, the less overflow risk exists (in other words, less risk of loss of data). The numbers at the left and right are respectively the maximal and minimal values reached all through the period of operation of the module since the last power connection.
- "T" : Is the value in °C of the internal temperature of the module. (Only available in equipment that includes temperature sensor).
- "BER" : Displays the channel BER value for input signal in scientific notation.


Use the STOP command (key ) to stop the status information update. The OK command appears then in the same place; use now this one to close the screen.

3.2 - The Alarms Screen

Informs about the existence of failures in the internal circuitry of the module or in the signal processing. Character "X" indicates there is an alarm situation and "0" means that the status or operation are correct:

Inp:X	FIFO:0	NIT:0
Hw: 0	Ins.:0	Tmp:0
CAM:0		
Cod:0030F0A1	ALMSTOP	

- "Input" : Operation of the tuner and the demodulation stage.
- "FIFO" : Character "X" warns of overflow, in other words, data loss in the output stream. (If the unreferenced PIDs are not blocked, the immediate action to do should be to block these PIDs).
- "NIT" : Regeneration of the NIT table.
- "Hardware" : General hardware of the module.
- "Insertion" : Insertion of tables into the output stream.
- "Tmp" : Internal temperature of the module.
- "CAM" : Operating of the Conditional Access Module. Only MTI-900.
- "Code" : This is a global alarms code that is useful when contacting IKUSI's technical support.

Use the ALMSTOP command (key ) to stop the alarms information update. The OK command appears then in the same place; use now this one to close the screen.

3.3 - The Details Screen

This screen identifies the module and displays software and hardware versions:

MTI-900	
F: 01.00	f: 01.00
L: 01.00	HWvers:00
	OK

- "F" : Version of the main firmware of the module.
- "f" : Firmware version of the internal FPGA device.
- "L" : Version of the bootloader.
- "Hardware Version" : Version of the hardware of the module.

Use the OK command (key ) to close the screen.

4. OTHER SCREENS

These are two screens that befit two operations that have already described in the Basic Handling guide : Firmware Update and Use of Configurations.

4.1 - The Module Firmware Update Screen

This screen appears when you select the *Update* command in the **General** menu. The firmware update process was already described in detail on pages 14/15 of the Basic Handling guide, so it is not to add any additional information.

4.2 - The Module Configurations Screen

On pages 12/13 of the Basic Handling guide was defined what is a module configuration, were indicated the advantages of its use and were described the processes of creation and utilization through the screens that appear when you select the *Save* and *Recall* commands in the **General** menu. Therefore it is not to add more information.

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