

Falcon 50 FM

6 Band DIGITAL audio PROCESSOR

Operating manual

(Rel. 1.3)

PART TWO: I/O & SYSTEM SETUP

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1 RUNNING THE SOFTWARE

Run the Falcon 50 software from START / PROGRAMS / AXEL FALCON 50.



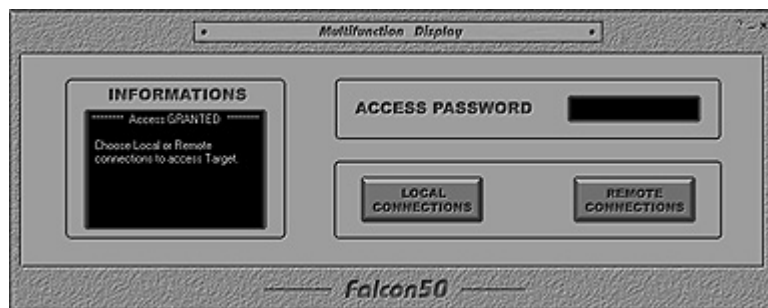
1.1 THE 'COMPACT SKIN' MODE

While the control software comes up, it will detect the actual resolution of the Pc monitor. If resolution is better or equal to 1024 x 768 (XGA), the software opens by default at its max graphic quality and detail (Extended Mode).

If lower, it automatically prompts in a more primitive graphic way called '**COMPACT SKIN**' mode, which opens the interface windows at a lower resolution, suitable for SVGA (800 x 600) Pc monitors.

Anyway, when using high-resolution monitors, the operator may always choose the Compact Skin mode from the starting window by clicking the associated option on the window.

Once the program has started, it will resemble one of the following mask, according to the chosen display mode (Compact or Extended skin)



Start mask in Compact Skin mode

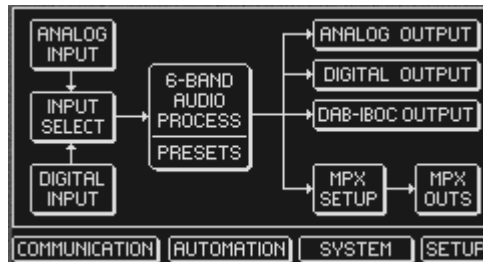


Start mask in Extended Skin mode

At this moment, the connection with the processor has not been established, yet. Communication channel also needs to be defined.

1.2 FITTING TFT MONITORS ('HIGH CONTRAST' MODE)

The 'HIGH CONTRAST' control turns the Navigator panel monochromatic, in order to make the software operation easier on some screen or computers (low contrast TFT, notebook screens, etc).



IF YOU ARE RUNNING THE PROGRAM FOR THE FIRST TIME

Upon initial installation, if You are connecting for the first time, You have to enter a password as a new user to access the Pc Control Software. A special mask will be shown. Enter the **New Password** and click OK. The password will be saved in the system memory and pre-registration will be no longer needed. It is NOT case sensitive.

Note: the New Password field **MUST** be filled with alphanumeric strings composed by **6 digits at least**. Click EXIT to leave without modifications or click HELP to get the on-line support. Click OK once the password has been entered.





The access to the Pc remote Control Software is protected by password. You need to type the right password at each access to launch the software, unless You disable the request for password from the general software CONFIG mask (see the next section).

1.3 ACCESSING THE CONTROL SOFTWARE

Before you can get started with software control, you must enter a Password that grants you to access the Remote Control Software.

The following mask is shown:

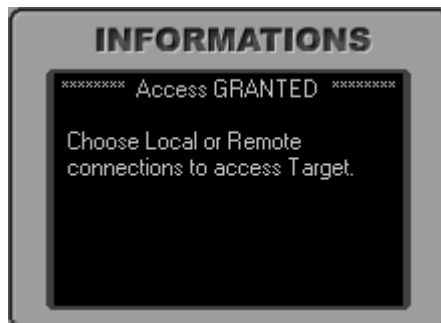


Enter the password in the 'ACCESS PASSWORD' black field.

You have **three attempts** available. As you type the password an asterisk will appear instead the letters you type. This is normal and helps to ensure that no one else can see your password when it is entered.



Once the password has been entered, press 'ENTER'. If the password is correct, the 'ACCESS GRANTED' message will appear and the two buttons on the right will turn bright.





NOTES ON PASSWORDS

If You are accessing for the first time, enter the same password already typed in the **Program Access Password Manager** mask. In our example: **FALCON50**.

1.4 CHANGING / DISABLING THE PROGRAM PASSWORD.

Once You have established a connection (either Local or Remote) with the Falcon 50 processor, You may change the initial password or tell the software not to request the password at each access. To do this, click the **CONFIG** button under the NAVIGATIONS buttons:



The **CHANGE PRoGram PassWorD** button allows the user to modify the password needed to access the Pc Remote Control Software:



Click the associated icon and enter the new password:

Program Access Password Manager

Old Password :

New Password :

Type the new Access Password in the field above.
Click OK to confirm.
NOTE: This operation cannot be undone.

In particular, as a security measure, the system will show your old password, and You will then be prompted to enter your new password, and click OK to confirm. Click ESC to exit without changing the password.

If would like to avoid the Remote Control Software for asking for a password, **'de-select'** the **ASK PRG PASSWORD** control from the CONFIG mask by clicking it.



2 LOCAL CONNECTIONS SET-UP (SERIAL RS232, USB)

Once the access has been granted, two buttons allow to set-up LOCAL CONNECTIONS (i.e. SERIAL and USB) or REMOTE CONNECTIONS (i.e. Modem and LAN/ETHERNET).



Pressing the LOCAL CONNECTIONS key the following screen will be shown:

 The screenshot shows a web-based configuration interface titled "Local Connections". On the left is a vertical banner with the text "FALCON 50". At the top, there are two radio buttons: "Serial Ports" (selected) and "Usb Ports". Below these are two main panels. The "Serial Ports" panel has a dropdown menu for "Available Ports" showing "COM1". The "USB Ports" panel has a dropdown menu for "Available Connections" and a refresh icon. Both panels have "User Name" (ADMIN) and "Password" (masked with asterisks) fields, each with a "Remember Password" checkbox and a "Connect" button. At the bottom, there is a "Messages" section with instructions and a "Close Panel" button. Letters A, B, C, and D are overlaid on the image to highlight specific elements: A points to the radio buttons, B points to the "Available Connections" dropdown, C points to the "User Name" dropdowns, and D points to the "Messages" section.

As first step, the user will choose the type of connection (RS 232 SERIAL or USB) to control the processor (A).

The relevant control panel (B) will turn bright.


SERIAL PORT

Select the connection port among the ones available on the actual computer.

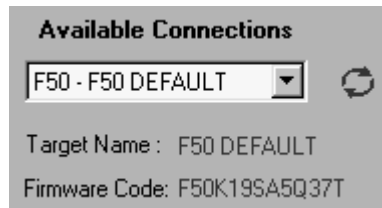
USB PORTS

When choosing a USB connection, the Available Connections menu lists all processors which are currently logged (i.e. active) in on a USB network.


For each processor, the name (given by the user or factory default) and the firmware number are provided*.

You may refresh the list in order to search for new processor connected by clicking the Refresh icon 

* the processor NAME and FIRMWARE code are contained in the **COMMUNICATIONS** page of navigation panel. Each time You add a new Falcon 50 processor to Yr computer, the Control Software will investigate the new connected unit for its actual Name and Firmware code.



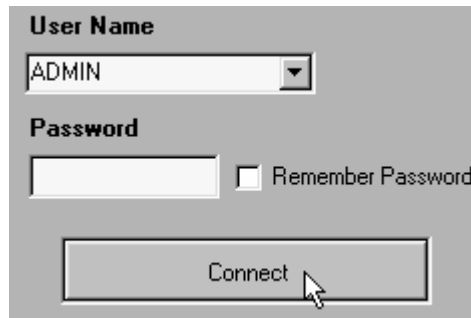
Available Connections

F50 - F50 DEFAULT 


Target Name : F50 DEFAULT

Firmware Code: F50K19SA5Q37T

As last connection step, the user is requested to enter his/her profile (NAME and PASSWORD). (C)




User Name

ADMIN 

Password

Remember Password

Connect 



The Falcon 50 provides two levels of security. The first one (called 'program password') is related to the Pc Control Software and enables the user to run it on the Pc. The second one is related to the connection to the processor unit itself. **There is therefore no relationship between the password required at this step to connect to the processor and the password previously used to access the Pc Remote Control Software.**



Whenever You are connecting for the first time or after a general reset, keep the default User Name (ADMIN) with no password.

You may introduce an ADMIN password or set NEW user profiles at any time from the **SYSTEM** page in the Navigation Window (see the Next Chapter)

Click the **CONNECT** button. If the connection parameters / status are Ok, the connection dialogue mask will close and the main Control Panel will appear.

The **NAME** of the logged user will also be saved and listed in the User Name list for the next connection session as soon as the connection has been established.

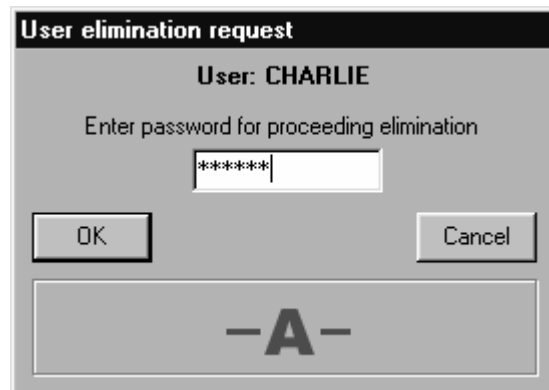
The **Remember Password** control, if selected before attempting the connection, avoid the user to type the password at next access.

Further information about the connection status or possible connection troubles are provided in the **Messages (D)** screen.

Note: You may remove at any time one of more of listed user by clicking right his/their names in the list



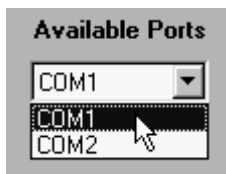
By confirming the Item Deleting a proper dialogue mask will ask You to type associated to the user to be removed:



Possible errors will be displayed in the field (A).

NB: the specially featured **ADMIN** user can NEVER be removed from the list.

2.1 ADDITIONAL NOTES ABOUT SERIAL CONNECTIONS



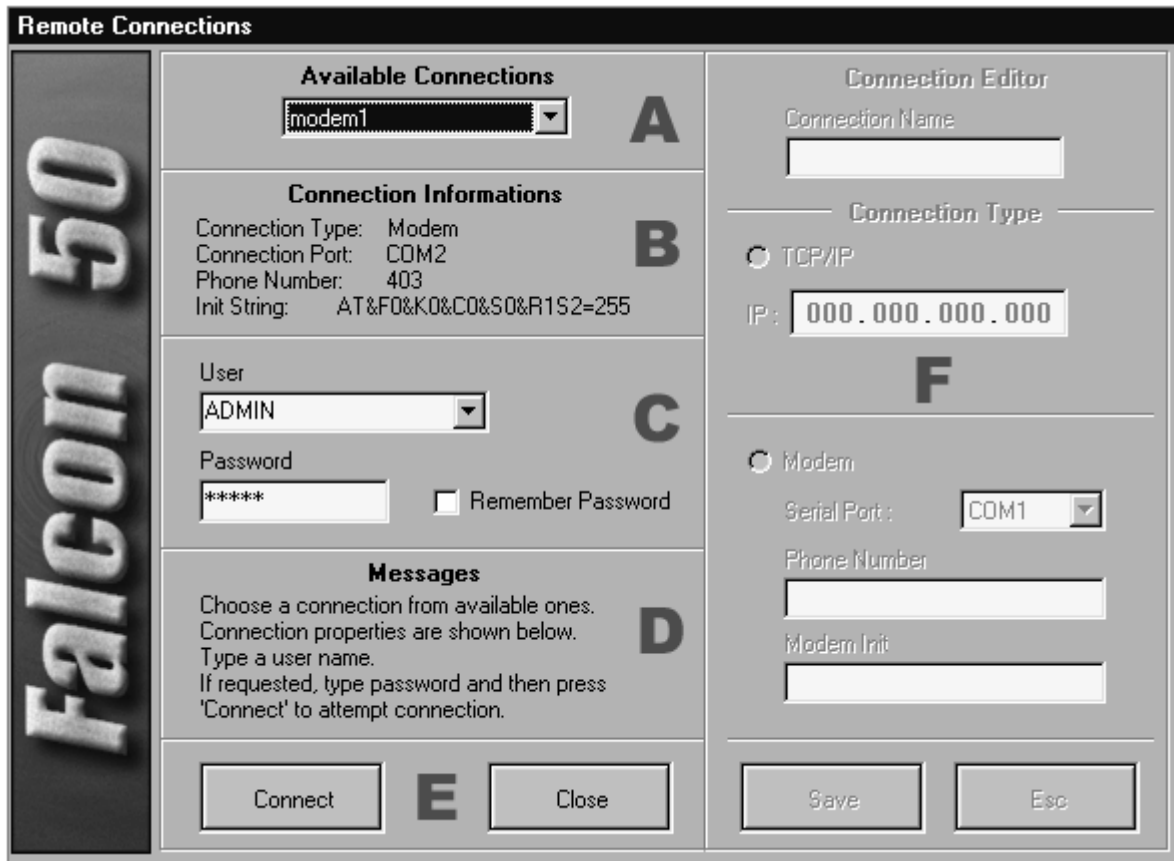
The Available Ports menu lists all ports currently available on the Pc.

By selecting one of them and trying to attempt the connection (by clicking the **Connect** button) if the connection can not be executed, special messages will be shown in the message board at the bottom (unavailability of selected port, wrong password or user name, etc).

The Pc Remote Control Software forces the connection parameters of chosen Serial Port to the most suitable ones, so that no further user-settings are required.

3 REMOTE CONNECTIONS SET-UP (LAN & MODEM)

The **REMOTE CONNECTIONS** key opens the dialogue mask for connecting via Modem and Ethenet.



As first step, the user can choose the type of connection to control the processor (A). The Available Connections menu lists the already created/edited connections (if existing) accordingly to their given name (TRANSMITTER, MASTER CONTROL, WCET). You may freely choose one of existing connections or create a new one using the EDIT button (see next Paragraph).



The relevant control panel (B) will turn bright.

As next step, the user is requested to enter his/her profile (NAME and PASSWORD) (C)



The Falcon 50 provides two levels of security. The first one (called 'program password') is related to the Pc Control Software and enables the user to run it on the Pc. The second one is related to the connection to the processor unit itself. **There is therefore no relationship between the password required at this step to connect to the processor and the password previously used to access the Pc Remote Control Software.**



Whenever You are connecting for the first time or after a general reset, keep the default User Name (ADMIN) with no password.

You may introduce an ADMIN password or set NEW user profiles at any time from the SYSTEM page in the Navigation Window (see the Next Chapter)

Click the CONNECT button (E). If the connection parameters / status are Ok, the connection dialogue mask will close and the main Control Panel will appear.

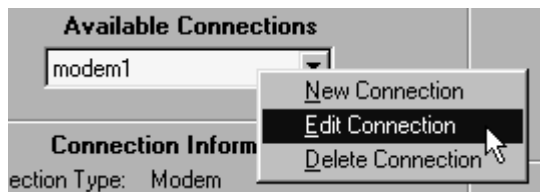
The NAME of the logged user will also be saved and listed in the User Name list for the next connection session as soon as the connection has been established.

The **Remember Password** control, if selected before attempting the connection, avoid the user to type the password when accessing the processor at next time.

Further information about the connection status or possible connection troubles are provided in the **Messages (D)** board.

3.1 HOW TO EDIT MODEM & ETHERNET CONNECTIONS

You can edit each of the connections listed in the Available Connections field by clicking right on it and then selecting the 'Edit Connection' item on the displayed pop-up menu.



Alternatively, You may click the EDIT icon on the right.



The Connection Editor mask (F) will turn bright.

Connection Editor

Connection Name: My Connection **A**

Connection Type

TCP/IP **B**

IP: 000.000.000.000

Modem **C**

Serial Port: COM1

Phone Number: [Empty]

Modem Init: AT&F0&K0&C0&S0&R1S2=255 **D**

Save Esc

The **Connection Name (A)** field allows You to type a mnemonic name for the current connections (this can be the call letters of a radio station, facility location, etc.)

Once entered, You may choose the type of Remote Connection to be edited.

3.2 MODEM CONNECTION EDITING

Choose 'Modem' in the Connection Type window. First of all, select the serial port on the pc the modem is connected to.

The screen will also prompt for the **Phone Number**. Enter the number that is to be dialed.

Type in the complete number. It is NOT acceptable to use hyphens or dashes. Example, when dialing a listed number such as 241-3343, it must be entered as 2413343.

Modem

Serial Port: COM1

Phone Number: 04873654289

Modem Init: AT&F0&K0&C0&S0&R1S2=255

If dialing out from a PBX system where a local line must be selected, enter the access number followed by a comma, then the number to be dialed. For example, if you must dial 0 to get an outside line, you would enter 0, 241-3343. The comma inserts a pause in the modem string and allows the outside line to be connected before the actual number is dialed.

Keep the actual initialization string for the local modem which is prompted at the bottom field.

Note: the initialization string is based on standard AT commands. Please refer to the relevant documentation for further details. For best operation, we highly suggest to use default string. Once the desired number to dialed and the other data are entered, press the SAVE key. The new connection will now be displayed in the *Available Connections* list field on the main mask. Press **ESC (D)** (or hit the ESC key on Your keyboard) to leave without saving.

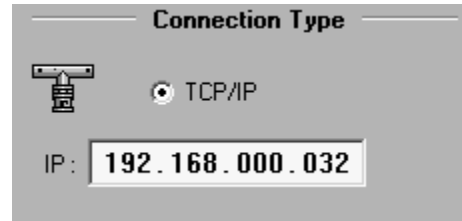


At the processor side, using a modem must be enabled from the Control Software. Refer to the COMMUNICATION screen.

3.3 REMOTE CONTROL VIA IP (ETHERNET CONNECTION) *

Type the IP address of processor to connect to in the IP field on section (B)

The Falcon 50 may be given an IP address (with associated Subnet mask) from the COMMUNICATION page of Navigation Main Menu.



After having edited the connection, the *Connect* button will then execute the connection, while *ESC* will discard the settings. Both buttons will afterwards close the dialogue mask.

** the Falcon 50 TCP/IP interface is available as an option. For further information, contact Your local dealer.*

Example for assigning an IP Address:

A Falcon 50 may be operated on a network where the following applies:

- The IP Addresses 192.168.1.0 to 192.168.1.100 have already been assigned
- The sub-network mask is 255.255.255.0
- The Falcon 50 should contain IP Address 192. 168.1.101

You can change at any time the actual Falcon 50 IP-address from the COMMUNICATION window (accessible by the COMMUNICATION tab on the Navigator screen) – see **Chapter** .



The presence of a firewall on Yr local network could cut down the connection speed. If You experience any lack of fluidity in the menu navigation, try to disable possible software controls on IP streaming (such as ZoneAlarm) and/or choose the slowest refresh rate of software screens (Ref to **Preferences** paragraph on next Chapter).

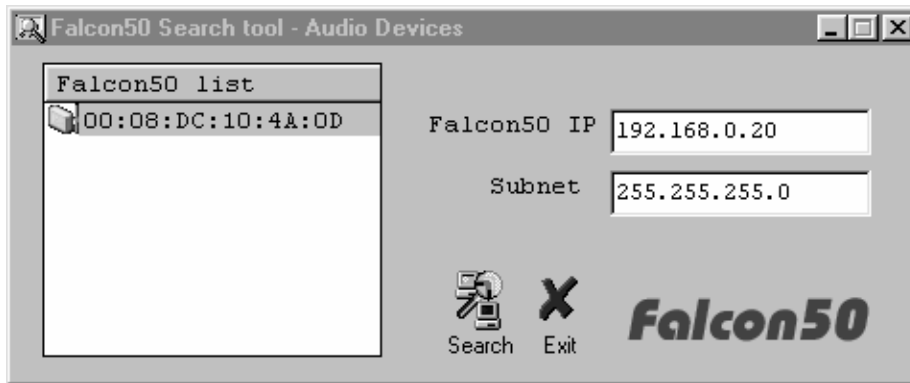


When powering-up the processor, the Falcon 50 FM Network interface needs up to 15 seconds for complete auto-setup and inzialization. During this period, no communication with the Pc through the Lan will be possible. For Network Port configuration You will need to communicate with the processor via RS232 or USB connection. The default IP Address of Falcon 50 FM network interface (when installed) is 192.168.0.20, with Subnet Mask 255.255.255.0.

3.4 AUTOMATIC NETWORK-SCAN FOR CONNECTED PROCESSORS

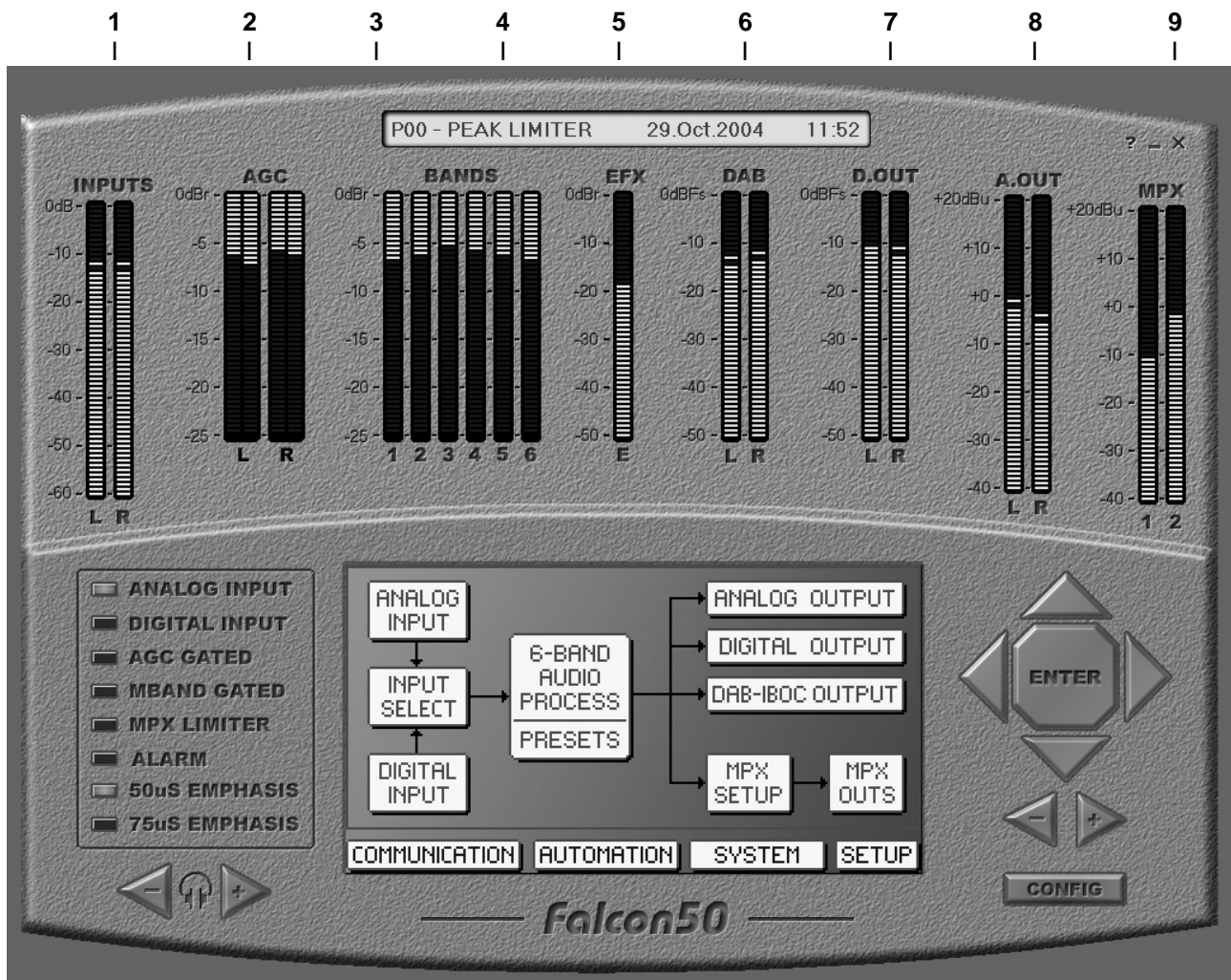
Together with the Pc Control Software, the Falcon 50 FM software Setup application will install a special tool called Falcon 50 IP Search Tool.

With launching it, it will be possible to examine the LAN for connected Falcon 50s. The following dialog window opens:



All found Falcon 50s are listed on the left (MAC address) with information about given IP-address and Subnet address. Clicking the desired item on the Falcon 50 list to connect to it.

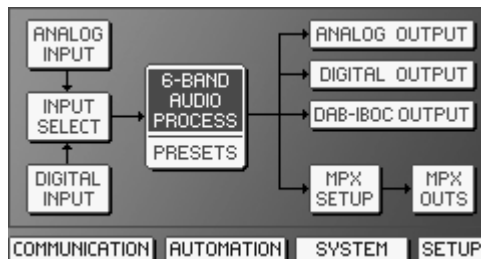
4 REMOTE CONTROL SCREEN – OVERVIEW



- 1 **Left and Right audio channel input level** (after AGC stage). Range: 0 to - 60dB
- 2 **AGC level:** shows the gain factor that the processor applies to the input signal. The best AGC values range close to 0 dB (or, still better, are slightly negative: - 1, - 2, etc).
- 3 **Band compression factors.** The meters show the compression factor (range 0 to -25 dB) applied to the frequencies relevant to that band: the higher the meter bar is, the stronger is the compression and therefore the presence of this component in the final signal is lower.
- 4 **ON AIR Preset & date /time bar:** it shows the current processing curve and the system date & time.
- 5 **EFFECT meter:** it shows the amount of effect (Stereo Enhancing) applied to the signal
- 6 **DAB meter:** it shows the actual level of DAB output
- 7 **D OUT meter:** it shows the audio DIGITAL OUTPUT level
- 8 **A OUT meter:** it shows the audio ANALOG OUTPUT level
- 9 **MPX meters:** it shows the levels of two MPX outputs.
- 10 **LOOK-UP TABLE:** it shows the main processor configuration. The Alarm signalling may be associated to many events / actions

- 11 **VOLUME CONTROL** it adjust the volume of front panel headphone socket
- 12 **MAIN BROWSING WINDOW:** it give access to processor operation parameters, grouped into blocks (block diagram)
- 13 **NAVIGATION BUTTONS:** click these buttons to navigate the Falcon 50 parameters

4.1 THE ‘CORE’ NAVIGATION SYSTEM



The Pc Remote Control Software employs a philosophy of displaying information on the block diagram, which diagrammatically shows the relationship of various parts of the system. Navigation through the system is intuitive by clicking on the blocks, for easy access to higher detailed block diagrams and property pages.

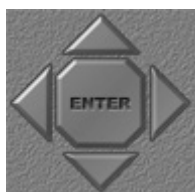
The default screen shows the complete loop, from the Input stages (analog or digital) to the audio and MPX outputs.

4.2 HOW TO NAVIGATE THRU BLOCKS AND CONTROLS

- By **Pc KEYBOARD**
- **ARROWS** keys: move among blocks. Selected block is shown in inverted colors.
 - **ENTER** key. It has a dual function: to allow access to selected block, and to save a new parameter or function value.
 - **ESC** key: allows you to exit a menu sublevel (exit without saving)

- By **MOUSE**
- single click selectes the block / item
 - double click opens the property page associated (when existing). A mouse double click has the same result as the ENTER button.

By **Navigation buttons (Extended mode only)**



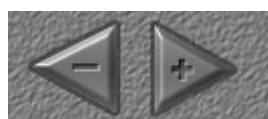
The four arrows move among blocks. Selected block is shown in inverted colors. The **ENTER** key has a dual function: to allow access to selected block, and to save a new parameter or function value.

4.3 HOW TO SCROLL THE PARAMETER VALUES

By **Pc KEYBOARD** Using the [+]/ [-] keys

By **MOUSE** Scrolling the mouse wheel

By **Navigation buttons (Extended mode only)**

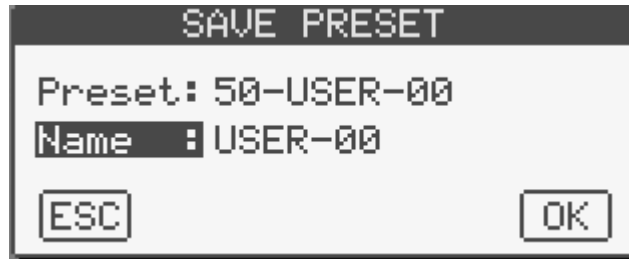


Using Less/ More buttons

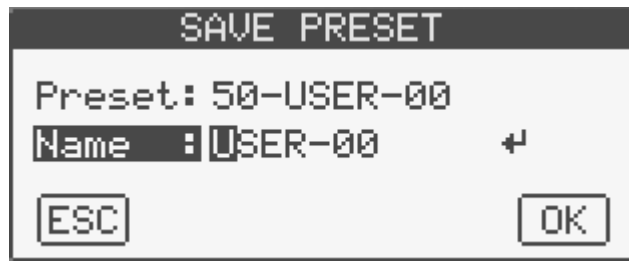
4.4 HOW TO MODIFY A TEXT FIELD

Once entered the editable dialogue mask:

Click the desired label/line to be edited



double click the or press ENTER (either on the Pc keyboard or on the Remote Control Software mask) to **edit** it:



type the text. Press Left / Right arrows to move the cursor.

Press BACKSPACE to get back to the previous character.

To delete one of more of typed characters, press BACKSPACE one or more times (as much as are the character to be modified) and then type the new character(s): the existing ones will be overwritten.

Press Enter to stop the editing mode and discard the remaining part of the text.

Click OK / Esc to confirm/exit without saving.

4.5 THE TOP BAR



With a reliable connection established, the top bar on the main Remote Software screen shows, on the left hand, the Preset currently on air.

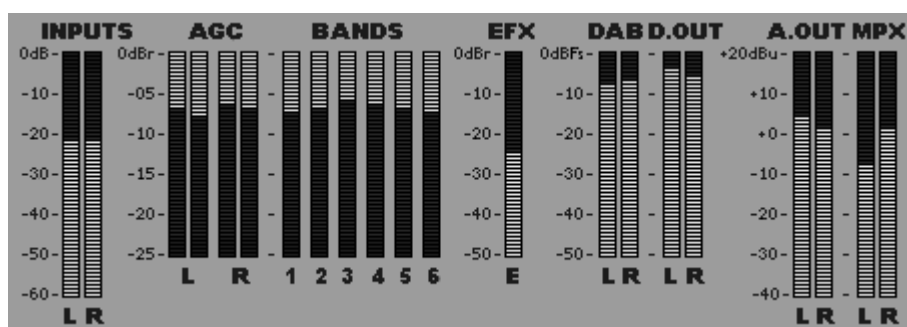
It is displayed as **Pnn - PRESET NAME** (where **P** identifies one of the 50 presets which come from the factory and which can not be altered by the user) or as **Unn – RESET NAM** (where **U** identifies one of the 50 presets which are user - customized).

Factory presets range from 00 to 49, while **User** presets range from 50 to 99.

The Calendar and the Clock show the present date and time of processor.

The Falcon 50 clock may be synchronize to the Pc system clock using the **PC Clock Synchronize** function available form the SETUP panel in the Navigator screen.

4.6 THE METERING SCREEN



The top half of the Remote Application window contains the Metering Screen.

The screen displays the audio levels and control signals within the Falcon 50 FM in realtime; this makes it easy for you to adjust each processing block and immediately see the effect (if any) on the audio.

Peak Indicator – The thin line on the Level Meters that holds the peak level can be turned on and off with

the box  **VU METER PEAKS** from the CONFIG window.

For further details refer to I/O audio and MPX Setup chapters.

4.7 THE LOOKUP TABLE

<ul style="list-style-type: none"> <input type="checkbox"/> ANALOG INPUT <input type="checkbox"/> DIGITAL INPUT <input type="checkbox"/> AGC GATED <input type="checkbox"/> MBAND GATED <input type="checkbox"/> MPX LIMITER <input type="checkbox"/> ALARM <input type="checkbox"/> 50uS EMPHASIS <input type="checkbox"/> 75uS EMPHASIS 	<p>Analog Input /Digital Input show the activa audio input, according to the setting done in the INPUT SELECTION menu</p> <p>AGC Gated and MBAND Gated light on when AGC and Multiband stage run in a Gated condition.</p> <p>MPX Limiter signals limiting is applied to the Composite MPX signal.</p> <p>ALARM signalling may be associated to occurrence of multiple events, as per the SETUP screen on the Navigator bar</p> <p>50us / 75 us EMPHASIS indicate the Preemphasis time in use.</p>
---	---

4.8 PREFERENCES



Click **CONFIG** button on the main screen. The Config screen display the following options:



- If selected, the option '*Slow Refresh Rate*' allows you to select a slower refresh speed than the default one (10 Hz instead of 30 Hz) in displaying the Vu Meter on the screen. Choose the slow speed (10 Hz) if the higher speed does not allow smooth display of the meters or when using Pcs with poor performance.
- If selected, the option '*Stay On Top*' will always keep the control program window in the foreground of the desktop.

4.9 HOW TO DISCONNECT FROM THE PROCESSOR

From the CONFIG page, click



button. Upon request, it will terminate any connection you have running.

4.10 HOW TO CLOSE THE 'CONFIGURATION' PANEL



Click the **CLOSE PANEL** button in the Configuration panel to get back to the Navigation panel It will not stop the current connection with the processor.

4.11 HOW TO CLOSE & MINIMIZE THE SOFTWARE SCREEN

The Remote Control software provides standard Windows controls to minimize and exit. They are provided at the right top corner of the screen.



4.12 THE 'ABOUT' INFORMATION SCREEN

The About screen displays pertinent information about the Remote Application, including the version number.

It can be recalled by clicking the question mark  at the right top corner of the screen.

5 PASSWORDS & RIGHTS TO ACCESS THE PROCESSOR

5.1 USER PROFILES

The Falcon 50 FM provides five levels of security, ranging from absolutely no access to any of the processing adjustments and parameters to full access to all functions. These FIVE levels (each one having its own rights associated) are indicated as Guest, Broadcaster, Advanced User, Technician and Administrator.

ADMINISTRATOR	Grants full access. All functions and parameters can be monitored and adjusted from this level. Also, the Administrator is fully allowed to set Processor password to grant or denies access to the other users (SYSTEM page). Once this level is selected, be careful because you can make a good mess of things.
TECHNICIAN	<i>It provides the same access as Administrator Level, but with the exception of the SYSTEM page (user access/rights management).</i>
ADVANCED USER	It provides access to AUTOMATION and to AUDIO PROCESSOR blocks. The Advanced User is therefore allowed to to make processing (i.e. sound) changes and to make scheduling changes. He/her is not allowed to modify Input/Output signal levels.
BROADCASTER	<i>It permits all processing parameters to be viewed but not adjusted. In addition, the processing curve may be chosen among the available (preset) ones and scheduled from the SCHEDULER page.</i>
GUEST	is the total "lockout" level. It allows the viewing of signal meter activity (audio input level, band levels, etc) on the software screen but it provides no access to all processing functions. <u>This is a 'very basic' level, which can not be set from the SYSTEM page.</u>


5.2 HOW TO ACCESS THE PROCESSOR AS 'GUEST' USER

To access the processor as the 'Guest' user type 'GUEST' in the *User Name* field of Connection dialogue mask and keep the *Password* field void.

The screenshot shows a dialog box titled "User Name". It contains a dropdown menu with "GUEST" selected. Below it is a "Password" field which is empty. To the right of the password field is a checkbox labeled "Remember Password" which is unchecked. At the bottom of the dialog is a "Connect" button with a mouse cursor pointing to it.

5.3 CHANGING PASSWORDS FOR ACCESSING THE PROCESSOR

NOTES ON PASSWORDS

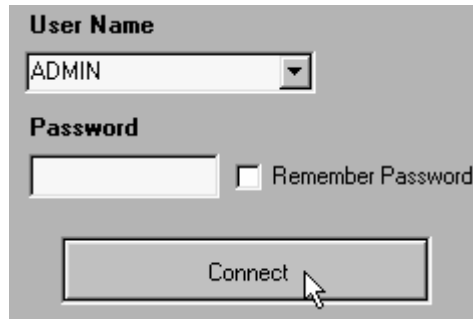



Passwords only provide security if you use them. Distribute passwords only to station personnel only when they must have access to Falcon 50 functions.

If you change your passwords and forget them, you have a significant, but not impossible problem.

You can restore the Falcon 50 to factory defaults using an Initialization procedure. In doing so, you will erase all of your custom programming and processing settings. Initialization procedure should only be used as a last resort as it erases ALL current processor settings.

Upon initial power up, the Falcon 50 is set at the factory default, Password Security Level ADMINISTRATOR (indicated as ADMIN in the LOCAL / REMOTE connections masks, requiring NO password at the first access).





Leaving empty the Password field of ADMIN user means keeping the protection system of Falcon 50 inactive. It is therefore highly suggested to associate a Password to the ADMIN user in order to grant the access to the Falcon 50 according to given user profiles.

To access the Change Password Sub-menu, press the SYSTEM button.



A special window will appear.

If You have got connection to the Falcon 50 for the first time as ADMIN default profile, as soon as You enter the SYSTEM page You will be requested to assign a password to the ADMIN user itself.



NOTE: the ADMIN user is always present in the system and can not be deleted/modified. Anyway, You may create new users holding the same 'ADMINISTRATOR' rights and having different name(s).

Once entered the ADMIN's password, the next screen will give the administrator the possibility to enter multiple user name (f.i. Jack, David, John, Paul, Henry, etc) each one with its own password and Security level (Broadcaster, Advanced User, Technician, etc).

NAME	PASSWORD	LEVEL
ADMIN	USA	ADMIN
JOHN	FLORENCE	ADMIN
MAURICE	DIVING	TECHN
DAVID	WIEN	BROAD
PAUL	DOCTOR	ADUSR
CHRIS	COFFEE	TECHN
MICHAEL	CS16	ADUSR
MARK	DELAY	BROAD

EVENTS LOGINS UNDO OK

5.4 LOGIN LIST

The administrator may always get the list of last 12 acces to the unit. For each access (login), user name, user's level (Technician, Administrator, Advanced User, etc), time and date are shown in the **LOGINS** page (to get it, press **LOGINS** button at the bottom of the **SYSTEM** screen).


When multiple access from the same user are registered, only the last access is displayed (i.e. previous access are overwritten).

NAME	LEVEL	DATE	HOUR
JOHN	ADMIN	15/12/04	10:36
MAURICE	TECHN	15/12/04	10:37
PAUL	ADUSR	15/12/04	10:37
CHRIS	TECHN	15/12/04	10:37
MARK	BROAD	15/12/04	10:37
ADMIN	ADMIN	15/12/04	10:38
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OK

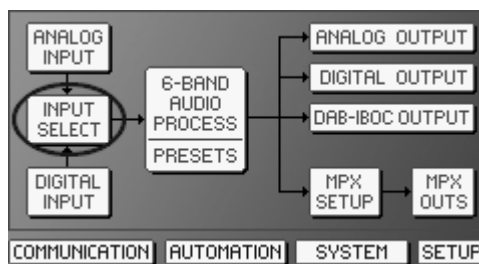
6 AUDIO INPUT SET-UP AND CALIBRATION

This Chapter presents all parameters related to processor audio input (either analog or digital).

	<p>Before starting, make sure the unit is running all the default parameters values, as set in the factory at the delivery time.</p>
---	--

6.1 HOW TO SWITCH BETWEEN ANALOG AND DIGITAL AUDIO SOURCES

The Falcon 50 features two inputs: analog and digital. The analog source is selected by default. Double click the INPUT SELECT block to access all parameters/settings related to Selection between Inputs.



The selection between inputs may be achieved manually, may be triggered by a fault on the selected source or it may be forced by activating one of six GP Input, accordingly to SOURCE SELECTION menu.

<p>PRIMARY INPUT SOURCE</p> <p><input checked="" type="checkbox"/> Analogic <input type="checkbox"/> Digital</p>	<p>FAULT ON</p> <p><input checked="" type="checkbox"/> NoSource</p> <p><input type="checkbox"/> LowSource</p> <p><input type="checkbox"/> UnbalSrc</p>
<p>SOURCE SELECTION</p> <p>Switch Mode: Manual</p>	<p>FAULT TIME</p> <p>FTime: 20s</p> <p>RTime: 3s</p>
<p>PROCESS PRE-EMPHASIS</p> <p><input type="checkbox"/> Off <input checked="" type="checkbox"/> 50uS <input type="checkbox"/> 75uS</p>	<p>SELECT PRIMARY INPUT SOURCE UNDO OK</p>

--	SOURCE SELECTION	--	<p>Manual - The input source is selected manually and no actions are taken in the event of source failure.</p> <p>On Fault - The Falcon 50 will automatically switch on the stand-by (alternative) audio source according to the events listed in the 'FAULT ON' menu</p> <p>ExternalCmd1 - Switching from primary to stand-by (secondary) source is triggered by suitable trigger command applied to Input 1 on GP INPUT interface</p> <p>ExternalCmd2 - Switching from primary to stand by (secondary) source is triggered by suitable trigger command applied to Input 2 on GP INPUT interface</p> <p>ExternalCmd3 - Switching from primary to stand by (secondary) source is triggered by suitable trigger command applied to Input 3 on GP INPUT interface</p> <p>ExternalCmd4 - Switching from primary to stand by (secondary) source is triggered by suitable trigger command applied to Input 4 on GP INPUT interface</p> <p>ExternalCmd5 - Switching from primary to stand by (secondary) source is triggered by suitable trigger command applied to Input 5 on GP INPUT interface</p> <p>ExternalCmd6 - Switching from primary to stand by (secondary) source is triggered by suitable trigger command applied to Input 6 on GP INPUT interface</p>
----	-------------------------	----	---

6.2 AUTOMATIC SWITCHING BETWEEN SOURCES

When selecting the 'ON FAULT' option in the SOURCE SELECTION menu, switching between audio sources (primary and secondary) will be controlled by a built-in audio detector stage.

With four independent and permanent circuits, the Falcon 50 constantly monitors both L & R channels on each input (Primary and Secondary).

When one of the following conditions occur (according to the FAULT ON menu selection):

- the Primary Input (both the channels) extinguishes
- the Primary Input (both the channels) falls below the threshold (typically set to around -35 dBm),
- the difference between Left and Right channel on the primary input exceeds 20 dB

the fail timer is started. Whether the fail time (FTIME) elapses without the signal recovering, then the Falcon 50 switches from the one to the other input **ONLY whether a valid signal is present on the Secondary (stand-by) input.**

--- FAULT ON	--- NoSource --- LowSource --- UnbalSRC	<ul style="list-style-type: none"> - With 'On fault' option selected in the SOURCE SELECTION menu, the Falcon 50 will switch on the secondary input in the event the primary source extinguishes for a time longer than the Fault Time (see) - With 'On fault' option selected in the SOURCE SELECTION menu, the Falcon 50 will switch on the secondary input in the event the primary source level runs under threshold (set at around - 35 dB) for a time longer than the Fault Time (see) - With 'On fault' option selected in the SOURCE SELECTION menu, the Falcon 50 will switch on the secondary input in the event the difference on levels between Left and Right channels exceeds 20 dB for a time longer than the Fault Time (see)
---------------------	---	--

The 'silence' time duration on the Primary input before the Falcon 50 switches (Fault TIME) is adjustable from 5 to 60 seconds (by step of 5 seconds) by means of FTIME control in the FAULT TIME menu.

Once the Falcon 50 has switched from Primary to Secondary input, the Primary input may be kept monitored till the Primary audio input resumes. Also when Primary audio appears, a time ranging from 1 to 10 seconds may be awaited before inverse switching (from Secondary to Primary) is performed.

--- FAULT TIME	--- FTime [5,10,...60 sec] --- Rtime [1,2....10 sec]	<ul style="list-style-type: none"> - With 'On fault' option selected in the SOURCE SELECTION menu, the Falcon 50 will switch on the secondary input in the event the Primary source stays below the threshold for a time longer than the FTime - With 'On fault' option selected in the SOURCE SELECTION menu, once the Falcon 50 has switched from Primary to Secondary input, also when Main audio appears, a time equal to Rtime will be awaited before inverse switching (from Secondary to Primary) is performed.
-----------------------	--	--

HINTS & TIPS

Since silence is often a part of normal audio, preset (typical) fail time is around 20 seconds. However time as long as one minute may be set. In order to ignore momentary levels above the threshold when re-connecting equipment the restore time for audio is generally set at around 10 seconds, but it may be also easily altered to longer times.

A full set of alarms (i.e. contact closing and relay switching) may also be triggered for external use.

6.3 HOW TO TRIGGER ALARMS ON IN THE EVENT OF INPUT AUDIO FAILURES

The Falcon 50 has wide alarm and signalling capabilities. In particular, audio failure on primary or secondary sources may trigger several alarms, according to the options selected from the **SETUP** window (the SETUP tab is listed in the bar underneath the central Navigator window).



An alarm condition may occur either on **PRIMARY INPUT FAILURE (P.I.F.)** or **SECONDARY INPUT FAILURE (S.I.F.)** or both.

An alarm condition will turn on the ALARM signalling on the Remote Control screen



and the front panel 'ALARM' LED:



Beside turning on that ALARM signalling, each one of the two TTL OUTPUTS may be associated to individual Input Failures (see TTL OUTPUT 1 in the example screen here below) or to a generic Alarm condition, as set in the ALARM ON menu (see TTL OUTPUT 2 in the example screen here below).



Alarm will clear itself immediately upon return of input audio.

NOTE: The alarm condition may be also associated to other events, such as extra-temperature, MPX signal clipping or the MPX modulation level is below 100% for some reason. Ref to ALARM ON menu.

6.4 SETTING THE PROCESS PREEMPHASIS

The frequency characteristic of L & R outputs (either analog or digital) and of MPX outputs can assume either a flat frequency response, or can follow a selected pre-emphasis curve.



For FM broadcasting worldwide, some form of pre-emphasis boost is employed. Generally it is 50µs or 75µs. In Europe, Australia, and New Zealand 50µs is employed, while for North and South America 75µs is used.

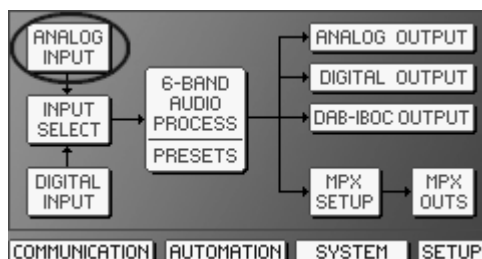
When 'flat' mode is engaged (Preemphasis = Off), this yields a signal with a flat frequency characteristic, but with an output ceiling that exactly follows the inverse of the pre-emphasis curve. Doing so, if the signal is again pre-emphasized in an external stereo generator or exciter, the transmitted signal will have proper pre-emphasis and spectral protection.

The actual pre-emphasis time is indicated on the **Process Pre-emphasis** menu.

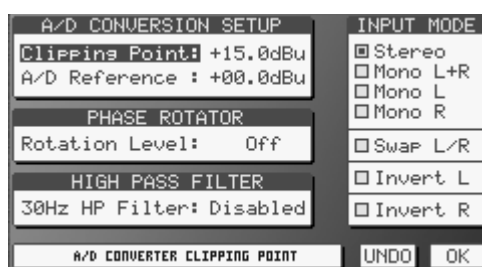
The pre-emphasis can be changed will relative ease from the same menu if, for some reason, the unit is to be operated at a preemphasis which is different to that as supplied

- | | | | | | |
|-----|-----------------------------|-------|--------------|---|---|
| --- | PROCESS PRE-EMPHASIS | --- | Off | - | The whole Falcon 50 process is completely flat |
| | | ----- | 50 uS | - | The Falcon 50 process is preemphasized according to 50 us curve |
| | | ----- | 75 uS | - | The Falcon 50 process is preemphasized according to 75 us curve |

6.5 ANALOG INPUT SET-UP



Double click the ANALOG INPUT block



6.5.1 SETTING THE INPUT MODE (MONO, STEREO, SWAP, ETC)

The INPUT MODE menu contains all control which can be applied to the analog audio source.

The **STEREO** mode is the common operating mode.

With **MONO L** option activated, the left signal will feed both left and right output signal paths.

With **MONO R** option activated, the right signal will feed both left and right output signal paths.

With **MONO L+R** option activated, the stereo input signal will be mixed to mono and it will feed both output signal paths.

The **SWAP L/R** control swaps Left and Right channels (L becomes R and R becomes L).

INVERT L (and **INVERT R**) inverts the polarity (i.e. *reverse the phase*) of respective XLR jacks (pin 2 to 3 and 3 to 2).

6.5.2 HIGH PASS FILTER

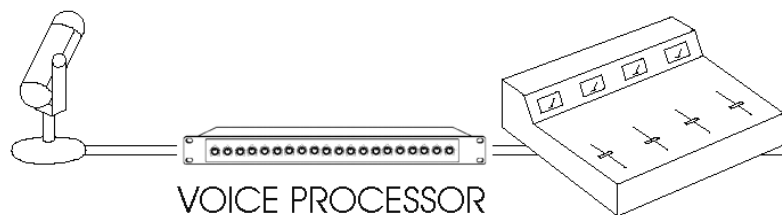
The Falcon 50 FM input stage also allows to switch on or off a High Pass Filter with 30 Hz frequencies cut-off. The Filter may be proven useful for eliminating wind noise, traffic rumble, and AC mains hum. For most voice applications the filter can be left activated. For wide bandwidth signals, such as music, the filter should be used only as necessary.

6.5.3 PHASE ROTATOR

The Phase Rotator circuits, when utilized, can assist in eliminating vocal distortion during periods of heavier processing needs. These specialized delay circuits create a “flywheel” effect on a certain range of frequencies. In this case, audio within the main vocal range of 300 Hz to 2 KHz will change in phase as frequency increases through the set passband.

The reason for using phase rotators is to address a problem created by the human voice. Some human voices (particularly male voices) exhibit as much as 6dB asymmetry in their waveform, while typical ‘musical’ signals are symmetric.

As asymmetric clipped signals result in a more unpleasant ‘sound’ to the ear than the symmetric clipped ones, a filter designed to convert asymmetric waveforms into symmetric ones would be very recommended. Even better, it would be highly recommended to pre-process the **live speech** (as captured by studio microphones) through dedicated VOICE PROCESSORS, that are situated between the microphone(s) and the broadcast mixing console (see figure).



Whenever no voice processors are available and the ‘speech’ material (as sourced by microphones) is directly passed to the processor inputs, You may activate the *phase rotator* input stage, that removes the asymmetrical waveforms from the incoming audio signal, thus giving significant improvements on speech processing and removing any distortion.

Although the ‘Phase Rotator’ stage is a special all-pass filter designed to properly modify live speech material, it may be set as ‘enabled’ even when ‘music’ signals are processed, as it doesn’t affect in a perceivable mode the most part of that kind of signals. However, we suggest to keep it off in every ‘all music’ station, when no live speech interventions are performed.

Three rotation levels are provided, each one having different impact on the ‘live’ speech material. Without being involved in mathematical explanations, we suggest to try all the levels and choose the one which best fits the actual program material being fed to the processor. The Phase Rotator is set OFF as default.

In addition to the Phase Rotator stage, the Falcon 50 features a Speech Detector stage able to recognize speech components inside the incoming audio and to automatically adjust processing parameters for best result. Refer to relevant Chapter.

All factory Presets have Speech Detector stage activated (even if at different levels).

6.5.4 A/D CONVERSION SETUP – QUICK START

With any audio signal processing equipment it is necessary to ensure adequate signal level is used through the device, to avoid sacrificing noise performance.

ADJUSTING THE CLIPPING POINT

The first step in the Falcon 50 Input calibration consists in stating the Analog-to-Digital Clip level. The Clip Level (or “fullscale digital”) is a hard digital ceiling above which no signal can go. That is, the highest level attainable in a digital system (a word of all binary 1’s). It is also indicated as 0 dBFS.



Distortion occurs once the audio level is louder than what the A/D chip can read (“above” 0 dBFS – see curve on the right in the figure), while too low Signal-to-Noise ratios are achieved whenever the clip level is set too high in respect of the input signal.

The clipping point should be adjusted in such a way that the processor clipping level fits the clipping point of the audio system / chain (mixing console, audio changeovers, matrix/routers, etc) feeding the processor input.



Use care and attention in setting this adjustment.

To calibrate the Clipping Point using Program audio material, do the following:

- 1) Feed the processor input with the **highest undistorted audio level**. Typically, You get this worst condition by raising-up all sliders on the mixing console or turning up the output volume of signal routers, changeovers, etc chained with the console.
- 2) Adjust the Clipping Point parameter in the Falcon 50 menu so that on program peaks the input meters indicate approximately -1 or -2 dB. The top level on the meters correspond to the A/D converter clipping point. Proper input levels for the Falcon 50 should have the second and third red meter indicators light on.
- 3) Recover standard source levels and pay attention to the peak working zone. If the peak ranges between **-15 dB and -10 dB**, the input stage is correctly tuned. Otherwise, re-adjust the Clipping level so that peaks in standard operation match the above condition(in particular, they never overpass -10 dB).

Minimum Headroom allowed by the system is 6 dB. That is, the condition (ClippingPoint – Adref) \geq 6dB is automatically enforced.

ADJUSTING THE A/D REFERENCE LEVEL

- 1) Feed the processor input with audio material at a **standard level** (normally 0 Vu on the mixing console meters).
- 2) Select one of the factory default processing curves. It is recommended to setup the processor input using the same curve as in the normal operation.
- 3) Adjust the A/D reference level so that on program peaks the **AGC meters** indicate approximately – 10 dB gain reduction.

The A/D REFERENCE parameter acts as a SENSIBILITY control. Thus, feeding the Falcon 50 FM with a 0 dBu signal and having the A/D Reference point set at – 10 dBu, the cascaded AGC stage will compensate for 10 dB with the AGC Drive control set to 0.

Minimum headroom is 6 dB. Clipping the input signal will generate an ALARM if the 'CLIPPING' option is selected in the ALARM ON menu included in the SETUP screen.

As optimal working level, it is advised to set the Clipping Point so that the input signal peak ranges between – 10 and – 15 dB on the Input meters.

It is strongly suggested to monitor the Input meters for reasonably long time, in order to fit in the best way the input signal trend.

ADDITIONAL NOTES

On professional analog consoles, 0 VU on the console meter often equates to the professional reference level of +4 dBu.

So, for example, if the line level inputs are calibrated to +4 dBu = -16 dBFS, then +20 dBu = 0 dBFS. Thus, an input level greater than +20 dBu would cause the converter to distort.

By setting the clipping point to, f.i., + 18 dBu, if the XLR input analog PEAK level is as high as +18 dBu, which is 6.16Volt RMS, this will give a 0dBFS reading. Top red LED indicates 0dBFS. From 0 dBFS to -60dBFS the readout resolution is 1dB. From –5 dBFS to 60dBFS the readout is indicated by green LEDs.

It is recommended to adjust the input signal to a maximum, peak value of –12dBFS. This means that the meter normally reads out 'green' values. In this way a 12 dB headroom is preserved.

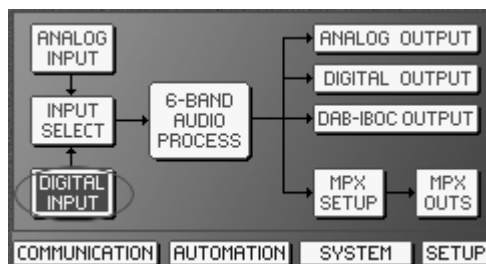
EXAMPLES

Having set the Clipping Point at + 20 dBu and reading out – 20 dB on the Analog input meter, the signal being fed is 0 dBu (no matter of A/D Reference Point).

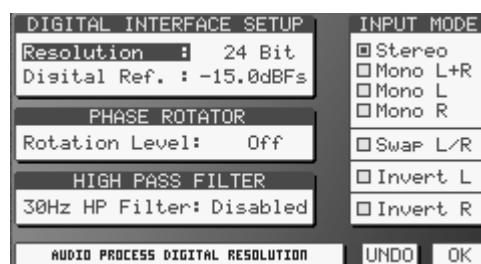
By re-adjusting the Clipping Point to + 10 dBu and keeping the input signal at 0 dBu, meters will read – 10 dB.

Having set the Clipping Point at + 24 dBu, for good operation the input signal can range up to + 10 dBu, thus keeping 14 dB of headroom.

6.6 DIGITAL INPUT SET-UP



Double click the highlighted block:



6.6.1 SETTING THE INPUT MODE (MONO, STEREO, SWAP, ETC)

The INPUT MODE menu contains all control which can be applied to the analog audio source.

The **STEREO** mode is the common operating mode.

With **MONO L** option activated, the left signal will feed both left and right output signal paths.

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The **SWAP L/R** control swaps Left and Right channels (L becomes R and R becomes L).

INVERT L (and **INVERT R**) inverts the polarity (i.e. *reverse the phase*) of respective XLR jacks (pin 2 to 3 and 3 to 2).

6.6.2 HIGH PASS FILTER

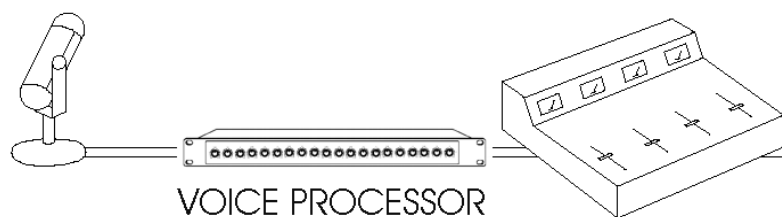
The Falcon 50 FM input stage also allows to switch on or off a High Pass Filter with 30 Hz frequencies cut-off. The Filter may be proven useful for eliminating wind noise, traffic rumble, and AC mains hum. For most voice applications the filter can be left activated. For widebandwidth signals, such as music, the filter should be used only as necessary.

6.6.3 PHASE ROTATOR

The Phase Rotator circuits, when utilized, can assist in eliminating vocal distortion during periods of heavier processing needs. These specialized delay circuits create a “flywheel” effect on a certain range of frequencies. In this case, audio within the main vocal range of 300Hz to 2kHz will change in phase as frequency increases through the set passband.

The reason for using phase rotators is to address a problem created by the human voice. Some human voices (particularly male voices) exhibit as much as 6dB asymmetry in their waveform, while typical ‘musical’ signals are symmetric.

As asymmetric clipped signals result in a more unpleasant ‘sound’ to the ear than the symmetric clipped ones, a filter designed to convert asymmetric waveforms into symmetric ones would be very recommended. Even better, it would be highly recommended to pre-process the **live speech** (as captured by studio microphones) through dedicated VOICE PROCESSORS, that are situated between the microphone(s) and the broadcast mixing console (see figure).



Whenever no voice processors are available and the ‘speech’ material (as sourced by microphones) is directly passed to the processor inputs, You may activate the *phase rotator* input stage, that removes the asymmetrical waveforms from the incoming audio signal, thus giving significant improvements on speech processing and removing any distortion.

Although the ‘Phase Rotator’ stage is a special all-pass filter designed to properly modify live speech material, it may be set as ‘enabled’ even when ‘music’ signals are processed, as it doesn’t affect in a perceivable mode the most part of that kind of signals. However, we suggest to keep it off in every ‘all music’ station, when no live speech interventions are performed.

Three rotation levels are provided, each one having different impact on the ‘live’ speech material. Without being involved in mathematical explanations, we suggest to try all the levels and choose the one which best fits the actual program material being fed to the processor.

6.6.4 DIGITAL INTERFACE SETUP – QUICK START

- 1) Choose the sampling resolution (16, 20 or 24 bits) which best fit the actual digital audio source.
- 2) Play program audio material from your studio, peaking at the level to which you normally peak program material (typically 0VU on analogue mixing consoles).
- 3) Select one of the factory default processing curves. It is recommended to setup the processor input using the same curve as in the normal operation.
- 4) Adjust the Digital Reference level so that on program peaks the **AGC meters** indicate approximately – 10 dB gain reduction.

ADDITIONAL NOTES

If you use a tone to line the meters up with your console, then with your console's meters at 0VU, set the Digital Reference level control for either -18dBFS or -12dBFS on the Falcon 50's meters, depending on the amount of desired headroom.

0 dBFS is the absolute highest voltage level that any particular A/D can convert. It produces the equivalent of a digital code consisting of all 1s. No digital level can exceed 0 dBFS. A 0 dBFS voltage level and all levels greater than this produce the same output code of all 1s.

On the contrary of analog signals, digital signals can range in the red meter zone without involving any distortion or signal degradation.

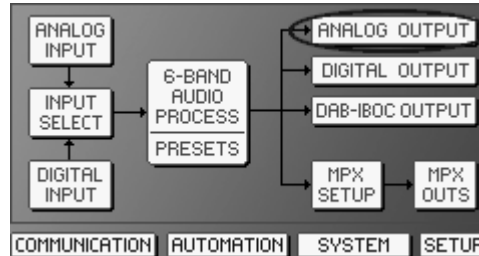
The Digital Reference parameter has the same meaning as the Analog Reference parameter in the analog input.

This is just a starting point, and you may want to alter this relationship.

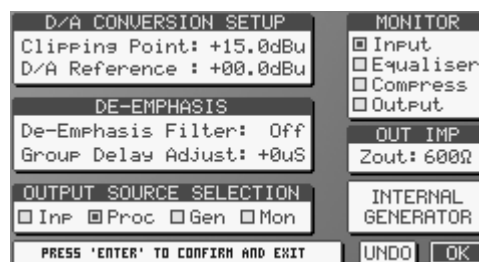
The Digital Reference level affect both L + R channels simultaneously.

7 AUDIO OUTPUTS SET-UP & CALIBRATION

7.1 ANALOG OUTPUT CALIBRATION



Double click the highlighted block:



7.1.1 OUTPUT SOURCE SELECTION

When **INP** (Input) is selected as output source, program audio completely bypasses the processing section and the analog audio XLR jacks provide the signal at the input, according to the equipment block diagram. The INP position defeats program audio pre-emphasis as well.

In the **PROC** position, this switch routes the input audio program signal through the whole processing circuitry. It is the **NORMAL OPERATING** position.

With **GEN** source selected, the analog output is fed by selectable tones (sinewave) as stated in the INTERNAL GENERATOR menu (see).

With **MON** source selected, the analog output is fed by the signal picked-up after the input stage, the Equaliser stage, the Compressor stage or the final output stage, according to the selection done in the Monitor box. For more details, refer to equipment block diagram.

7.1.2 DE-EMPHASIS & GROUP DELAY

Preemphasis may be selectively removed from the analog output by turning the De-emphasis filter to OFF. Output Group Delay is adjustable within the range [0-3 uSec]

7.1.3 D/A CONVERSION SETUP

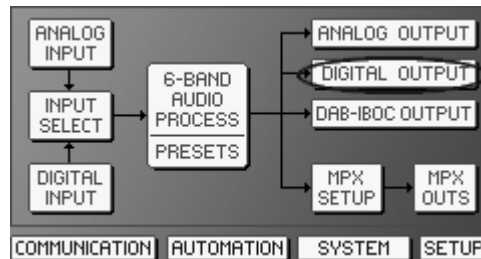
Clipping point (level) of output D/A converter should match the clipping point of connected (load) equipment. Adjust the D/A reference control so that You match the input sensibility of target equipment.

7.1.4 MATCHING THE LOAD IMPEDANCE

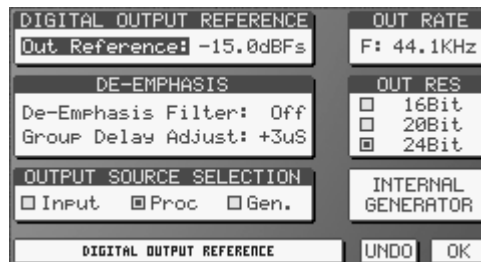
The OUT IMP menu helps in matching at the best the actual input impedance of the load (transmitter, stereo coder, exciter, etc) connected to the processor.

Having the Falcon 50 analog outputs a typical source impedance of 50 Ohms, the output level varies by up to 0.8 dB when connecting 600 Ohms loads rather than 10 K loads.

7.2 DIGITAL OUTPUT CALIBRATION



Double click the highlighted block:



7.2.1 OUTPUT SOURCE SELECTION

When **INP** (Input) is selected as output source, program audio completely bypasses the processing section and the analog audio XLR jacks provide the signal at the input, according to the equipment block diagram. The INP position defeats program audio pre-emphasis as well.

In the **PROC** position, this switch routes the input audio program signal through the whole processing circuitry. It is the **NORMAL OPERATING** position.

With **GEN** source selected, the analog output is fed by selectable tones (sinewave) as stated in the INTERNAL GENERATOR menu (see).

7.2.2 DE-EMPHASIS & GROUP DELAY

Preemphasis may be selectively removed from the analog output by turning the De-emphasis filter to OFF. Output Group Delay is adjustable within the range [0-3 uSec]

7.2.3 DIGITAL OUTPUT REFERENCE

It sets the output level. 0 dBFS always identifies the clipping point.

7.2.4 OUTPUT RATE

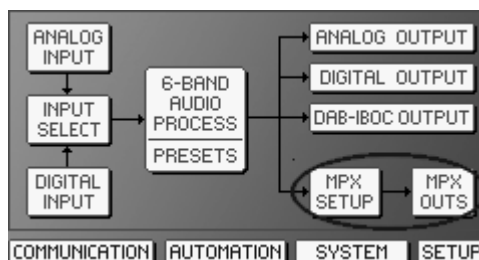
It sets the Sampling Rate of output signal. Default value is 44.1 KHz. Alternative values are [32,48, 64, 88.2, 96 KHz]. Note that the sampling rate may also be linked to the Synchron Reference signal provided to the SyncIN input connector. To do this, select EXT INP option in the OUT RATE menu box.

Alternatively, the output Sampling Rate may be the same as the AES/EBU input (i.e. changing the input sampling rate causes the output sampling rate to change accordingly). To do this, choose INPSYNC option in the OUT RATE menu box.

7.2.5 OUTPUT RESOLUTION

Default Output Resolution is 24 bits. It may be easily altered to 16 or 20 bits by means of the OUT RES menu box

7.3 MPX OUTPUTS CONFIGURATION AND LEVELS



Double clicking the MPX SETUP block You will get access to the all controls common to both outputs:



7.3.1 OUTPUT SOURCE SELECTION

When **INP** (Input) is selected as output source, program audio completely bypasses the processing section and the analog audio XLR jacks provide the signal at the input, according to the equipment block diagram. The INP position defeats program audio pre-emphasis as well.

In the **PROC** position, this switch routes the input audio program signal through the whole processing circuitry. It is the **NORMAL OPERATING** position.

With **GEN** source selected, the analog output is fed by selectable tones (sinewave) as stated in the INTERNAL GENERATOR menu (see).

7.3.2 PILOT LEVEL AND PHASE

Pilot Level: The default is set to -20 dB compared to the overall Stereo Composite MPX signal. Use the +/- buttons to change this level within the range of -14 dB to -26 dB, in 0.1 dB steps. The pilot signal may also be disabled by using appropriate controls on the MPX OUTPUT blocks.

Pilot Phase may be adjusted from -12.0 to $+12.0$ degrees (Deg) in 1 degree steps. The Phase selection allows you to adjust the phase relationship between the 19kHz pilot and the 38kHz modulator. This can be used to correct for inconsistencies among different transmitters

7.3.3 SELECTABLE MPX ATTENUATION

The amount of Composite MPX signal sourced by the Falcon 50 internal processing may be reduced by 1 to 100% in selected steps in order to accommodate externally injected signals such as RDS and SCA while maintaining constant the overall MPX level at the processor output.

In particular, the Falcon 50 control allows for MPX reduction in two steps completely user-definable and associated to the activation of selectable Inputs on the General Purpose (GP) Input interface.

EXAMPLE

MPX ATTN	
In#1: Ext5	
Att1: 6%	
In#2: Ext3	
Att2: 9%	

Activating External Input 5 will cause the sourced Falcon 50 Composite signal to be reduced by 6 %.

Activating External Input 3 will cause the sourced Falcon 50 Composite signal to be reduced by 9 %.

Activating either External Input 5 or External Input 3 at the same time will cause the sourced Falcon 50 Composite signal to be reduced by 15 %.

NOTE: By choosing an attenuation factor of 100 %, the Falcon 50 processed composite signal will be totally removed from the output.

7.3.4 MPX POWER LIMITER CONTROL (ITU 412)

The ITU BS-412 regulation aims to reduce the density of the modulated signal while maintaining the same peak deviation level in order to ensure minimal or limited co-channel interference.

The BS-412 definition says:

"It is assumed that the maximum peak deviation of ± 75 kHz is not exceeded. Moreover, it is assumed that the power of the complete multiplex signal (including pilot-tone and additional signals) integrated over any interval of 60 seconds is not higher than the power of a multiplex signal containing a single sinusoidal tone which causes a peak deviation of ± 19 kHz."

In essence, the regulation installs a 12dB peak-to-average ratio on the processing.

It is possible to adjust the Falcon 50 Composite MPX outputs so that they will adhere to the BS-412 regulation.



WARNING!

The POWER LIMITER default setting is Off. Many European countries are enforcing ITU-R 412 recommendation. However, if your country's laws do not require the use of the MPX Power Limiter, make sure that the Power Control is set to off, or severe loss of loudness will result!

E.g, whif the ITU BS-412 Power Limiter set to on at 0.0dB, there are approximately 5 to 8 dB loudness loss over the limiter being switched off!

To enable the output power limiting, turn the Mpx Power Control to ON. Power threshold can be then increased from 0 to + 12 dB in steps by 0.1 dB.

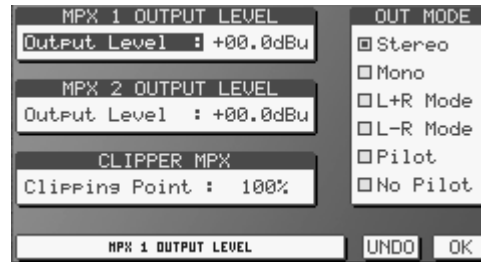
The output power calculation does take into account the injection values of the Pilot, external RDS signal and possible SCA signals.



The Falcon 50 FM presents several ITU-complaint presets, which have a density level fitting at the best the subsequent Power Limiter stage.

To get the best result whif the Power Limiter stage, use Presets marked as 'ITU'.

7.4 MPX OUTPUT LEVELS AND MODES



7.4.1 MPX 1 & MPX 2 OUTPUT LEVELS

Individual controls are provided for the two composite outputs. This will allow equipment requiring different output levels to be adjusted appropriately. Refer also to the § 7.3.3 for Attenuation controls.

7.4.2 CLIPPER MPX

Adjustable between 95 % and 105%, the Clipper stage operates within the pre-pilot signal region and is performed on the L+R and L-R signals before the pilot signal is inserted. This design guarantees that the clipper action is clipping just the dynamic composite signal and never the pilot signal.

The Clipper stage may be also turned to OFF from the same menu. When off, the Composite Clipper circuit is totally bypassed and removed from the system.

Whenever an 'aggressive' modulation (i.e. Density increment to the detriment of 'Definition') is desired, the Clipping Point should be set < 100 %, while whenever a 'protective' modulation is requested, the Clipping Point will be set > 100 %.

The Falcon 50 FM clipping stage is based on the principle of having a fixed clipping level and of expanding (so applying a positive Gain) to the Modulated signal to be clipped or of reducing (so applying a negative Gain) to the Modulated signal.

The applied Gain will be calculated according to the following formula:

Gain = 100 % - Clipping Point parameter value.

F.I., having set the Clipping point parameter to 97%, the Gain will be 100 % - 97% = 3%, thus yielding to a Density increment by 3 %. The Modulation level is kept at the 100 %.

On the contrary, setting the Clipping Point to f.i. 104%, the applied gain will be 100 % - 104% = - 4 %.

Without Clipper stage activated, the Modulation peaks will overpass by 2 or 3 KHz the 100 % limit.

It is highly suggested to set the Clipping Point to the default value of 100 %, thus avoiding any modulation distortion and preserving at the most the processed sound quality.

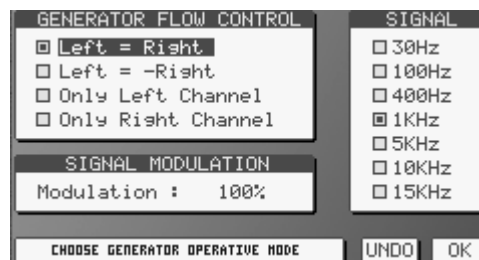
The Clipping Point range has been designed so that even setting it to 95 % the Pilot Protection factor exceeds 60 dB.

7.4.3 MPX OUTPUT MODES

MODE	DESCRIPTION	PURPOSE
STEREO	Normal operating mode	ON AIR
MONO	Will remove the L-R portion of the composite signal and simply output the sum of the Left and Right audio inputs. Pilot is automatically switched off.	ON AIR
L+R	Will output the Main part of the composite signal only plus the Pilot	TEST
L-R	Will output the Sub part of the composite signal only plus the Pilot	TEST
PILOT	Will output the Pilot tone only	TEST
NO PILOT	Will output the whole spectrum (Main and Sub parts) with the exception of the Pilot	TEST

8 THE INTERNAL GENERATOR

The Internal Generator configuration page is accessible from the Analog Output, Digital Output and MPX Setup pages.



The top right part of the tone generator display is the current tone frequency that is being synthesized. They are placed either upper or below the pre-emphasis threshold.

Tone levels are programmable between 0 and 120% of total modulation. Output configuration may be chosen in such a way to suppress Main or Sub part of Composite outputs for convenient measurements or transmitter alignment and set-up.