Falcon 15

FM & ST

Broadcast Digital Audio Processor

Operating manual

Rel. 1.8

Sede BOLOGNA: Via Caduti Di Sabbiuno 6/F –
40011 Anzola Emilia - Bologna - Italy
Tel. +39 051 736555 - Fax. +39 051 736170

Sede BERGAMO: Via Italia 1 –
24030 Medolago (Bg) – Italy

e-mail: info@axeltechnology.com - **web site:** www.axeltechnology.com

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2 INTRODUCTION

Thanks to its long experience in the DSP audio field, Axel Technology is proud to present Falcon 15, a 3 band audio digital processor for FM radio broadcasting.

Falcon 15 offers the proven competitive advantages of all-digital processing: operation versatility, instantaneous preset recall, Pc control, upgrade capability, consistent high quality, easy installation / configuration…

Typical applications for the Falcon 15 are small and medium radio stations, radio relay stations and advertising splitting systems.

Falcon 15 comes with an user-friendly and reliable Pc control software which allows easy operations and a constant monitoring of all processing and modulation parameters.

Falcon 15 has been refined over a period of years by an experienced team of technicians, psycho-acoustic experts and designers specializing in the development of professional audio equipment based on DSP technology

The Falcon 15 processing stage provides for analog stereo audio inputs (a digital input is available as an option). You can choose between two Falcon 15 models, featuring two different Output types: analog stereo or composite MPX (i.e. suitable for a direct transmitter connection or a STL radio link).

Falcon 15 processing is based on 3 compressors related to Bass, Mid and High audio bands. The wide range of preset curves and the sophisticated AGC stage allows all users (even unskilled) to achieve astonishing results for density, richness and colour of the sound… An unique 'signature' for Yr radio sound !

Main Features

The **digital MPX stereo coder** (built-in) makes adjustements easy. The Falcon 15's performance is enhanced by the addition of the Stereo Coder which ensures the best ratio between signal density and modulation level.
Together with the automatic composite clipper (always included), Falcon 15 MPX Stereo Coder ensures a modulation quality much better than that presented by external coders.

The **Digital audio input** (optional) supports a wide range of numerical formats (including AES3/EBU and S/PDIF) with several sample rates. Thanks to its automatic recognition of the injected signal and connection type (optic or coaxial), the Falcon 15 digital input doesn't require any specific configuration.

The **Digital RDS & RBDS coder** (optional) provides the services PS, PI, PTY, M/S, AF, RT, DI, TP, TA. Program service Name (PS) may be broadcast in a sequential mode (up to 8 different words) and with scrolling effect. RDS programming is achieved through the Pc software which comes with the unit.

The **Analog Audio Output** provides bi-channel (stereo) audio output electronically balanced on XLR male. It provides the L and R processed audio signals on which it is possible to enable/disable pre-emphasis. The level is set via menu.

The Falcon 15 processor comes with **Windows software** specifically designed for remote monitoring and control of all the processor sections (from the generation of the MPX signal to the level of AGC), as well as message editing and enabling RDS services.

2.1 FALCON 15 - AVAILABLE VERSIONS

Falcon 15 ST	featuring processed **stereo (bichannel) output** only (i.e. separated Left and Right channels). No stereo coder built-in
Falcon 15 FM	featuring built-in **stereo Coder and (optional) RDS** / **RBDS coder**. No stereo (bichannel) audio outputs available.

OPTIONAL FEATURES	**DESCRIPTION**
Falcon 15 P DG-IN	Digital audio input (optical and coaxial)
Falcon 15 P Split	Audio splitting control system (for **FM version** only)
Falcon 15 P RDS	Digital RDS / RBDS coder (for **FM version** only)

NOTE: the present manual describes Falcon 15 in its MPX (FM version) and STEREO OUT (ST version) configuration. Depending on the chosen configuration and on the chosen options, Yr actual equipment might not provide some of the here-below described features or controls.

3 SAFETY WARNINGS / ISTRUZIONI PER LA SICUREZZA

SAFETY WARNINGS

CONSIGNES DE SÉCURITÉ IMPORTANTES

ISTRUZIONI IMPORTANTI PER LA SICUREZZA

WICHTIGE SICHERHEITSHINWEISE

INSTRUCCIONES IMPORTANTES DE SEGURIDAD

(Rel. 1.1)

3.1 FOREWORD

For your own safety and to avoid invalidation of the warranty all text marked with these Warning Symbols should be read carefully.

Information in this manual is subject to change without notice and does not represent a commitment on the part of the vendor.

The manufacturer shall not be liable for any loss or damage whatsoever arising from the use of information or any error contained in this manual, or through any mis-operation or fault in hardware contained in the product.

It is recommended that all maintenance and service on the product should be carried out by the manufacturer or its authorised agents. The manufacturer cannot accept any liability whatsoever for any loss or damage caused by service, maintenance or repair by unauthorised personnel.

4 SAFETY WARNINGS

The installation and servicing instructions in this manual are for use by qualified personnel only.

- **Read All Instructions.** All safety and operating instructions must be read before operating the product. They also must be retained for future reference, as it contains a number of useful hints for determining the best combination of equipment settings for Yr particular application.
- **Heed All Warnings**. All warnings on the product and those listed in the operating instructions must be adhered to.
- **Heat**. This product must be situated away from any heat sources such as radiators or other products (including power amplifiers or transmitters) that produce heat.
- **Power Sources.** This product must be operated from the type of power source indicated on the marking label and in the installation instructions. If you are not sure of the type of power supplied to your facility, consult your local power company. Make sure the AC main voltage corresponds to that indicated in the technical specifications. If a different voltage (ex. 110/115 VAC) is available, open the equipment closure and set the voltage switch on the main supply circuit, located behind the AC socket
- **Power Cord Protection.** Power supply cords must be routed so that they are not likely to be walked on nor pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord plugs into the product
- **Use only with a cart,** stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- **Lightning**. For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the AC wall outlet and the audio connections. This will prevent damage to the product due to lightning and power line surges
- **Installation**. Configuration and installation should only be carried out by a competent installation engineer
- **Cabling**. Using high quality wires, well protected. Make sure the cable integrity.

	**This symbol alerts you to the presence of dangerous voltage inside the closure – voltage which may be sufficient to constitute a risk of shock. Do not perform any servicing other than that contained in the operating instructions. Refer all servicing to qualified personnel**

	**The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance**.

	**Do not change the voltage setting or replace the mains fuse without first turning the unit off and unplugging the mains cord.**

	**Make sure the AC main voltage corresponds to that indicated in the technical specifications.** **THIS APPARATUS MUST BE EARTHED !**

	**To avoid risk of fire use the correct value fuse, as indicated on the label stuck on the right side of the unit.**

	**This apparatus uses a single pole mains switch and does therefore not separate the unit completely from the mains power. To completely separate from mains power (f.i. in the event of danger) unplug mains power cord. As the MAINS plug is the disconnect device, the disconnect device shall remain readily operable.**

5 CONSIGNES DE SÉCURITÉ IMPORTANTES

- **Lire ces consignes**
- **Conserver ces consignes**
- **Observer tous les avertissements**
- **Suivre toutes les consignes**
- **Ne pas utiliser cet appareil à proximité de l'eau**
- **Ne pas obstruer les ouvertures de ventilatio**n. Installer en respectant les consignes du fabricant
- **Ne pas installer à proximité d'une source de chaleur** telle qu'un radiateur, une bouche de chaleur, un poêle ou d'autres appareils (dont les amplificateurs) produisant de la chaleur.
- **Ne pas annuler la sécurité de la fiche de terre**, la troisième branche est destinée à la sécurité. Si la fiche fournie ne s'adapte pas à la prise électrique, demander à un électricien de remplacer la prise hors normes.
- **Protéger le cordon d'alimentation** afin que personne ne marche dessus et que rien ne le pince, en particulier aux fiches, aux prises de courant et au point de sortie de l'appareil
- **Utiliser uniquement les accessoires spécifiés par le fabricant**
- **Utiliser uniquement avec un chariot**, un support ou une table spécifié par le fabricant ou vendu avec l'appareil. Si un chariot est utilisé, déplacer l'ensemble chariot–appareil avec précaution afin de ne pas le renverser, ce qui pourrait entraîner des blessures
- **Débrancher l'appareil** pendant les orages ou quand il ne sera pas utilisé pendant longtemps.
- **Confier toute réparation à du personnel qualifié.** Des réparations sont nécessaires si l'appareil est endommagé d'une façon quelconque, par exemple: cordon ou prise d'alimentation endommagé, liquide renversé ou objet tombé à l'intérieur de l'appareil, exposition de l'appareil à la pluie ou à l'humidité, appareil qui ne marche pas normalement ou que l'on a fait tomber.
- **NE PAS exposer cet appareil aux égouttures et aux éclaboussements**. Ne pas poser des objets contenant de l'eau, comme des vases, sur l'appareil

	**Ce symbole indique la présence d'une tension dangereuse dans l'appareil constituant un risque de choc électrique.**

	**Ce symbole indique que la documentation fournie avec l'appareil contient des instructions d'utilisation et d'entretien importantes.**

	**Avant de modifier le commutateur de changement de tension ou replacer le fusible il faut débrancher l'appareil de la prise électrique. Pendant son usage, l'appareil doit etre branchee à la prise de terre**

	**Utiliser le fusible principal AC avec le valeur qui est indiquée sur l'étiquette collée sur le coffret.**

	**Assurez-vous que la tension principale AC correspond à celle indiquée dans les spécifications techniques.**

	**L'interrupteur d'alimentation interrompt un pôle du réseau d'alimentation excepté le conducteur de terre de protection. En cas de danger, debrancher le cordon d'alimentation. Parce que la prise du réseau de alimentation est utilisée comme dispositif de déconnexion, ce dispositif doit demeuré aisément accessible.**

6 ISTRUZIONI IMPORTANTI PER LA SICUREZZA

- **Leggere le presenti istruzioni**
- **Conservare queste istruzioni**
- **Osservare tutte le avvertenze**
- **Seguire scrupolosamente tutte le istruzioni**
- **Non usare questo apparecchio in prossimità di acqua**
- **Non ostruire alcuna apertura per il raffreddamento**. Installare l'apparecchio seguendo le istruzioni
- **Non installare l'apparecchio accanto a fonti di calore** quali radiatori, aperture per l'afflusso di aria calda, forni o altri apparecchi (amplificatori inclusi) che generino calore
- **Non rimuovere il terminale di connessione a terra sul cordone di alimentazione**: esso ha lo scopo di tutelare l'incolumità dell'utilizzatore. Se la spina in dotazione non si adatta alla presa di corrente, rivolgersi ad un elettricista per far eseguire le modifiche necessarie.
- **Evitare di calpestare il cavo di alimentazione o di comprimerlo**, specialmente in corrispondenza della spina e del punto di inserzione sull'apparato.
- **Utilizzare solo dispositivi di collegamento e gli accessori specificati dal produttore.**
- **Utilizzare l'apparecchio** solo con un carrello, un sostegno, una staffa o un tavolo di tipo specificato dal produttore o venduto insieme all'apparecchio. Se si utilizza un carrello, fare attenzione negli spostamenti per evitare infortuni causati da ribaltamenti del carrello stesso.
- **Scollegare l'apparecchio dalla presa di corrente** durante i temporali o quando inutilizzato a lungo
- **Per qualsiasi intervento**, rivolgersi a personale di assistenza qualificato. È' necessario intervenire sull'apparecchio ogniqualvolta si verificano danneggiamenti di qualsiasi natura. Ad esempio, la spina o il cavo di alimentazione sono danneggiati, è entrato liquido nell'apparecchio o sono caduti oggetti su di esso, l'apparecchio è stato esposto alla pioggia o all'umidità, non funziona normalmente o è caduto.
- **Non esporre a sgocciolamenti o spruzzi**. Non appoggiare sull'apparecchio oggetti pieni di liquidi, ad esempio vasi da fiori.

	***Questo simbolo indica la presenza di alta tensione all'interno dell'apparecchio, che comporta rischi di scossa elettrica.***

	***Questo simbolo indica la presenza di istruzioni importanti per l'uso e la manutenzione nella documentazione in dotazione all'apparecchio.***

	**Non sostituire il fusibile o cambiare la tensione di alimentazione senza aver prima scollegato il cordone di alimentazione. L'APPARATO DEVE ESSERE CONNESSO A TERRA.**

	**Sostituire il fusibile generale con uno di identico valore, come indicato sulla etichetta applicata sul mobile dell'apparato.**

	**Assicurarsi che la tensione di rete corrisponda a quella per la quale è configurato l'apparecchio.**

	**Questo apparato utilizza un interruttore di alimentazione di tipo unipolare e l'isolamento dalla rete elettrica non è pertanto completo. Per ottenere un isolamento totale, scollegare il cordone di alimentazione. Inoltre, poichè la spina di alimentazione è utilizzata come dispositivo di sezionamento, essa deve restare facilmente raggiungibile.**

7 WICHTIGE SICHERHEITSHINWEISE

- **Diese Hinweise LESEN**
- **Diese Hinweise AUFHEBEN**
- **Alle Warnhinweise BEACHTEN**
- **Alle Anweisungen BEFOLGEN**
- **Dieses Gerät NICHT in der Nähe von Wasser verwenden**
- **KEINE Lüftungsöffnungen verdecken**. Gemäß den Anweisungen des Herstellers einbauen
- **Nicht in der Nähe von Wärmequellen**, wie Heizkörpern, Raumheizungen, Herden oder anderen Geräten (einschließlich Verstärkern) installieren, die Wärme erzeugen
- **Die Schutzfunktion des Schukosteckers NICHT umgehen**. Bei Steckern für die USA gibt es polarisierte Stecker, bei denen ein Leiter breiter als der andere ist; US-Stecker mit Erdung verfügen über einen dritten Schutzleiter. Bei diesen Steckerausführungen dient der breitere Leiter bzw. der Schutzleiter Ihrer Sicherheit. Wenn der mitgelieferte Stecker nicht in die Steckdose passt, einen Elektriker mit dem Austauschen der veralteten Steckdose beauftragen
- **VERHINDERN, dass das Netzkabel gequetscht oder darauf getreten wird**, insbesondere im Bereich der Stecker, Netzsteckdosen und an der Austrittsstelle vom Gerät
- N**UR das vom Hersteller angegebene Zubehör** und entsprechende Zusatzgeräte verwenden.
- **NUR in Verbindung** mit einem vom Hersteller angegebenen oder mit dem Gerät verkauften Transportwagen, Stand, Stativ, Träger oder Tisch verwenden. Wenn ein Transportwagen verwendet wird, beim Verschieben der Transportwagen-Geräte- Einheit vorsichtig vorgehen, um Verletzungen durch Umkippen
- **Das Netzkabel dieses Geräts** während Gewittern oder bei längeren Stillstandszeiten aus der Steckdose ABZIEHEN.
- **Alle Reparatur- und Wartungsarbeiten** von qualifiziertem Kundendienstpersonal DURCHFÜHREN LASSEN. Kundendienst ist erforderlich, wenn das Gerät auf irgendwelche Weise beschädigt wurde, z.B. wenn das Netzkabel oder der Netzstecker beschädigt wurden, wenn Flüssigkeiten in das Gerät verschüttet wurden oder Fremdkörper hineinfielen, wenn das Gerät Regen oder Feuchtigkeit ausgesetzt war, nicht normal funktioniert oder fallen gelassen wurde.
- **Dieses Gerät vor Tropf- und Spritzwasser SCHÜTZEN**. KEINE mit Wasser gefüllten Gegenstände wie zum Beispiel Vasen auf das Gerät STELLEN.

	***Dieses Symbol zeigt an, dass gefährliche Spannungswerte, die ein Stromschlagrisiko darstellen, innerhalb dieses Geräts auftreten.***

	**Dieses Symbol zeigt an, dass das diesem Gerät beiliegende Handbuch wichtige Betriebs- und Wartungsanweisungen enthält.**

	**Vor Änderung der Netzspannung oder Sicherungswechsel Netzkabel trennen.** **Das Gerät muss für den Betrieb geerdet werden.**

	**Hauptsicherung nur mit einer gleichwertigen austauschen (s. entsprechende Etikette).**

	**Vor Einschalten Netzspannungseinstellung am Gerät überprüfen bzw. anpassen.**

	**Inpoliger Netzschalter. In Notfälle oder für Wartungsarbeiten Netzkabel trennen. Der Netzstecker fungiert auch als Trennelement muss deshalb zugänglich bleiben**

8 INSTRUCCIONES IMPORTANTES DE SEGURIDAD

- **LEA estas instrucciones**
- **CONSERVE estas instrucciones**
- **PRESTE ATENCION a todas las advertencias.**
- **SIGA todas las instrucciones**
- **NO utilice este aparato cerca del agua**
- **NO obstruya ninguna de las aberturas de ventilación.** Instálese según lo indicado en las instrucciones del fabricante
- **No instale el aparato cerca de fuentes de calor** tales como radiadores, registros de calefacción, estufas u otros aparatos (incluyendo amplificadores) que produzcan calor
- **NO anule la función de seguridad del enchufe polarizado** o con clavija de puesta a tierra. Un enchufe polarizado tiene dos patas, una más ancha que la otra. Un enchufe con puesta a tierra tiene dos patas y una tercera clavija con puesta a tierra. La pata más ancha o la tercera clavija se proporciona para su seguridad. Si el toma corriente no es del tipo apropiado para el enchufe, consulte a un electricista para que sustituya el toma corriente de estilo anticuado
- **PROTEJA el cable eléctrico** para evitar que personas lo pisen o estrujen, particularmente en sus enchufes, en los toma corrientes y en el punto en el cual sale del aparato
- **UTILICE únicamente los accesorios especificados por el fabricante**
- **UTILICESE únicamente** con un carro, pedestal o mesa del tipo especificado por el fabricante o vendido con el aparato. Si se usa un carro, el mismo debe moverse con sumo cuidado para evitar que se vuelque con el aparato
- **DESENCHUFE el aparato** durante las tormentas eléctricas, o si no va a ser utilizado por un lapso prolongado.
- **TODA reparación** debe ser llevada a cabo por técnicos calificados. El aparato requiere reparación si ha sufrido cualquier tipo de daño, incluyendo los daños al cordón o enchufe eléctrico, si se derrama líquido sobre el aparato o si caen objetos en su interior, si ha sido expuesto a la lluvia o la humedad, si no funciona de modo normal, o si se ha caído.
- **NO exponga** este aparato a chorros o salpicaduras de líquidos. NO coloque objetos llenos con líquido, tales como floreros, sobre el aparato .

	**Este símbolo indica que la unidad contiene niveles de voltaje peligrosos que representan un riesgo de choques eléctricos.**
	**Este símbolo indica que la literatura que acompaña a esta unidad contiene instrucciones importantes de funcionamiento y mantenimiento.**
	**Antes de cambiar la alimentacion de voltaje o de cambiar el fusible, desconecte el cable de alimentacion. Para reducir el riesgo de descargas, esta unidad debe ser conectada a tierra.**
	**Remplaze el fusible con lo mismo, que corresponde a lo indicado en el panel del equipo.**
	**Antes de encender, controlar que la linea de alimentacion de voltaje corresponda a la indicada.**
	**El interruptor de alimentación es unipolar. En el caso de peligro, desconecte el cable de alimentación. Porque la clavija de conexion a red sirve por la desconection de la unidad, la clavija debe ser ubicada en proximidad de la unidad.**

9 FIRST INSTALLATION RECOMMENDATIONS

9.1 POWER SUPPLY CABLE

A power supply cable of approx. 2 mt length is supplied with the device, which has a moulded IEC plug attached – this is a legal requirement.
The type of plug for the power supply depends on the country in which it is delivered.

If for any reason, you need to use this appliance with a different plug, you should use the following wiring guidelines in replacing the exsisting plug with the new one:

Earth	Green, or green and yellow
Neutral (N)	Blue
Live (L)	Brown

Supply cables should be laid in such a manner that one does not step or walk on them. They should not be squashed by any objects.

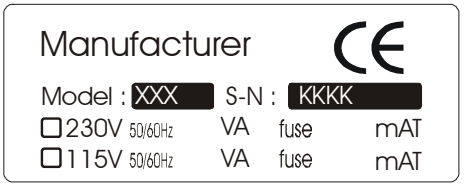
THIS EQUIPMENT MUST BE EARTHED.

The chassis is always connected to mains earth to ensure your safety: check your mains wiring and earthing before switching on.

9.2 AC MAINS VOLTAGE SETTING (230 V / 115 V)

BE SURE THAT THE UNIT IS SET TO THE CORRECT MAINS/LINE VOLTAGE FOR YOUR COUNTRY BEFORE PLUGGING IT INTO THE WALL OUTLET !

The actual Mains voltage is indicated on the label stuck on the equipment closure. Should the type of power at the operation location not be known, please contact your dealer or electricity company.



If, for some reason, the unit is to be operated at a mains input voltage which is different to that as supplied, you need to open the top cover and set properly the **voltage change-over switch** which is located inside, close to the transformer. You also need to replace the AC main fuse, according to information provided on the external label or on the Technical Specifications table at the end of this user manual.

CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, ALWAYS DISCONNECT THE AC MAINS CABLE BEFORE ALTERING THE CHANGE-OVER SWITCH. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

9.3 FUSE REPLACEMENT

The power supply socket has an integral fuse drawer containing the AC power fuse and a spare, both of the same value.

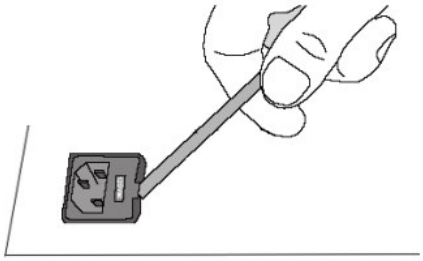
BEFORE REPLACING THE POWER FUSE, MAKE SURE YOU HAVE THE RIGHT TYPE OF FUSE FOR THE VOLTAGE TO BE PROTECTED.
USING WRONG FUSE TYPE WILL RESULT IN INSUFFICIENT PROTECTION.

Make sure that the power is switched off and the power cable is disconnected from the equipment.

Open the fuse drawer using a small blade screwdriver.

Replace the fuse located at the inner position

Push the fuse socket back into the original position



Perform the set-up under static control conditions. Static charges are likely to completely destroy one or more of the CMOS semiconductors employed in the unit. Static damage will not be covered under warranty.
Basic damage prevention consists of minimizing generation, discharging any accumulated static charge on your body and preventing that discharge from being sent to or through any electronic component.

Uninsulated dangerous voltage are inside the enclosure, voltage that may be sufficient to constitute a risk of shock.
Always disconnect to AC Mains before removing the top cover

9.4 PROTECTION AGAINST LIGHTNING

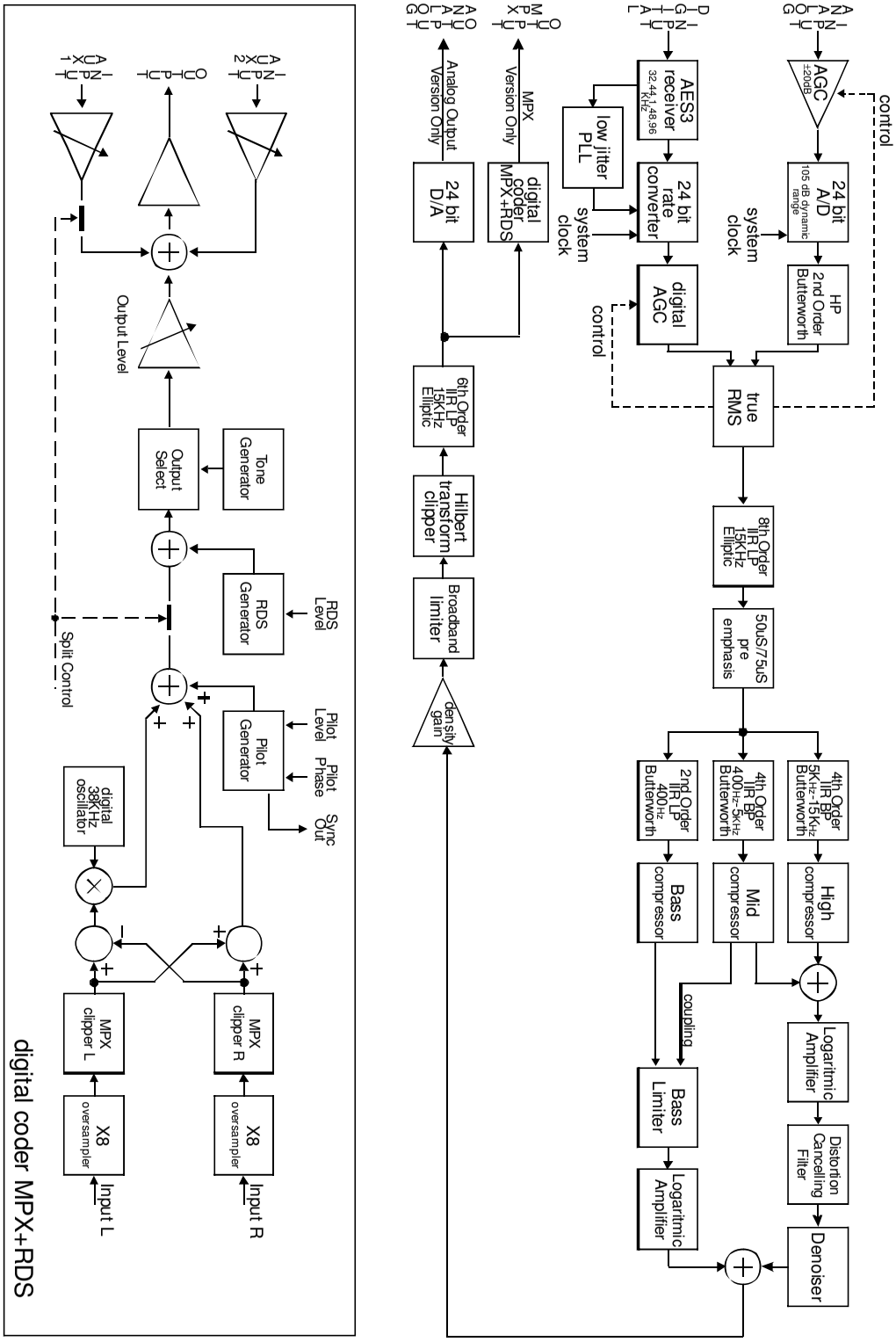
Should the device be put out of action due to being struck by lightning or excess voltage, disconnect it from the power supply without delay. Do not reconnect until the device has been checked. If in doubt contact the technical support service.

Make sure there is suitable lightning protection to protect the device.
Alternatively you should disconnect all connectors from the device during a storm or when the device is going to be unsupervised or not used for a longer period of time.
These measures will protect against damage by lightning or excess voltage.

9.5 VENTILATION

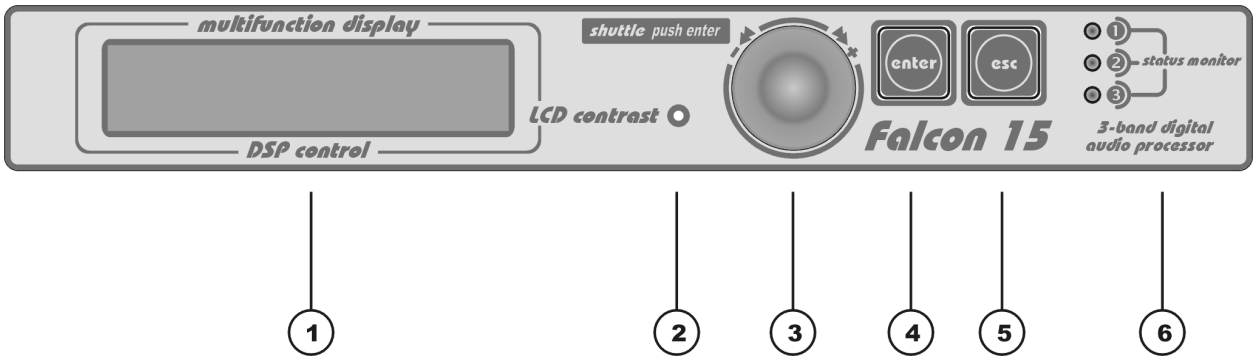
The equipment will operate as a free-standing unit without requiring any special cooling arrangement.
However, slots and openings in the product are provided for ventilation. They ensure reliable operation of the product, keeping it from overheating. These openings must not be blocked nor covered during operation.
YOU MUST LEAVE AT A MINIMUM ONE RACK UNIT OF EMPTY SPACE ABOVE THE EQUIPMENT TO ENHANCE VENTILATION AND TO GET A LONGER EQUIPMENT LIFE.

10 BLOCK DIAGRAM (FM & ST VERSIONS)



11 FM VERSION DESCRIPTION

11.1 FRONT PANEL VIEW



1 **Multifunction display (LCD)** multifunction display showing the equipment operating conditions

2 **LCD contrast:** trimmer to adjust the display contrast. Please use a small screwdriver

3 **Jog-wheel**: for menu scrolling and parameter settings. It can also be pressed, having the same control function as the Enter key

4 **ENTER:** key to access to the parameters submenu and to select the new values

5 **Esc:** key to Esc the current menu and go back to the previous one. By pressing this key the modifications realised by accident on the selected parameter are not executed

6 **LEDS**: they show external inputs status (related to M/S and TA RDS status and to Split Enabling):

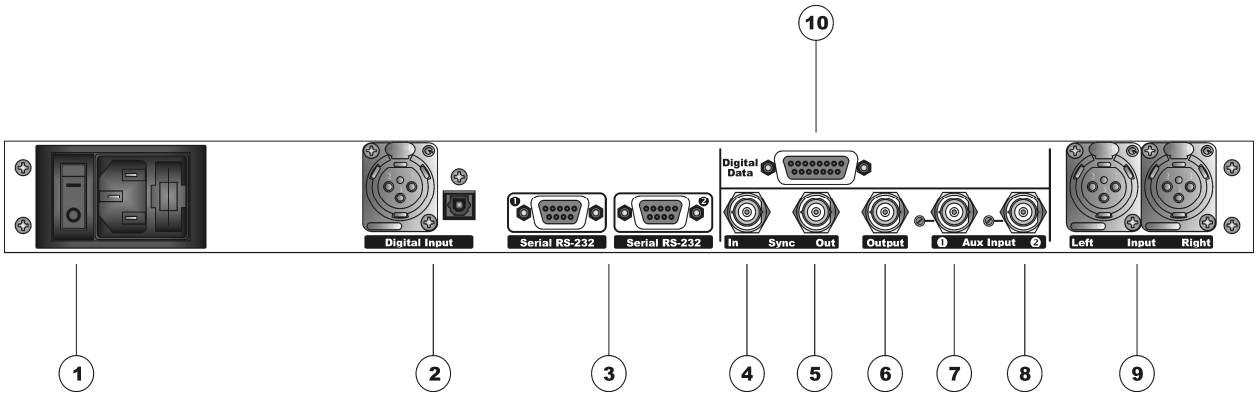
The three LEDs on the front panel light as the following:

LED 1 This LED lights up while Input 1 on Digital Data Port is ‘active’ - Split Mode enabled (please refer to Section 12.5)

LED 2 This LED lights up while Input 2 on Digital data is ‘active’. Input 2 is related to M/S RDS switch (please refer to par. 18.5)

LED 3 This LED lights up while Input 3 on Digital data is ‘active’. Input 3 is related to TA RDS switch (please refer to par. 18.5)

11.2 REAR PANEL VIEW (FM VERSION)



1 **ON/OFF main switch**, the led inside switchs on/off accordingly. If it is off while the switch is ON, please check the supplied AC cord and the fuse.
AC outlet: IEC power cord receptacle. AC voltage change-over switch is located inside the box, closed to the AC transformer

2 **Digital input***. It features two connectors: XLR female for coaxial connections and tos-link for optical connections

3 **RS232 Serial Ports**: optoisolated serial ports for connection to PCs or satellite receivers.

4 **Sync-in** (not connected)

5 **Sync-out**: Synchronism output. It provides 19KHz tone at 5Vpp to lock external equipment (for instance RDS coders)

6 **Out** It features Stereo Composite signal or Stereo Composite signal +RDS (with or without signals injected from Aux 1 and 2 mixed into). The output is set for a 75 Ohm load

7 **Multipurpose Aux In (for external RDS, SCA, etc..)**: the injected signal is adjusted by the related trimmer (near to the Bnc), mixed to the Falcon 15 internally generated signal and output by the main Out connector. Factory preset: 0 dB gain

8 **Multipurpose Aux In (for external RDS, SCA, etc..)**: the injected signal is adjusted by the related trimmer (near to the Bnc), mixed to the Falcon 15 internally generated signal and output by the main Out connector. Factory preset: 0 dB gain

9 **Analog Input**: bi-channel audio input electronically balanced on XLR female. The input level is set via the menu

10 **Digital Data Port**: SubD 15-pin female Interface. It provides 3 optoinsulated “trigger” inputs (for RDS M/S and TA service enabling and for splitting mode control)

* available as an option (DG-IN option – ref to Chapter 2)

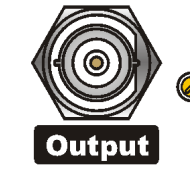
11.3 AC CONNECTION

The Falcon 15 uses a power entry module with AC switch just closed to the IEC power cord receptacle. It can operate on 110 or 240 VAC, 50/60 Hz AC mains voltages. If the unit is to be used with a mains voltage different to that for which the unit is supplied, set the voltage change-over switch, which is placed inside the box, closed to the AC transformer.

The power supply socket has an integral fuse drawer containing the AC power fuse and a spare, both of the same value.

- for 220/230 V AC the fuse is rated at 500 mA T
- for 110/115 V AC tension the fuse is rated at 1 A T

11.4 OUTPUT CONNECTOR

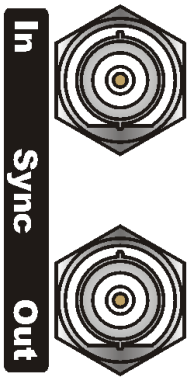


Depending on the version, Output BNC connector (50 Ohm impedance) features Stereo Composite Signal (MPX) and/or RDS signal (with or without signals injected from Aux 1 and 2 mixed into).

You can adjust the overall output level through the menu (*MPX Level* control in the MPX MODULE SETUP page) in the – 9 dBm to +15dBm range. Factory preset: 0 dBm (2.2 Vpp).

Output connector can provide a reference tone consisting of a 500 Hz / 0 dBm sinusoidal signal. This tone corresponds to the maximum frequency deviation. To enable it, see par. 12.3.3 .

11.5 SYNC-IN AND SYNC-OUT CONNECTORS



Sync In:

It is **disconnected** (not used)

Sync Out

This TTL-level (5Vpp) 19 kHz square wave output can be used as the reference signal for any SCA generator that operates at 57 kHz or other multiple of the 19 kHz pilot frequency. Using the 19 kHz clock from the Falcon 15 makes it much easier to phase lock the external signal to the pilot frequency. This is extremely helpful in order to remove intermodulation components. For RDS coders, this feature is also very useful.
The Sync Output is disabled by default (see par. Output Sync menu 12.3.5 for enabling).

11.6 AUXILIARY INPUTS

The Aux inputs allow the Mpx, SCA, RDS injection from external coders. The resultant signal (f.i. external RDS+ self-generated MPX) is available on the **Output** connector.

Remarks:

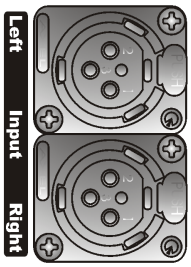
When using an external RDS encoder, the internal RDS one must be disabled.

The level of the injected signal may be adjusted by means of the trimmer next to the corresponding BNC connector (no software control is provided for this purpose). This trimmer is factory preset for a gain of 0 dB.

Suggested RDS injection level is -31.5 dBm (≈ 60mVpp / 2.0 kHz deviation) in relation to an MPX output of 0 dBm (2.2 Vpp, 0.776 Vrms).

AUX Input impedance is 10 KOhm.

11.7 ANALOG AUDIO INPUT (Female XLR)

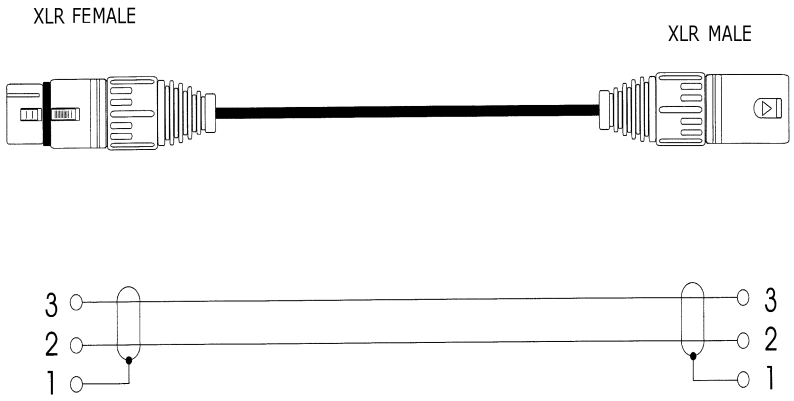


Balanced XLR-type connectors are used for input analog audio.
The stereo analog inputs are designed for standard 0 dBu balanced signals. Input level setting (Sensibility) is done using the software parameter settings (see par. 12.1).

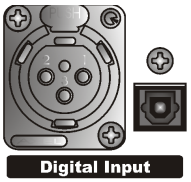
XLR pinout:

Pin 1	Gnd
Pin 2	Signal
Pin 3	Return

In case of unbalanced connections, please connect the cold pole (Pin 3) to the ground (Pin 1).
Factory preset input impedance is 10 kOhm. This impedance may also be set to 600Ohm by moving the two internal jumpers on the INPUT board (see Chapter 19 - hardware settings).



11.8 DIGITAL AUDIO INPUT



Transformer balanced XLR-type and optic connectors are used to input AES-3, S/PDIF, IEC60958, EIAJCP1201 digital audio.

To avoid malfunctions, only one digital connector may be connected at a time. Please keep the tos-link connector covered while not used.

The digital input accepts any sampling rate between 32 and 96 kHz. No user adjustment is necessary since a sample rate converter is built into the unit. Furthermore, digital input automatically recognizes the digital format (AES, EBU, SPDIF, etc.) and the type of connection (optic or coaxial).

Even though both analog and digital input audio cables can be connected, only one input can be set active (analog/digital input selection is done through the software parameter setting - par. 12.1). Input gain and level setting for digital input is fixed.

XLR pinout:		
	Pin 1	Gnd
	Pin 2	Signal
	Pin 3	Return

In case of unbalanced connections (as required by S/PDIF format), shortcut pin 3 and 1 or connect the unbalanced signal to XLR Pin 2 (hot) and Pin 3 (Gnd).

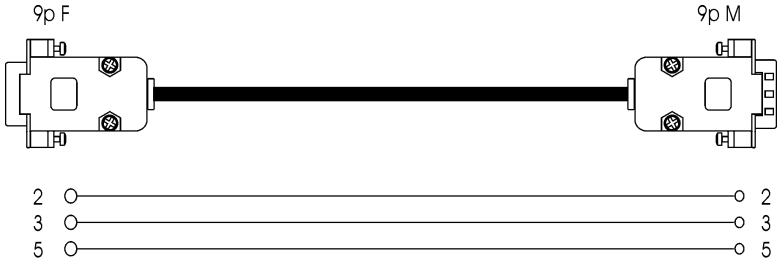
11.9 SERIAL PORTS

Falcon 15 features two optoinsulated RS232 serial ports which allow the remote control and RDS programming via a connected PC (ref to Chapter 16).

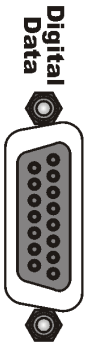
Connect a standard serial cable (not crossed) between the RS-232 connector and a serial port connector on the computer. Cable length must not exceed 10 mt.

The ports can be separately enabled / disabled via the menu (see par. 12.6.1).

The two serial ports support Tx and Rx signals only. One serial cable comes with the unit.



11.10 DIGITAL DATA PORT



15-pin female Interface connector provides 3 optoinsulated “trigger” inputs.

These inputs can be used to dynamically alter two RDS flags (TA and M/S) and to enable Split operating mode in response to logic signal transitions.

INPUT 1 is used to carry external network ‘**split’** command (ref to Section 13).

INPUT 2 is used to dynamically alter **M/S** RDS flag. Input enabling will cause LED 2 on Front Panel to light.

INPUT 3 is used to dynamically alter **TA** RDS flag. Input enabling enabling will cause LED 3 on Front Panel to light.

The following table displays internal connection of Digital Port and how to provide (f.i.) an external TTL command to Input # 1.

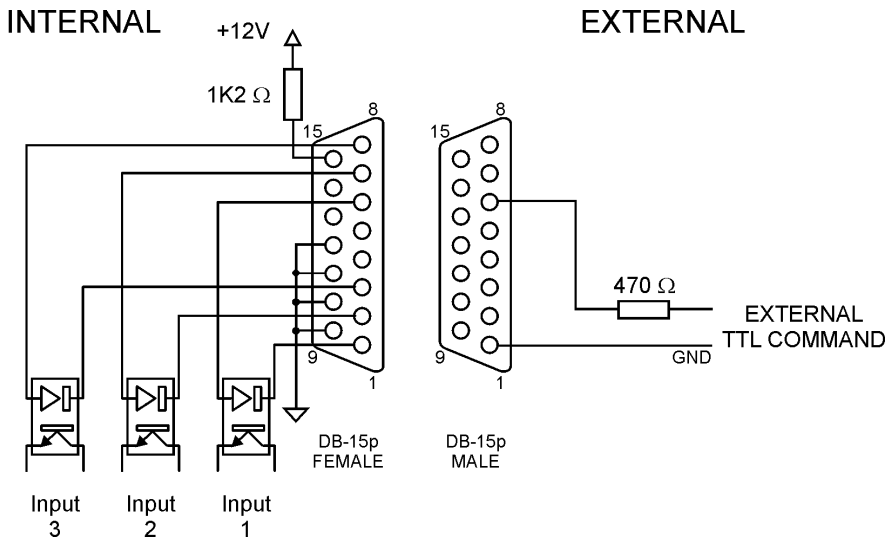
PIN	DESCRIPTION	DIRECTION
1	Cathode of photocoupler **input 1 (split)**	IN
2	Cathode of photocoupler **input 2 (M/S)**	IN
3	Cathode of photocoupler **input 3 (TA)**	IN
6	Anode of photocoupler **input 1 (split)**	IN
7	Anode of photocoupler **input 2 (M/S)**	IN
8	Anode of photocoupler **input 3 (TA)**	IN

PIN	DESCRIPTION	DIRECTION
9	GND	/
10	GND	/
11	GND	/
12	GND	/
15	+ Vcc	OUT

Pins 9, 10, 11, 12 are linked together and provide an insulated GND connection.

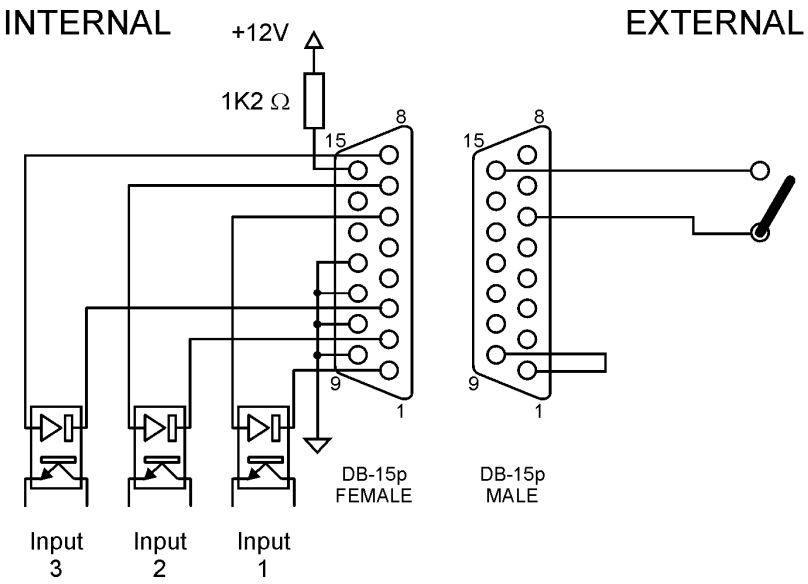
A current-limited + Vdc source is available on pin 15 (+ 12 V via a 1K2 resistor).

EXAMPLE N° 1 – *controlling the SPLIT function from a TTL command*



Apply an external TTL signal through a 470 Ohm carbon resistor to the photodiode 1 (pins 6 and 1). Max current allowed: 10 mA. Nominal: 5 mA

EXAMPLE N° 2 – *controlling the SPLIT function from a clean contact*



shortcut pin 9 and 1 and shortcut pin 15 and pin 6 via an external switch.

11.11 THE MENU TREE

The menu tree for the **Falcon 15 MPX Version** is shown on here below. It has all of the possible main menu items listed along the left side.
The branching sub-menus and parameters are connected in the order they are encountered in the menu system.

The diagram here below displays the complete Falcon 15 menu – please refer to the table on Cap. 2 for Optional feature list.

|-- MAIN PAGE *(Preset, Agc level, Compressor levels, Input Meters)*

|--	Input Setup	--	|-- Sensibilty	--	- 12 dBm to+ 12 dBm (1 dB step)
			|-- AGC Speed	--	0 to 6 dB/sec (0.2 dB step)
			|-- AGC Mode	--	Hold=0 sec & MaxG= 08 dB;
				--	Hold=1 sec & MaxG= 10 dB;
				--	Hold=0 sec & MaxG= 12 dB;
				--	Hold=2 sec & MaxG= 12 dB;
				--	Hold=3 sec & MaxG= 15 dB;
				--	Hold=3 sec & MaxG= 20 dB;
				--	Hold=0 sec & MaxG= 15 dB;
				--	Hold=0 sec & MaxG= 20 dB;
			|-- Input Source	--	Analogic / Digital input
|--	Mpx Module Setup	--	|-- Pilot Level	--	Off / - 25 dB to – 15.5 dB (0.1 dB step)
			|-- Pilot Phase	--	- 12 Deg to + 12 Deg (1 Deg step)
			|-- Preemphasis	--	50 uSec / 75 uSec (Internal)
			|-- Output (Mpx) Level	--	- 9.0 dB to + 15 dB (0.1 dB step)
			|-- Output Mode	--	Normal / Peak Ref Tone / Split mode / Bypass
			|-- Mpx mode	--	Normal (Stereo) / Mono (Left Input) / Mono (L+R)
			|-- Output Sync	--	Output Sync Disabled / Enabled
			|-- Noise Gate	--	Off, - 80 dB to – 51 dB (1 dB step)
|--	Rds Setup	--	|-- Rds Encoder	--	Rds Encoder Off / Rds Encoder On
			|-- Rds Level		- 44.0 dB to – 20.0 dB (0.1 dB step)
			|-- Rds On Split	--	Rds Encoder Off / Rds Encoder On
|--	Serials Setup	--	|-- Serial Port 1	--	Serial Disabled / Serial Enabled
			|-- Serial Port 2	--	Serial Disabled / Serial Enabled
|--	System Information	--	|-- Temperature		
			|-- External Inputs	--	Bit M/S On (1) / Off (0); bit TA On (1) / Off (0); Split On (1) / Off (0)
			|-- Firmware Version		
			|-- Firmware Code		

11.12 FRONT PANEL OPERATION

As described at par. 11.1, Falcon 15 user interface consists of a front panel-mounted jog-wheel, two buttons and an LCD screen. The LCD screen displays menus, parameter settings and several bargraphs (Level Meters or processing activity).

The menus are used for the processing parameters adjustement.

Rotating the jog-wheel lets You browse up or down through menus and parameter choices.

Pressing the jog-wheel (called “clicking”) selects the blinking menu item or parameter choice. When editing the parameter values, rotating the jog-wheel adjusts the parameter’s value up (by rotating CW) or down (CCW).

Once the desired value is reached, clicking the jog-wheel twice saves the value and returns the display to the upper menu level. You can return to the upper menu without saving by pressing the *Esc* key or by choosing the ‘*Esc’* option.

Thus pressing (or clicking) the jog-wheel serves, depending upon the LCD screen status, as an Enter, Select or Return command.

Please note that when a new value is only displayed – even blinking – it is immediately loaded into the equipment processing so that the user can get a real time response.

Enter function is achieved by pressing ‘Enter’ button, too.

Esc/Return function is achieved by pressing ‘Esc’ button, too.

It is useful to remark that you can access all the menu settings and parameters also in a faster and more confortable way trough the supplied PC control software, which allows an easy and effective remote monitoring and control, too. When the Falcon 15 control is taken by the PC application in a bidirectional mode (see Chapt. 17), any access to the menu via the front panel keys is not allowed and the message “Remote Pc Host in Control” is displayed.

NOTE: The front panel menu allows only RDS signal level and status setting. RDS / RBDS messages programming and all the other related facilities requires the supplied Pc control software – see Chapter 16.

In order to prevent any modification to the Processor configurations, the Front Panel keyboard may be locked (‘Lock’ procedure is available via the Pc software).

To save the changes, firstly press Enter to get the Save function and then a second time to confirm

Press Esc to escape the menu without saving and get the upper menu level

Press Esc to get the upper menu level.

12 IN & OUT SETTINGS (FM VERSION)

Once the unit is installed, here's the procedure to get your Falcon 15 operating properly using factory presets. With proper calibration the Falcon 15 will give you the most accurate results for peak control and modulation. Take the time to go through the steps laid out in this chapter!

12.1 HOW TO CONFIGURE THE INPUT (*INPUT SETUP*)

12.1.1 SELECTING THE INPUT (ANALOG OR DIGITAL)

Falcon 15 features, as an option, a digital audio input (ref to Section 0). The ***Input Setup*** / ***Input Source*** menu switches between the analog and digital audio inputs.

- **the digital input audio level is fixed**
- **the audio level indicated on the input level meters will reflect the current input mode setting**
- **when enabled, the digital input disconnects the analog one**

12.1.2 ADJUSTING THE INPUT AUDIO LEVEL

The ***Input Setup*** / ***Sensibility*** menu controls the amount of gain or attenuation applied to the analog audio input.

To take full advantage of the processor potential, **the AGC value should operate in compression mode** (meaning that it slightly reduces the input level). This is **indicated** on the display **by a negative sign**, while a positive sign means there has been an expansion or gain increase. The message 'Gated' appears on the display to indicate that there is no incoming signal, or the signal is below the minimum AGC threshold.

Using a song or announcement recorded at a standard level, **adjust the Sensibility** parameter** in the *Input Setup* menu until the **AGC value** shown on the display (**AGC:**) ranges at - **2 / - 3 dB**.

If the *Input Sensibility* control is not enough to achieve the AGC condition described above, adjust the output levels of the audio source directly (mixers, PC audio cards, etc.). If necessary, it may be acceptable to work with AGC levels between -3 /- 4 dB and +3 / +4 dB.

** this control allows you to adjust the input signal amplification factor, to ensure a standard signal of 0 dB to the internal processor circuits. For example: with a signal of 0dB, the Input Sensibility should be set to 0dB; with a signal of +4dB, the Input Sensibility should be set to -4 dB.
To make sure that the Input Sensibility is properly adjusted, make sure that the AGC indicator display averages around 0 / -2 dB.

The AGC numeric indication will indicate the audio level AFTER the INPUT GAIN has been applied, so you can monitor the amount of input gain needed.

12.1.3 CHOOSING THE PROPER AGC OPERATION

One of the most important processor function is the **Automatic Gain Control (AGC)** system, which compensates for variations in the input level to keep the signal at 0 dB.

The following parameters regulate the AGC function and may be edited:

- **AGC Mode**: acts on both the digital and analog inputs sets the maximum amplification level applied to the input signal by the AGC (***MaxG***) and the correction waiting time (***Hold***)

- **AGC Speed**: acts on both the digital and analog inputs and sets the compensation speed of the input channel signal level variation.

AGC Mode parameter mainly serves to regulate the maximum level gain recoverable by the AGC (MaxGain) and its intervention time (Hold). Hold = 0 means that the system reacts instantly to any source signal variations, while Hold = 2 means that you must wait two seconds before the automatic level compensation process begins.

For instance, setting MaxGain = 12 means that maximum amplification is +12dB: thus a -12dB signal can be compensated to 0, while a -15dB signal will reach a maximum of -3dB.

F.i., if AGC Speed is set as 2 dB/sec and the input signal drops down of 6 dB, the compensation trip will be completely reached after 3 seconds if Hold time is 0 sec (6/2) and after 6 seconds (3 + 6/2) if Hold time is 3 seconds.

We suggest setting a medium MaxGain value (no more than +12 dB, keeping in mind that this value may already be enough to alter level ratios between different musical passages, as in the case of classical music), and Hold = 0 if the music flow is discontinuous and immediate AGC intervention is required, or a higher Hold value (3 or 4 seconds) if any silent breaks may occur during the broadcast (pauses in speech, line changeover between studios, etc.).

Falcon 15 menu provides **5 fixed combinations** of **MaxGain** and **Hold** parameters (i.e. those parameters may not be selected or edited individually, but only within preset combinations).

Mode 0	Hold=0Sec	MaxG=+08dB
Mode 1	Hold=1Sec	MaxG=+10dB
Mode 2	Hold=0Sec	MaxG=+12dB
Mode 3	Hold=2Sec	MaxG=+12dB
Mode 4	Hold=3Sec	MaxG=+15dB
Mode 5	Hold=3Sec	MaxG=+20dB
Mode 6	Hold=0Sec	MaxG=+15dB
Mode 7	Hold=0Sec	MaxG=+20dB

The **AGC speed** indicates the number of dB by which the input level may be increased or decreased in one second.

For example, with AGC speed = + 5 dB, an input signal of – 15 dB will be reduced to – 5 dB in exactly two seconds***

****the approach to the 0 threshold is slower, as AGC works at 1/4 of the user-set speed within the interval –3 to + 3 dB centered on 0 dB reference level*

High *AGC Speed* values obviously make it possible to quickly recover strong level differences, but they can also lead to unpleasant 'pumping' effects.

We suggest using **medium** levels of around **2 to 3 dB** / **sec**, and especially that you concentrate on the audio sources connected to the processor, to obtain the most even sound possible.

12.2 THE VOICE OPTIMIZER

*NOTE: The processor features a phase rotator input stage, also called '**Voice Optimizer**' that is always kept active.*
It is a special all-pass filter designed to properly modify input signal waveform in order to avoid unpleasant effects in the processing of 'live speech' material.
Typical speech waveforms (as those sourced by microphones) are mostly asymmetric, 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 waverforms into symmetric waveforms is enabled by default, giving significant improvements on speech processing and removing any distortion.

12.3 HOW TO CONFIGURE THE MPX OUTPUT (*MPX MODULE SETUP*)

12.3.1 SETTING THE PREEMPHASIS

The ***Mpx Module Setup*** / ***Preemphasis*** menu toggles between 50uS and 75uS of preemphasis applied to the Falcon 15's MPX output.

European countries use a 50 uSec preemphasis, while US countries use a 75 uSec preemphasis.

> **NOTE**: FALCON 15 PREEMPHASIS **REMAINS ACTIVE AT ALL TIMES** AND CAN **NOT** BE **REMOVED** FROM THE MPX OUTPUT

Only one pre-emphasis must be kept active in a transmitting chain. Turn always off the pre-emphasis generated by transmitters.

> **NOTE**: MAKE SURE YOU HAVE PREEMPHASIS SET TO THE APPROPRIATE VALUE FOR YOUR APPLICATION BEFORE CALIBRATION AS THIS WILL AFFECT THE OUTPUT LEVEL

12.3.2 MONO - STEREO OPERATION

The ***MPX Module Setup*** / ***Mpx Mode*** menu selects the mono versus stereo operation of the composite output. With Mono audio modes enabled, Pilot tone is automatically turned off.

In particular:

Selecting *Mono (Left*) will remove the L-R portion of the composite signal and simply output the left audio input. The Pilot will be turned off.

Selecting *Mono (Left+Right*) will remove the L-R portion of the composite signal and simply output the sum of the left and right audio inputs. The Pilot will be turned off.

12.3.3 ADJUSTING THE MPX OUTPUT LEVEL

The MPX signal (+ any internally or externally generated RDS signal) is available on the Bnc MPX OUT connector.

We recommend connecting the processor output directly to the transmitter or radio link, without inserting any other equipment. The factory preset for the overall MPX signal is **0 dBm**.

Where necessary, this output may be tuned using the ***Mpx Module Setup*** / ***Output Level*** menu.

In order to best adjust the output level, we recommend enabling a pilot tone, which identifies the maximum peak which should match the deviation of 75 KHz. To do this:

1 Escape from the ***Output Level*** menu and enter the ***Output Mode*** menu.

2 Select the ***Peak Reference Tone*** option.

The Peak Tone identifies the maximum peak value of the audio and MPX signals reached by the processor while it is operating. This peak corresponds to the maximum frequency deviation. This allows you to set the levels for the entire sound chain simply and safely.

The Peak Tone consists of a 500 Hz/ 0 dBm tone + a 19 kHz / - 20 dB pilot tone (the pilot signal may be disabled by selecting the ***Off*** option within the ***MPX Module*** menu before enabling the ***Peak Reference Tone*** mode).

3 Once you have enabled the Peak Tone, adjust the Mpx Output Level until You reach the desired modulation deviation.

4 Select the ***Normal Operation*** option in the **Output Mode** menu
(Normal Operation mode allows a normal use of the equipment and all its functions)

NOTE: THE PROCESSOR FACTORY SETTINGS ARE 0 dB FOR BOTH INPUT AND OUTPUT.
TO ACHIEVE THE BEST AUDIO QUALITY, WE RECOMMEND NOT TO LOWER THE OUTPUT LEVEL AND TO ADJUST THE EQUIPMENT CONNECTED TO THE PROCESSOR (STEREO ENCODERS, EXCITERS, ETC.) RATHER THAN THE PROCESSOR ITSELF.

12.3.4 CALIBRATING THE PILOT LEVEL AND PHASE

The ***Mpx Module*** / ***Pilot Level*** menu allows you to adjust the amount of 19kHz pilot tone injected into the composite signal (expressed in dB). Factory-default value is – 20 dB (+/- 7.5 kHz carrier deviation) compared to the overall Stereo Composite MPX signal. Level may be adjusted within the range of -25 dB to -15.5 dB, in 0.1 dB steps. Pilot tone may also be disabled by turning the jog-wheel anti-clockwise to Off.

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

12.3.5 ENABLING SYNC OUTPUT

When required, Falcon 15 can supply TTL pilot synchro signal (19 kHz, square wave, 5 Vpp) on the Sync Out connector.
To do this, enter the ***Mpx Module Setup*** / ***Output Sync*** menu and select ***Output Sync Enabled*** option.

12.3.6 *NOISE GATE SETTING* (Noise Gate)

The **Mpx Module Setup** / **Noise Gate** function allows you to avoid the effects of background noises while the input signal presents a lack of high frequencies. The parameter to be set is the **Noise Gate Threshold**, which determines the threshold value below which the dynamic pre-emphasis is automatically excluded.

The Noise Gate Threshold: This may be adjusted within a range of –80 to –51dB (1 dB steps).
The Noise Gate function can be turned off if necessary by turning the shuttle counter-clockwise to the Off position.

12.3.7 BYPASS MODE

In **Processor ByPass** mode, all the processing stages are disabled (AGC system, audio processing and pre-emphasis circuit). It allows you to carry out tests and reference measurements: it is not intended for equipment setup or installation use

12.4 ADJUSTING THE RDS / RBDS OUTPUT (*RDS MODULE SETUP*)

The level of generated RDS / RBDS signal and its status On/Off can be adjusted by means of the ***RDS Module Setup*** menu.

Selection of the Data System to be used (RDS or RBDS) can be achieved from the SETUP page in the Pc Control Software page, after connecting to a processor featuring the RDS/RBDS encoder.

RDS Encoder menu allows You to turn the encoder On and Off.

The **RDS signal Level** may be adjusted within the deviation range. Here below are presented some relations between deviation and RDS signal level:

-37.5 dB	D=1.0 KHz
-31.5 dB	**D=2.0 KHz**
-28 dB	D=3.0 KHz
-25.5 dB	D=4.0 KHz
-23.5 dB	D=5.0 KHz
-21.9 dB	D=6.0 KHz

- The default operating level is -31.5 dB, D = 2.0 KHz with an overall MPX level of 0 dBm

- The RDS signal is available on the MPX Out connector, blended together with the MPX signal.
  Also see Section 12.3.3 for setting the overall MPX signal

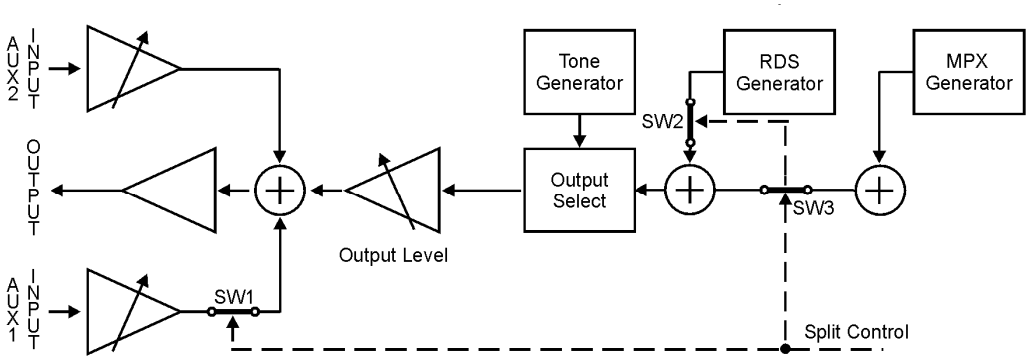
The **RDS On Split** option allow / don't allow the Falcon 15's RDS signal to be output in MPX splitted session.

*** Falcon 15 with RDS option installed – Ref to Chapter 2.1*

12.5 SETTING THE SPLIT MODES

The ***MPX SPLIT mode*** allows Falcon 15 Output to toggle between an external MPX signal applied to AUX 1 input and the MPX signal internally generated (see Switch SW1 and SW2 here below). Switching is triggered by **Input 1** on Digital Data Port (ref to par. 11.10).

NOTE: FALCON 15 - FM VERSION IS REQUIRED, WITH INSTALLED **SPLIT** OPTION (ref to Chapt. 2)



MPX SPLIT mode	data port INPUT1	OUTPUT	LOGIC SWITCHERS	
			SW 1	**SW 3**
enabled	active	Internal Mpx	open	closed
	unactive	Fold-back of Aux 1 signal *	closed	open

Whenever the **RDS option** is also **installed (ref to Section 2.1)**, RDS signal available on the Output with the *Split Mode* activated depends on the '**RDS On Split**' function setting (see Table here below). In other words, RDS signal generated by Falcon 15 may be always available (even when the AUX signal is routed to the Output) or it may be removed.

RDS ON SPLIT mode	data port INPUT1	OUTPUT	LOGIC SWITCHERS		
			Sw1	**Sw2**	**Sw3**
disabled	active	Internal Mpx + internal RDS	open	closed	closed
	unactive	Fold-back of Aux 1 signal *	closed	open	open
enabled	active	Internal Mpx + internal RDS	open	closed	closed
	unactive	Fold-back of Aux 1 signal* + internal RDS	closed	closed	open

* Aux 1 level is controlled via trimmer (ref to par. 11.6)

12.6 ADDITIONAL DATA AND SETTINGS

12.6.1 SERIAL PORT SETUP

Serial Port Setup displays the serial port 1 and Port 2 status and allows to enable/disable them.

- **Serial Port 1** This selection allows you to enable / disable the port
- **Serial Port 2** This selection allows you to enable / disable the port

12.6.2 SYSTEM INFO

The System Info page provides useful data concerning Falcon 15 operation:

- **Temperature** it shows the internal temperature of the processor during operation.

  The current temperature is updated each time this option is accessed.

  For proper operation, **the temperature should never exceed 50 °C**. If this threshold is exceeded, you must leave a ventilation space equivalent to at least 1 rack unit both above and below the processor.

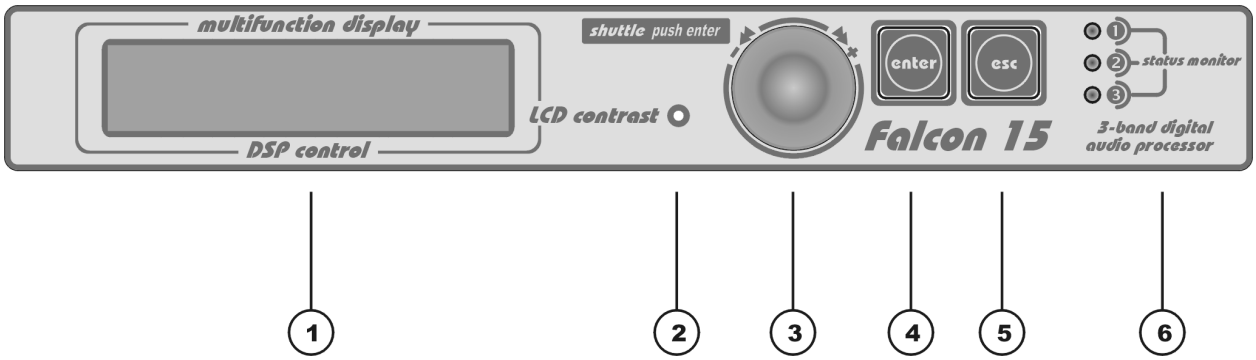
- **Ext Inputs** It displays the current state of the three **Digital Data** inputs (see par. 11.10). IN=1 means active input, IN=0 means input disabled

- **FW Version** It shows the current Falcon 15 firmware version. Firmware may be upgraded to later versions (ref to Chapter 20.1)

- **FW Code** It shows firmware serial code. The user might be requested to communicate it to the manufacturer in some cases

13 ST VERSION DESCRIPTION

13.1 FRONT PANEL VIEW



1 **Multifunction display (LCD)** multifunction display showing the equipment operating conditions

2 **LCD contrast:** trimmer to adjust the display contrast. Please use a small screwdriver

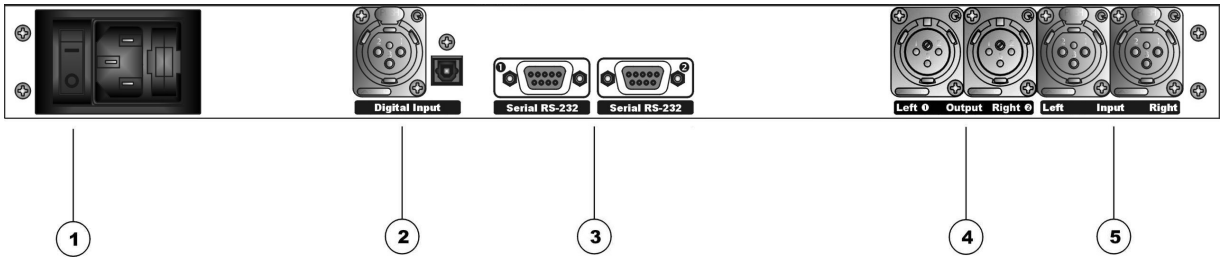
3 **Jog-wheel**: for menu scrolling and parameter settings. It can also be pressed, having the same control function as the Enter key

4 **ENTER:** key which gives access to the parameters submenu and selects the new values

5 **Esc:** key to Esc the current menu and go back to the previous one. By pressing this key the modifications realised by accident on the selected parameter are not executed

6 **LEDS**: disabled on the ST version

13.2 REAR PANEL VIEW (ST VERSION)



1 **ON/OFF main switch**, the led inside switchs on/off accordingly. If it is off while the switch is ON, please check the supplied AC cord and the fuse.
AC outlet: IEC power cord receptacle. AC voltage change-over switch is located inside the box, closed to the AC transformer

2 **Digital input***. It features two connectors: XLR female for coaxial connections and tos-link for optical connections

3 **RS232 Serial Ports**: optoisolated serial ports for connection to PCs or satellite receivers.

4 **Analog Output**: bi-channel audio output electronically balanced on XLR male connectors. The output level is set via the menu

5 **Analog Input**: bi-channel audio input electronically balanced on XLR female. The input level is set via the menu

* available as an option (DG-IN option – ref to Chapter 2)

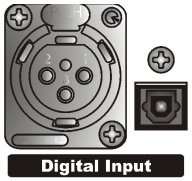
13.3 AC CONNECTION

The Falcon 15 uses a power entry module with AC switch just closed to the IEC power cord receptacle. It can operate on 110 or 240 VAC, 50/60 Hz AC mains voltages. If the unit is to be used with a mains voltage different to that for which the unit is supplied, set the voltage change-over switch, which is placed inside the box, closed to the AC transformer.

The power supply socket has an integral fuse drawer containing the AC power fuse and a spare, both of the same value.

- for 220/230 V AC the fuse is rated at 500 mA T
- for 110/115 V AC tension the fuse is rated at 1 A T

13.4 DIGITAL AUDIO INPUT



Transformer balanced XLR-type and optic connectors are used to input AES-3, S/PDIF, IEC60958, EIAJCP1201 digital audio.

To avoid malfunctions, only one digital connector may be connected at a time. Please keep the tos-link connector covered while not used.

The digital input accepts any sampling rate between 32 and 96 kHz. No user adjustment is necessary since a sample rate converter is built into the unit. Furthermore, digital input automatically recognizes the digital format (AES, EBU, SPDIF, etc.) and the type of connection (optic or coaxial).

Even though both analog and digital input audio cables can be connected, only one input can be set active (analog/digital input selection is done through the software parameter setting - par. 12.1). Input gain and level setting for digital input is fixed.

XLR pinout:	Pin 1	Gnd
	Pin 2	Signal
	Pin 3	Return

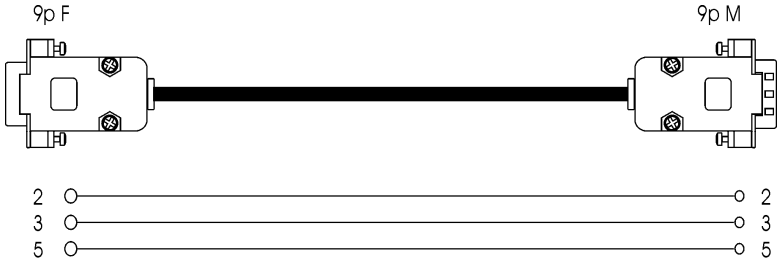
13.5 SERIAL PORTS

Falcon 15 features up to four optoinsulated RS232 serial ports (port 3 and 4 are available as an option) which allow the remote control and RDS programming both through local - or remote PCs, UECP programmer, etc.

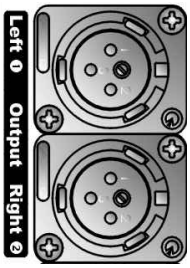
In particular, these connectors are for a local bidirectional computer connection when the BSN - Remote Control software is loaded onto a local computer. Connect a standard serial cable (not crossed) between the RS-232 connector and a serial port connector on the computer. Cable length must not exceed 10 mt.

The ports can be separately enabled / disabled via the menu. UECP protocol allows the user to assign different properties, data speed, acces to commands, etc to every port (see par. 12.6.1).

The four serial ports support Tx and Rx signals only. One serial cable comes with the unit.



13.6 ANALOG AUDIO OUTPUT (Male XLR)



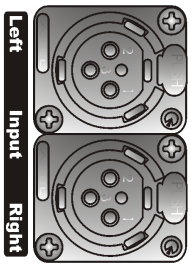
Balanced XLR-type connectors are used for output analog audio.
The stereo analog outputs are designed for standard 0 dBu (line- level) balanced signals. Output level setting is done using the software parameter settings (see par. 14.3).

XLR pinout:

Pin 1	Gnd
Pin 2	Signal
Pin 3	Return

In case of unbalanced connections, please connect the cold pole (Pin 3) to the ground (Pin 1).
The impedance is set to 600Ohm (electronically balanced).

13.7 ANALOG AUDIO INPUT (Female XLR)

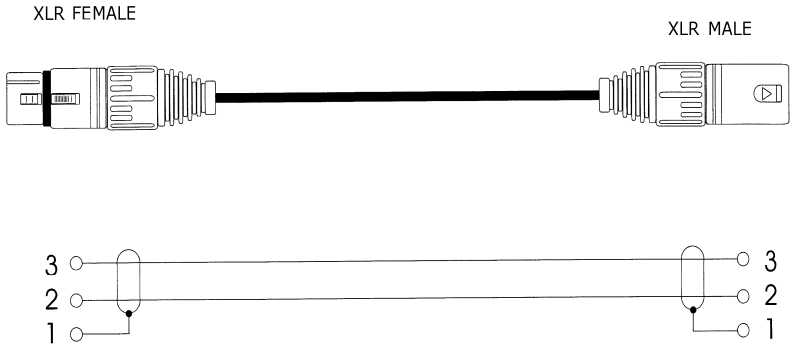


Balanced XLR-type connectors are used for input analog audio.
The stereo analog inputs are designed for standard 0 dBu balanced signals. Individual channel gain and level setting is done using the software parameter settings (see par. 12.1).

XLR pinout:

Pin 1	Gnd
Pin 2	Signal
Pin 3	Return

In case of unbalanced connections, please connect the cold pole (Pin 3) to the ground (Pin 1).
Factory preset input impedance is 10 kOhm. This impedance may also be set to 600Ohm by moving the two internal jumpers on the INPUT / OUTPUT board (see Chapter 19 - hardware settings).



13.8 FALCON 15 MENU TREE (ST version)

The menu tree for the **Falcon 15 ST-OUT Version** is shown on here below. It has all of the possible main menu items listed along the left side.
The branching sub-menus and parameters are connected in the order they are encountered in the menu system.

The diagram here below displays the complete Falcon 15 menu – please refer to the table on Cap. 2 for Optional feature list.

|-- MAIN PAGE *(Preset, Agc level, Compressor levels, Input Meters)*

|--	Input Setup	--	|-- Sensibilty	--	- 12 dBm to+ 12 dBm (1 dB step)
			|-- AGC Speed	--	0 to 6 dB/sec (0.2 dB step)
			|-- AGC Mode	--	Hold=0 sec & MaxG= 08 dB;
					Hold=1 sec & MaxG= 10 dB;
					Hold=0 sec & MaxG= 12 dB;
					Hold=2 sec & MaxG= 12 dB;
					Hold=3 sec & MaxG= 15 dB;
					Hold=3 sec & MaxG= 20 dB;
					Hold=0 sec & MaxG= 15 dB;
					Hold=0 sec & MaxG= 20 dB;
			|-- Input Source	--	Analogic / Digital input
|--	Audio Mod. Setup	--	|-- Preemphasis	--	50 uSec Internal / 75 uSec Internal / 50 uSec External / 75 uSec External
			|-- Output Level	--	- 10 dB to + 14 dBm (0.5 dB step)
			|-- Output Mode	--	Normal / Peak Ref Tone / Bypass
			|-- Process mode	--	Normal (Stereo) / Mono (Left Input) / Mono (L+R)
			|-- Noise Gate	--	Off, - 80 dB to – 51 dB (1 dB step)
|--	Rds Setup	--	|-- Not Installed	--	
|--	Serials Setup	--	|-- Serial Port 1	--	Disabled / Enabled
			|-- Serial Port 2	--	Disabled / Enabled
|--	System Information	--	|-- Temperature		
			|-- External Inputs	--	Not Installed
			|-- Firmware Version		
			|-- Firmware Code		

13.9 FRONT PANEL OPERATION

As described at par. 11.1, Falcon 15 user interface consists of a front panel-mounted jog-wheel, two buttons and an LCD screen. The LCD screen displays menus, parameter settings and several bargraphs (Level Meters or processing activity).

The menus are used for the processing parameters adjustement.

Rotating the jog-wheel lets You browse up or down through menus and parameter choices.

Pressing the jog-wheel (called “clicking”) selects the blinking menu item or parameter choice. When editing the parameter values, rotating the jog-wheel adjusts the parameter’s value up (by rotating CW) or down (CCW).

Once the desired value is reached, clicking the jog-wheel twice saves the value and returns the display to the upper menu level. You can return to the upper menu without saving by pressing the *Esc* key or by choosing the ‘*Esc’* option.

Thus pressing (or clicking) the jog-wheel serves, depending upon the LCD screen status, as an Enter, Select or Return command.

Please note that when a new value is only displayed – even blinking – it is immediately loaded into the equipment processing so that the user can get a real time response.

Enter function is achieved by pressing ‘Enter’ button, too.

Esc/**Return** function is achieved by pressing ‘Esc’ button, too.

It is useful to remark that you can access all the menu settings and parameters also in a faster and more confortable way trough the supplied PC control software, which allows an easy and effective remote monitoring and control, too. When the Falcon 15 control is taken by the PC application in a bidirectional mode (see Chapt. 17), any access to the menu via the front panel keys is not allowed and the message “Remote Pc Host in Control” is displayed.

In order to prevent any modification to the Processor configurations, the Front Panel keyboard may be locked (‘Lock’ procedure is available via the Pc software).

To save the changes, firstly press Enter to get the Save function and then a second time to confirm

Press Esc to escape the menu without saving and get the upper menu level

Press Esc to get the upper menu level.

14 IN / OUT SETTINGS (ST version)

Once the unit is installed, here's the procedure to get your Falcon 15 operating properly using factory presets. With proper calibration the Falcon 15 will give you the most accurate results for peak control and modulation. Take the time to go through the steps laid out in this chapter!

14.1 HOW TO CONFIGURE THE INPUT (*INPUT SETUP*)

14.1.1 SELECTING THE INPUT (ANALOG OR DIGITAL)

Falcon 15 features, as an option, a digital audio input (ref to Section 0). The ***Input Setup*** / ***Input Source*** menu switches between the analog and digital audio inputs.

NOTE
- **the digital input audio level is fixed**
- **the audio level indicated on the input level meters will reflect the current input mode setting**
- **when enabled, the digital input disconnects the analog one**

14.1.2 ADJUSTING THE INPUT AUDIO LEVEL

The ***Input Setup*** / ***Sensibility*** menu controls the amount of gain or attenuation applied to the analog audio input.

To take full advantage of the processor potential, **the AGC value should operate in compression mode** (meaning that it slightly reduces the input level). This is **indicated** on the display **by a negative sign**, while a positive sign means there has been an expansion or gain increase. The message 'Gated' appears on the display to indicate that there is no incoming signal, or the signal is below the minimum AGC threshold.

Using a song or announcement recorded at a standard level, **adjust the Sensibility** parameter** in the *Input Setup* menu until the **AGC value** shown on the display (**AGC:**) ranges at - **2 / - 3 dB**.

If the *Input Sensibility* control is not enough to achieve the AGC condition described above, adjust the output levels of the audio source directly (mixers, PC audio cards, etc.). If necessary, it may be acceptable to work with AGC levels between –3 /- 4 dB and +3 / +4 dB.

** this control allows you to adjust the input signal amplification factor, to ensure a standard signal of 0 dB to the internal processor circuits. For example: with a signal of 0dB, the Input Sensibility should be set to 0dB; with a signal of +4dB, the Input Sensibility should be set to -4 dB.
To make sure that the Input Sensibility is properly adjusted, make sure that the AGC indicator display averages around 0 / -2 dB.

The AGC numeric indication will indicate the audio level AFTER the INPUT GAIN has been applied, so you can monitor the amount of input gain needed.

14.1.3 CHOOSING THE PROPER AGC OPERATION

One of the most important processor function is the **Automatic Gain Control (AGC)** system, which compensates for variations in the input level to keep the signal at 0 dB.

The following parameters regulate the AGC function and may be edited:

- **AGC Mode**: acts on both the digital and analog inputs sets the maximum amplification level applied to the input signal by the AGC (***MaxG***) and the correction waiting time (***Hold***)

- **AGC Speed**: acts on both the digital and analog inputs and sets the compensation speed of the input channel signal level variation.

AGC Mode parameter mainly serves to regulate the maximum level gain recoverable by the AGC (MaxGain) and its intervention time (Hold). Hold = 0 means that the system reacts instantly to any source signal variations, while Hold = 2 means that you must wait two seconds before the automatic level compensation process begins.

For instance, setting MaxGain = 12 means that maximum amplification is +12dB: thus a -12dB signal can be compensated to 0, while a -15dB signal will reach a maximum of -3dB.

F.i., if AGC Speed is set as 2 dB/sec and the input signal drops down of 6 dB, the compensation trip will be completely reached after 3 seconds if Hold time is 0 sec (6/2) and after 6 seconds (3 + 6/2) if Hold time is 3 seconds.

We suggest setting a medium MaxGain value (no more than +12 dB, keeping in mind that this value may already be enough to alter level ratios between different musical passages, as in the case of classical music), and Hold = 0 if the music flow is discontinuous and immediate AGC intervention is required, or a higher Hold value (3 or 4 seconds) if any silent breaks may occur during the broadcast (pauses in speech, line changeover between studios, etc.).

Falcon 15 menu provides **5 fixed combinations** of **MaxGain** and **Hold** parameters (i.e. those parameters may not be selected or edited individually, but only within preset combinations).

Mode 0	Hold=0Sec	MaxG=+08dB
Mode 1	Hold=1Sec	MaxG=+10dB
Mode 2	Hold=0Sec	MaxG=+12dB
Mode 3	Hold=2Sec	MaxG=+12dB
Mode 4	Hold=3Sec	MaxG=+15dB
Mode 5	Hold=3Sec	MaxG=+20dB
Mode 6	Hold=0Sec	MaxG=+15dB
Mode 7	Hold=0Sec	MaxG=+20dB

The **AGC speed** indicates the number of dB by which the input level may be increased or decreased in one second.

For example, with AGC speed = + 5 dB, an input signal of – 15 dB will be reduced to – 5 dB in exactly two seconds***

****the approach to the 0 threshold is slower, as AGC works at 1/4 of the user-set speed within the interval –3 to + 3 dB centered on 0 dB reference level*

High *AGC Speed* values obviously make it possible to quickly recover strong level differences, but they can also lead to unpleasant 'pumping' effects.

We suggest using **medium** levels of around **2 to 3 dB** / **sec**, and especially that you concentrate on the audio sources connected to the processor, to obtain the most even sound possible.

14.2 THE VOICE OPTIMIZER

*NOTE: The processor features a phase rotator input stage, also called '**Voice Optimizer**' that is always kept active.*
It is a special all-pass filter designed to properly modify input signal waveform in order to avoid unpleasant effects in the processing of 'live speech' material.
Typical speech waveforms (as those sourced by microphones) are mostly asymmetric, 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 waverforms into symmetric waveforms is enabled by default, giving significant improvements on speech processing and removing any distortion.

14.3 HOW TO CONFIGURE THE AUDIO OUTPUT (*AUDIO MODULE SETUP*)

14.3.1 SETTING THE PREEMPHASIS

The ***Audio Module Setup*** / ***Preemphasis*** menu allows You to select one of the following options:

- **50uSec Internal** pre-emphasis enabled on the processor audio outputs at 50 usec
- **75uSec Internal** pre-emphasis enabled on the processor audio outputs at 75 usec
- **50uSec External** pre-emphasis disabled on audio outputs (an external 50 usec preemph. must be applied)
- **75uSec External** pre-emphasis disabled on audio outputs (an external 75 usec preemph. must be applied)

European countries use a 50 uSec preemphasis, while US countries use a 75 uSec preemphasis.

The processor generates two types of pre-emphasis: dynamic and fixed. The former may vary in relation to the modulation peak, thereby considerably increasing the average modulation within the maximum deviation of 75KHz, while the latter is fixed at 50 or 75uSec depending on the country in which it is used. The latter may be removed from the analog audio outputs if necessary, while the first is always present to ensure proper modulation at all times.

ONLY ONE PRE-EMPHASIS MUST BE KEPT ACTIVE IN A TRANSMITTING CHAIN.
IT IS HIGHLY RECOMMENDED TO USE THE PRE-EMPHASIS WITHIN THE PROCESSOR AND TURN OFF THE ONE GENERATED BY EXTERNAL TX OR MPX CODERS.

NOTE: MAKE SURE YOU HAVE PREEMPHASIS SET TO THE APPROPRIATE VALUE FOR YOUR APPLICATION BEFORE CALIBRATION AS THIS WILL AFFECT THE OUTPUT LEVEL

14.3.2 ADJUSTING THE AUDIO OUTPUT LEVEL

The processed audio signal is available on the XLR OUT connectors.

The factory preset for the output signal is **0 dBm**.

Where necessary, this output may be tuned using the ***Audio Module Setup*** / ***Output Level*** menu.

In order to best adjust the output level, we recommend enabling a **pilot tone**, which identifies the maximum peak which should match the deviation of 75 KHz. To do this:

1 Escape from the ***Output Level*** menu and enter the ***Output Mode*** menu.

2 Select the ***Peak Reference Tone*** option.

The Peak Tone identifies the maximum peak value of the audio reached by the processor while it is operating. This peak corresponds to the maximum frequency deviation. This allows you to set the levels for the entire sound chain simply and safely.

The Peak Tone consists of a 500 Hz/ 0 dBm tone.

3 Once you have enabled the Peak Tone, **adjust the Audio Output Level** until You reach the desired modulation deviation.

4 Select the ***Normal Operation*** option in the **Output Mode** menu
(Normal Operation mode allows a normal use of the equipment and all its functions)

NOTE: THE PROCESSOR FACTORY SETTINGS ARE 0 dB FOR BOTH INPUT AND OUTPUT.
TO ACHIEVE THE BEST AUDIO QUALITY, WE RECOMMEND NOT TO LOWER THE OUTPUT LEVEL AND TO ADJUST THE EQUIPMENT CONNECTED TO THE PROCESSOR (STEREO ENCODERS, EXCITERS, ETC.) RATHER THAN THE PROCESSOR ITSELF.

14.3.3 BYPASS MODE

In **Processor ByPass** mode (***Audio Module Setup*** / ***Output Mode*** / ***Bypass Mode*** menu), all the processing stages are disabled (AGC system, audio processing and pre-emphasis circuit). It allows you to carry out tests and reference measurements: it is not intended for equipment setup or installation use

14.3.4 MONO - STEREO OPERATION

The ***Audio Module Setup*** / ***Process Mode*** menu selects the mono versus stereo operation of the audio output.

In particular:

- Selecting *Mono (Left*) the Left input channel only will be processed and output on both the L and R outputs.
- Selecting *Mono (Left+Right*) the sum of the left and right audio inputs will be processed and output on both the L and R outputs.

14.3.5 *NOISE GATE SETTING* (Noise Gate)

The **Audio Module Setup** / **Noise Gate** function allows you to avoid the effects of background noises while the input signal presents a lack of high frequencies. The parameter to be set is the **Noise Gate Threshold**, which determines the threshold value below which the dynamic pre-emphasis is automatically excluded.

The Noise Gate Threshold: This may be adjusted within a range of –80 to –51dB (1 dB steps).
The Noise Gate function can be turned off if necessary by turning the shuttle counter-clockwise to the Off position.

14.4 ADDITIONAL DATA AND SETTINGS

14.4.1 SERIAL PORT SETUP

Serial Port Setup displays the serial port 1 and Port 2 status and allows to enable/disable them.

- **Serial Port 1** This selection allows you to enable / disable the port
- **Serial Port 2** This selection allows you to enable / disable the port

14.4.2 SYSTEM INFO

The System Info page provides useful data concerning Falcon 15 operation:

- **Temperature** it shows the internal temperature of the processor during operation.

  The current temperature is updated each time this option is accessed.

  For proper operation, **the temperature should never exceed 50 °C**. If this threshold is exceeded, you must leave a ventilation space equivalent to at least 1 rack unit both above and below the processor.

- **Ext Inputs** It displays the current state of the three **Digital Data** inputs (see par. 11.10). IN=1 means active input, IN=0 means input disabled

- **FW Version** It shows the current Falcon 15 firmware version. Firmware may be upgraded to later versions (ref to Chapter 20.1)

- **FW Code** It shows firmware serial code. The user might be requested to communicate it to the manufacturer in some cases

15 CHOOSING THE PROCESSING CURVE

15.1 INTRODUCTION

Once you have adjusted the input levels and reached the correct AGC level, you may move on to select the processing curve.

There are 30 factory presets designed for various programming formats. Chose one that approximately matches your station's format. If you are not sure, **chose Preset # 25 and 26** to achieve best results for density, richness and colour of the sound.

As shown in the table on the next page, there are 3 parameters involved in the audio processing. The curves may be gather into groups: curves from 1 to 10 have a **low density**, curves from 11 to 20 have a **medium density** and curves from 21 o 30 have a **high density** (i.e. they allow you to reach a high broadcasting sound level and an average sound fidelity).

Furthermore, curves 1, 11 and 21 are totally 'flat': You may compare the different curves if desired, using these curves as a reference.

NOTE - **Contrary to the submenu parameters, a new curve becomes operative (thus is broadcast) only when it is selected via encoder and then confirmed by the ENTER command within 10 seconds after selection**.

15.2 THE FALCON 15 PRESET TABLE

PRESET	BASS	MID	HIGH	DENSITY	TYPE
1	1	1	1	Low	Flat
2	3	0	3	Low	Pop
3	1	3	1	Low	Live
4	3	1	1	Low	Bass
5	3	3	1	Low	Disco
6	1	3	3	Low	Live
7	3	3	0	Low	Disco
8	3	0	1	Low	Bass
9	3	1	2	Low	Pop
10	3	2	2	Low	Bass
11	4	4	4	Mid	Flat
12	6	3	6	Mid	Pop
13	4	6	4	Mid	Live
14	6	4	4	Mid	Bass
15	6	6	4	Mid	Disco
16	4	6	6	Mid	Live
17	6	6	3	Mid	Disco
18	6	3	4	Mid	Bass
19	6	4	5	Mid	Pop
20	6	5	5	Mid	Bass
21	7	7	7	High	Flat
22	9	6	9	High	Pop
23	7	9	7	High	Live
24	9	7	7	High	Bass
25	9	9	7	High	Disco
26	7	9	9	High	Live
27	9	9	6	High	Disco
28	9	6	7	High	Bass
29	9	7	8	High	Pop
30	9	8	8	High	Bass

The **Bass Level** parameter adjusts the threshold level that trips the bass frequency compressor, affecting the frequency band up to 400 Hz (see block diagram)

The **Mid Level** parameter adjusts the threshold level that trips the middle frequency compressor, affecting the frequency band from 400 Hz to 5 KHz (see block diagram).

The **High Level** parameter adjusts the threshold level that trips the high frequency compressor, affecting the frequency band from 5KHz to 15KHz (see block diagram).

15.3 CHOOSING A CURVE

As already explained in other sections of the manual, the DSPs in the processor implement three compressors, which affect the 3 bands: Bass, Mid and High.
The three meter bars displayed on the front panel indicate the level of compression exerted on each frequency (in other words, the more notches shown, the more the corresponding frequency is compressed, and thus the less will be audible).
The curves are identified by three letters: B (i.e Bass), M (i.e. Medium) and H (i.e. High).

The higher the value of a band in respect of the others, the more the band will be present on the output.

Example:

The curve 02 (B3M0H3) mainly contains Bass and High sound components, as the Medium frequencies are compressed (as indicated by the '0' index, in respect of B=3 and H=3).

On the other hand, the curve 07 (B3M3H0) contains strongly presence of Bass and Mid frequencies, as High frequencies are compressed (H=0).

As You can get from the preset table, curves 1, 11, 21; 2, 12, 22; 3, 13, 23, etc have the same 'ratio' between Bass, Medium and High frequencies (f.i. Bass level is twice the amount of Medium level, etc) but the 'absolute' level index is higher, meaning that curve's density is higher.

Example:

*The curve 12 (B6M3H6) presents the same relation between the band levels (i.e.the 'sound equalization' is the same than curve 02) but **density** has **changed**: as 'absolute' level index are higher than curve 02 (B6 > B3, M3>M0, etc), curve 12 allows you to reach a higher broadcasting sound level*

The preset table provides also, in the last column, an useful classification of curves according to their 'sound' (pop, bass, disco, etc).

16 THE REMOTE PC CONTROL SOFTWARE

16.1 INTRODUCTION

The Falcon 15 (ST and FM versions) comes with a powerful and reliable software running on all Microsoft Windows® o.s. (’95, ’98, ME, 2000, NT and XP) and specially conceived for equipment programming and control.

It allows either the visualization in **real time** of the equipment **current configuration** or its modification by means of a Bidirectional (i.e. local) serial link. There is no limit in the number of units which can be controlled from a single software license.

Examples of typical applications:

- the processor configuration directly in the transmitting site, for example by means of portable PCs (laptop / notebook)

- the remote control through one of the PC already installed in the control room or in the broadcasting room (on condition that the connection serial cable does not exceed 20 meters length)

Firmware and software upgrades may be performed by the final user directly at his side.

16.2 INSTALLING THE PC CONTROL SOFTWARE

The software can be found on the CD ROM provided with the equipment.
This software runs under the Microsoft Windows® operating systems (’95, ’98, ME, 2000, NT and XP).

Place the CD ROM into the computer’s CD Rom drive.
Using standard Windows procedures, run the SETUP.EXE file.

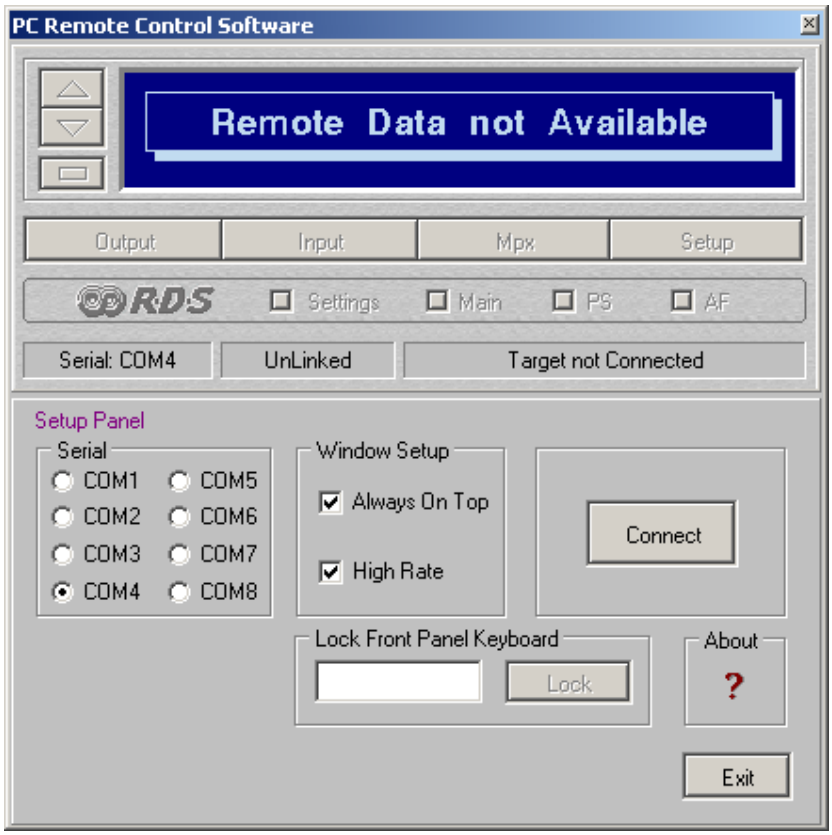
The install program installs the application onto the computer's hard disk and places the program name *Axel Falcon 15 vers X.Y* in the Start Menu. The installation screen will also suggest a destination directory for the software. If Yr computer has typical directory tree organization, this will be C:\Program Files\Axel Technology \ Falcon 15 Audio processor versX.Y.

If You have a reason to specify another directory for installation, use the *Browse* button or type an alternative path.

Click to Install and Next to complete installation. This takes only a few seconds. When the software is succesully installed, *Finish* message will appear at the bottom of the installing box. Click *Close* to close the installation screen. Standard Windows procedures can be used to create a shortcut to the program on the desktop.

16.3 RUNNING THE PROGRAM

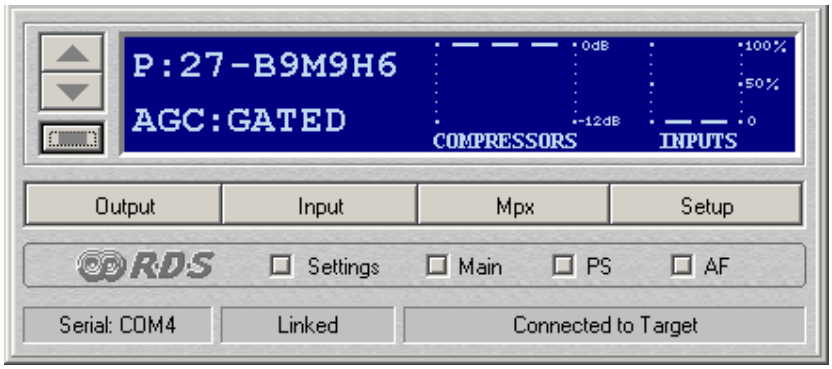
Open the software from Start -> Programs -> *Axel Falcon 15 vers X.Y* (or C:/programs/ Axel Technology / Falcon 15 Audio processor versX.Y). The computer screen should resemble the image below:



Click the box **X** in the upper, right hand corner of the screen. Quitting the program does not alter Falcon 15 operation.

16.4 PC CONTROL SOFTWARE OVERVIEW

The control software allows access to the same parameters and functions also available from the processor control panel. Therefore, for any clarification regarding the nature and function thereof, see Sections 11.11 and 13.8).



- The **three buttons** located alongside the display allow you to **choose the processing curve**: select the curve from among the 30 available (also called Preset), using the two arrows, then **confirm the choice using the rectangular button (in the bottom).**

- The *Output* page includes the controls for the functions: MPX *Output Level, Audio Output Level, Pre-emphasis, Noise Gate, Output Mode, Output Sync and Input Mode (Stereo/Mono).* These controls may ba disabled, according to Yr Falcon 15 version (ST or FM).

- The *Input* page includes the controls for the functions: *AGC Mode, AGC Speed, Input Sensibility and Input selection* (analog or digital)

- The *MPX* page includes the controls for the functions: *Pilot Phase and Pilot Level, MPX Mode.* This page is disabled when operating the ST Falcon 15 version.

- The *RDS* submenu includes the programming windows for the RDS functions (ref. to the next Section)

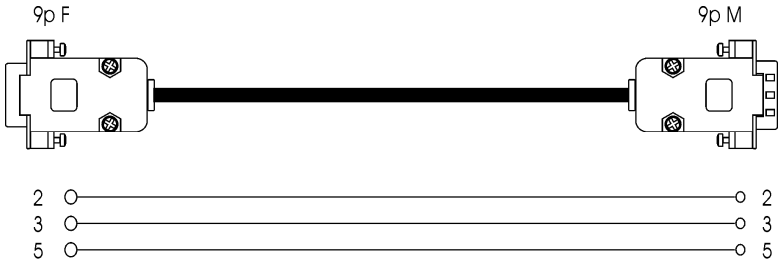
NOTE: In each menu, any changes to the parameters may be saved by clicking the button 'ok', while clicking 'Cancel' allows you to abandon the changes (or the submenu) without saving.

17 ACCESSING THE TARGET FROM THE PC

Connect the Pc Com Port to one of the available Target serial ports.

Use a regular serial cables pin to pin type for connections (see par. 11.9). Cable lenght must not exceed 20 mt.

A serial connection (serial cable) between Host Pc Serial Port and one of the Falcon 15 serial ports IS REQUIRED. Connection link is always established in a bidirectional mode.

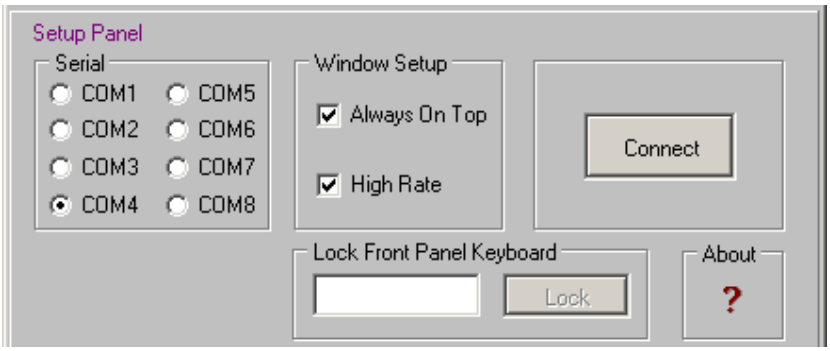


Always close the control program before removing the connection. In case the front panel operation freezes, switch off and then switch on the equipment and check Yr computer.

Please note that the Processor's serial ports are enabled by default. To check their enabling or status control, please follow the steps indicated at par. 12.6.1.

Open the **SETUP window** on the pc software.

17.1 THE SETUP PANEL



17.1.1 SELECTING THE PC SERIAL PORT

First of all, it is necessary to indicate which computer serial port is dedicated to the communication with the processor (COM 1, 2, 3, 4 to 8). Once a port is assigned, click 'Connect' buton to attempt the connection to the processor.

- If the serial port selected is physically present on the computer but is not connected to the processor, the control program will display 'Remote Data not Available'. This means that the program is unable to connect to the processor.

- If the serial port is NOT physically present on the computer, the message '*Selected Serial port not available*' will appear just below the display screen.

NOTE: the program tests the connection mode each time you access the Setup screen. However, the '**Connect**' button allows You to try to connect the target at any time.

If link fails, some Setup or connection element may be wrong. A troubleshooting guide is provided here-below:

POSSIBLE CAUSE	**SOLUTION**
The selected COM PORT is not available	Change Yr Pc Port selection or free the selected one.
Addressed Target firmware version does not match the current version on the Pc (f.i.: Your Falcon 15 features rel 1.1 firmware and the Pc control software is updated to rel 1.2).	Update the processor
Serial cable is not ok	Check the serial cable (type and electrical integrity)

17.1.2 OTHER SETTINGS

It is now possible to set up or modify some modes regarding the software window display on the computer screen, and communications between the computer and the processor.

- If selected, the option '**Always On Top'** will always keep the control program window in the foreground of the desktop.

- If selected, the option '**High Rate'** allows you to select the higher refresh speed (30 Hz) in displaying the Vu Meter on the screen. Choose the default speed (10 Hz) if the higher speed does not allow smooth display of the meters.

17.1.3 FRONT PANEL 'LOCK' FUNCTION

Falcon 15 front panel access is provided with a lock function to avoid any unauthorized staff being able to reprogram it.
To activate the lock function, type a password into the '**Lock Front Panel Keyboard**' field and then click on the *Lock* button. At this moment, You may remove the connection to the PC. To unlock the panel, type the same password, and then click *Unlock*.
The password may be changed during each access.

18 RDS / RBDS SETTINGS (FM Version only)

18.1 INTRODUCTION

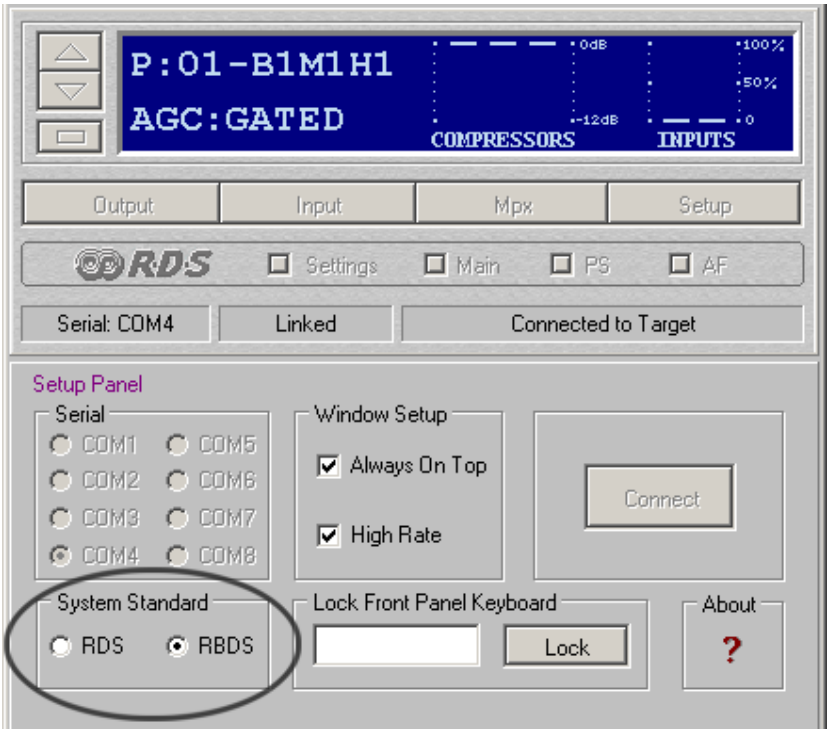
The Falcon 15 FM supports either RDS (Radio Data System) or RBDS (Radio Broadcast Data System) generation as an option (please refer to the initial Chapter for further information).
The Radio Data System was developed in Europe, while RBDS is the USA implementation of european RDS.
Thus, for North America (US, Canada and Mexico) the RBDS system must to be selected, while for the rest of the world one must select RDS system.

The RDS / RBDS programming and configuration is accessible only via the Pc control software supplied with the processor. Please refer to the previous chapter for installation & setup procedure instructions for this software.

For the sake of simplicity, the more generic and established term **RDS** will be used throughout this manual.

18.2 CHOOSING BETWEEN RDS OR RBDS SYSTEM

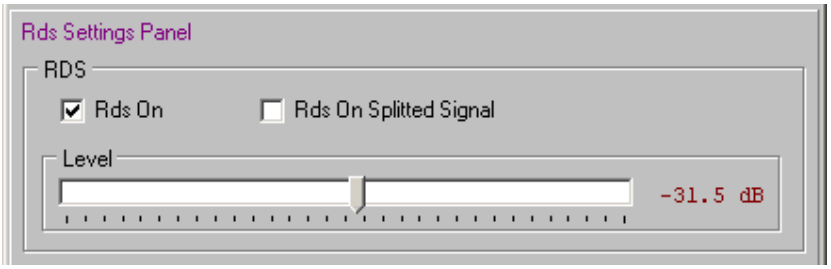
Selection of the Data System to be used (RDS or RBDS) can be achieved from the **SETUP** page in the Pc Control Software page, upon connection to a processor with the RDS/RBDS option installed.



Click OK to confirm. A the top of the page, the RDS section / menu will be enabled.:

18.3 CHANGING THE RDS / RBDS OUTPUT LEVEL

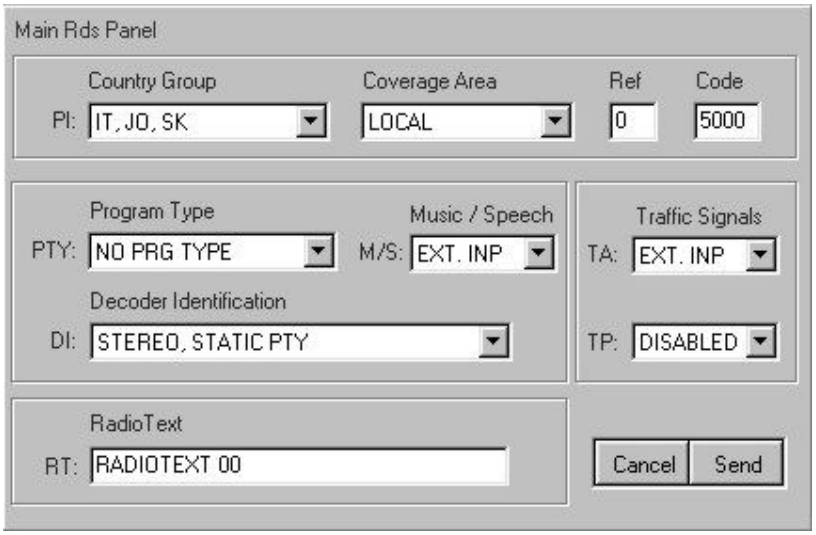
This can be achieved from the RDS Settings menu:



You may also switch RDS generation on and off and enable/disable RDS output while the Falcon 15 FM is on split (i.e. while it is replicating an external MPX signal on its output).

18.4 RDS: CONFIGURING THE SERVICES PI, PTY, DI, RADIO TEXT, TP, TA AND M/S

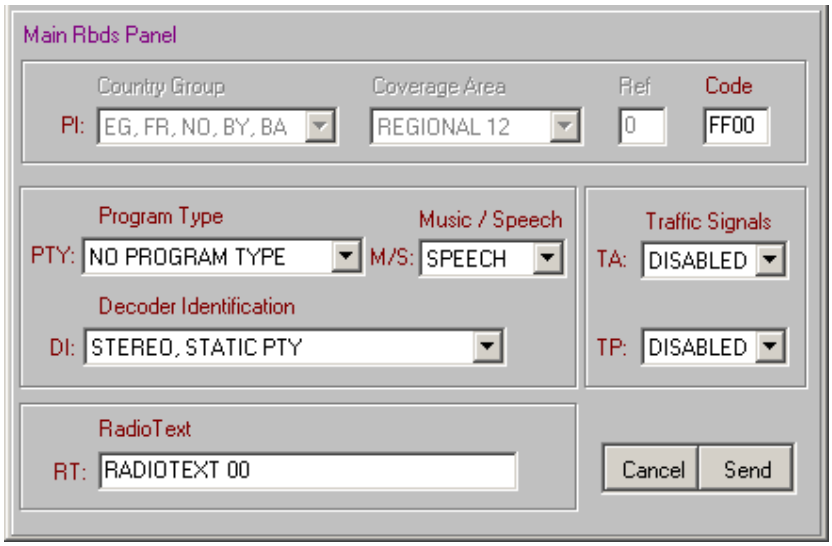
Access the RDS configuration section clicking the 'MAIN' button in the RDS Section. This will open the main screen, where you can set the main parameters of the RDS service.



Once you have finished loading one or more fields, click *Send* to enable one or more parameter changes or click *Cancel* to quit without save the changes.

18.5 RBDS: CONFIGURING THE SERVICES PI, PTY, DI, RADIO TEXT, TP, TA AND M/S

Access the RBDS configuration section clicking the '**MAIN**' button in the RDS Section. This will open the main screen, where you can set the main parameters of the RBDS service.



The hexadecimal PI code must be entered manually in the (Code) PI field.

Once you have finished loading one or more fields, click *Send* to enable one or more parameter changes or click *Cancel* to quit without save the changes.

18.5.1 RDS / RBDS SERVICES DESCRIBED

PI - Programme Identification

RDS:
It contains four hexadecimal numbers (see 'Code' box): the first one assigns the broadcast country and it is automatically provided from the application by clicking the country acronyms (see *Country Group*). The second hexadecimal number assigns the *coverage area* profile (i.e. national , local etc.) Click on the most suitable item inside the Coverage Area window and the application provides the hexadecimal corresponding number.The 'Ref' window contains a number from 1 to 255 (normally assigned from the law authorities to the broadcaster). If the entire hexadecimal code is already known, you can enter it into the 'Code' box.
RBDS:
In the United States the PI code is numerically calculated from the station's callsign.

PTY Programme Type

This is an identification number to be transmitted with each programme item and which is intended to specify the current Programme Type within 31 possibilities (News, Sports, Rock, Pop, etc.). This code could be used for search tuning. The code will, moreover, enable suitable receivers and recorders to be pre-set to respond only to programme items of the desired type. There are two lists, one for the European RDS system and one for the American RBDS specification.

DI Decoder Identification

This pull-down menu allows you to identify the kind of modulation (Stereo, Mono, etc). Stereo modulation is assigned to STEREO, STATIC PTY, while mono is MONO, STATIC PTY.

TP Traffic Programme

It is a flag to indicate that the tuned programme carries traffic announcements. The TP flag must only be set on programmes which dynamically switch on the TA identification during traffic announcements.

TA Traffic announcement

identification is an on/off switching signal to indicate when a traffic announcement is on air.
TA flag may also activated by proper **external command** provided through **Input 3** of the Digital Data Port (see EXT INP selection in the TA menu). Ref also to par. 11.10.

M/S Music/Speech

is a two-state signal to provide information on whether music or speech is being broadcast. The signal would permit receivers to be equipped with two separate volume controls, one for music and one for speech, so that the listener could adjust the balance between them to suit his individual listening habits.
M/S flag may also activated by proper **external command** provided through Input 2 of the Digital Data Port (see EXT INP selection in the M/S menu). Ref also to par. 11.10.

RT Radio Text

It is a function addressed only to consumer home receivers capable of displaying cyclical messages up to 32 characters in length, including spaces.

18.6 PROGRAM SERVICE NAME (PS)

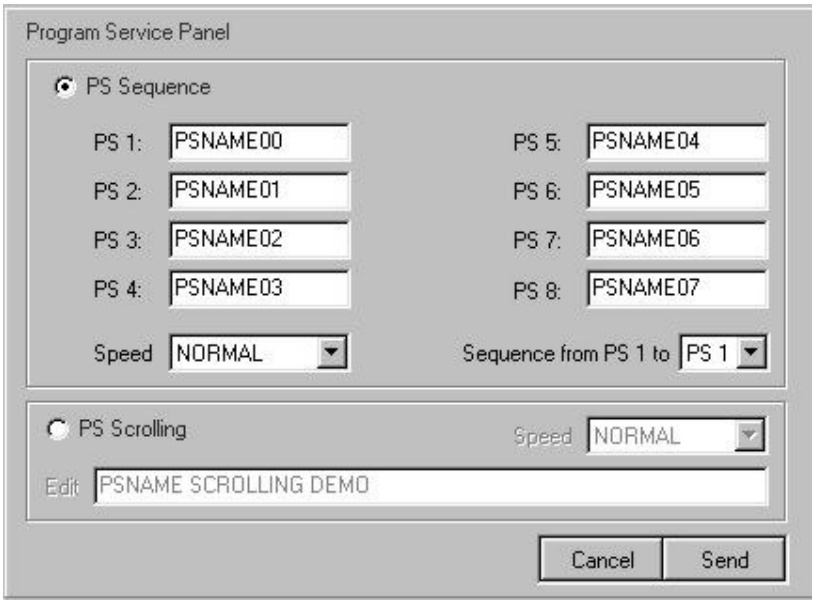
18.6.1 SCOPE

The PS feature is intended to denote the Program Service Name.
Both the European CENELEC and the American NRSC specifications for RDS/RBDS operation expressly forbid Dynamic PS as it may be a distraction to the drivers. Nonetheless, dynamic messaging is currently practiced worldwide.
For this reason, the RDS specification doesn't provide any provision for the dynamic use of the PS feature and its use is under the sole responsibility of the user.

If the PS is constantly changed, it is possible that some receivers will display a mixture of old and new PS message on the same display. In some cases, no PS will be displayed at all. This may occurs as message byte group order is not univocally recommended by the RDS standards and strictly depends on the coder/decoder physical implementation. Neither the RDS encoder nor the car receiver are faulty.

18.6.2 THE PROGRAM SERVICE NAME EDITOR

Click the PS button to access the main PS message window (Program Service Name).



PSN - Program Service Name is a text consisting of not more than eight alphanumeric characters which is displayed by RDS receivers in order to inform the listener what programme service is being broadcast by the station to which the receiver is tuned. An example for a PS name is "Radio 21".

The FALCON 15 PS panel allows You to broadcast single PS messages, PS sequences as well as PS Scrolling messages.

18.6.3 PS SEQUENCES

Falcon 15 allows You to easily create and broadcast sequences composed by up to 8 PS Names. You can also set the 'display speed' (related to the time it will last on the receiver display).

Having filled the fields PS 1, PS 2 , etc, to create a PS sequence You have just to select the last item of it, as the first item is set by default (PS 1).

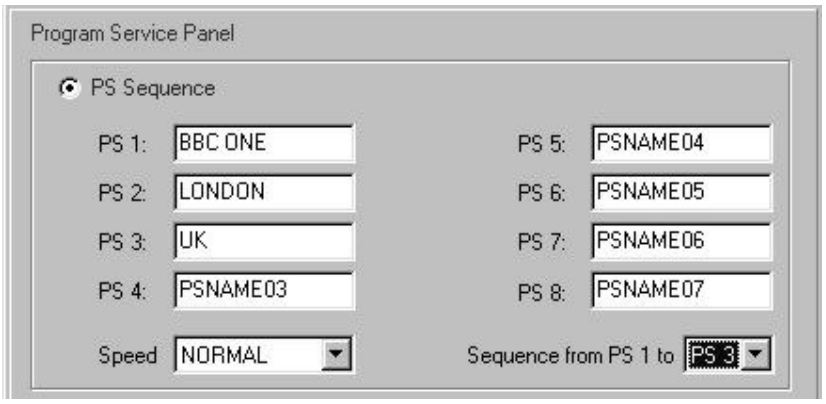
Different 'display rate' can be set for al the messages. Available options are listed in the SPEED pop-up menu (slowest, slow, normal, fast and fastest).

NOTE: the time needed for a receiver to properly receive and display a message is dependent upon the following:

- numbers of characters in the message
- repetition rate of data group / overall number of groups carried out by RDS signal
- reception conditions at the receiver
- software implementation of PS feature

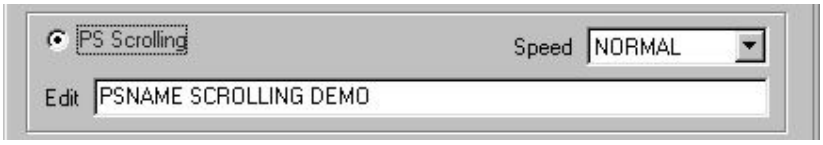
Further to these conditions, it is not possible to set a precise time duration for each PSN (i.e. number of seconds). Any way, 'normal' rate factor corresponds to an average display time of around 3 seconds. Please remind that *fast* and *fastest* rate factors are advisable only whenever a large number of groups is carried out by RDS signal.

Example



F.i., accordingly to the settings as in the picture here closed the PS sequence broadcast at all time will be: BBC ONE / LONDON / UK / BBC ONE / LONDON / etc.

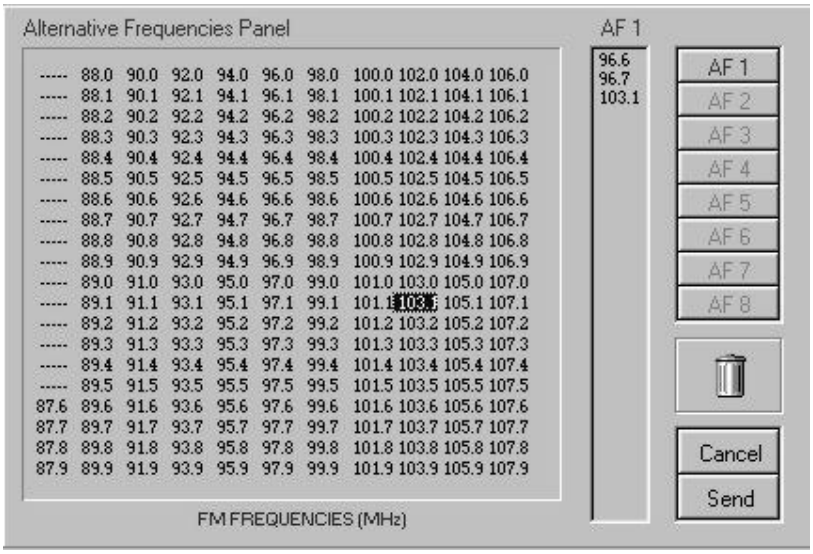
18.6.4 PS SCROLLING



PS Scrolling panel allows You to enter PS message which will scroll on the receiver display. It means, text is moved right to left across the display one character at a time at the rate set by the user (SPEED).
Max lenght: 32 characters.

In case of PS Scrolling selection, we therefore suggest to choose low display speeds.

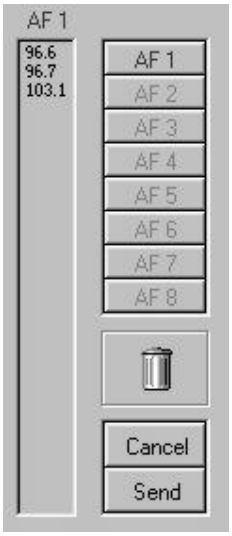
18.7 ALTERNATIVE FREQUENCIES



The list(s) of **alternative frequencies** give information on the various transmitters broadcasting the same programme in the same or adjacent reception areas, and enable receivers equipped with a memory to store the list(s), to reduce the time for switching to another transmitter. This facility is particularly useful in the case of car and portable radios.

The alternative frequencies (AF) list can be transmitted following two methods: A Method and B Method (see next page).
In both methods the alternative frequencies lists must contain only the frequencies of the adjacent transmitters and repeaters with overlapped transmitting areas.

To **compile the AF lists** use the following procedure:



- Choose one of the 24 lists (from AF1 to AF8)
- Select the AF from the available frequencies in the left window and drag & drop it into the AF list
- To remove a frequency from the list follow the procedure drag & drop to move to 'recycle bin' or cancel them by pressing on the 'Cancel' button.

A second loading procedure is provided:

- Click the label of the AF List to be filled (f.i., click AF2 label): it will turn red
- Double click the frequencies listed on the left window: selected frequencies will be automatically loaded into the highlighted list.

Lists containing at least one AF are shown in blu color.

18.8 AF METHODS A AND B

There are two ways to transmit lists of alternative frequencies: Method A and Method B.
In both cases the lists should include only those frequencies for the nearest transmitters and repeaters (with overlapping coverage areas).

Generally speaking, Method A is used when the list contains no more than 25 frequencies, and Method B when the list is longer (for a maximum of 24 lists).

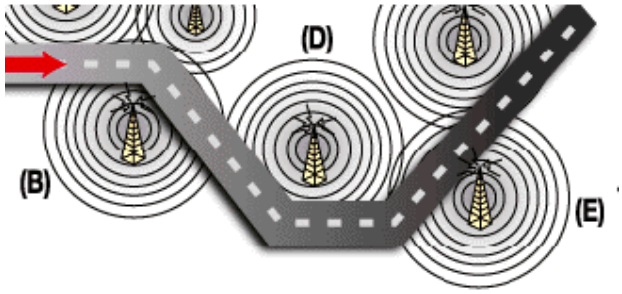
Method B is recommended when splitting areas or when different programs are broadcast.

NOTE: use of encoding method A or B is not explicitly assigned by a dedicated signal to the receiver, as the latter is capable of identifying which method is used by analyzing the transmitted data structure (whether or not they are organized in pairs).

METHOD A

Compile the AF1 list assigning the tuning frequency (i.e. the frequency carrying the list of alternative frequencies) in the first position, and then continue in strictly increasing order with the alternative frequencies transmitting exactly the same program.

We recommend recording the alternative frequencies (those of adjacent transmitters and repeaters with overlapping coverage areas) on each transmitter, being careful that the first position indicates the frequency carrying the list of alternative frequencies.



For example, in the situation shown in the figure three transmitters (B, D, E) intersect only in two coverage areas: between B and D, and between D and E. The following lists should be loaded in each transmitter:

Tx B lists (tuning frequency: f Tx B)	**AF1**	**AF2**	Note that the frequency of transmitter C is not included in the list, since the latter's coverage area does not overlap with that of transmitter A
	f Tx B	f Tx D	
	f Tx D	f Tx B	

Tx D lists (tuning frequency: f Tx D)	**AF1**	**AF2**	**AF3**	Coverage area D partially overlaps that of both transmitters B and E, and thus it is recommended to load the lists for both adjacent transmitters. Be careful to list all frequencies above the tuning frequency in ascending order.
	f Tx D	f Tx B	f Tx E	
	f Tx B	f Tx D	f Tx D	
	f Tx E			

Tx E lists (tuning frequency: f Tx E)	**AF1**	**AF2**	Note that the frequency of transmitter B has not been included in the list, since its coverage area does not overlap with that of transmitter E.
	f Tx E	f Tx D	
	f Tx D	f Tx E	

METHOD B

As mentioned earlier, Method B is used with high numbers of alternative frequencies and/or when the transmitter also has frequencies that broadcast different radio program at various times of day (splitting, local programming, etc.).

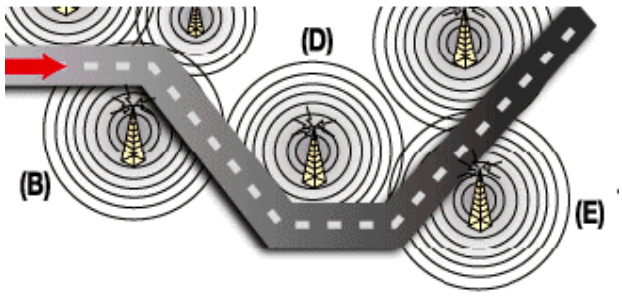
In the latter instance, the mobile receiver should check whether the AF is broadcasting the same content before selecting another frequency.

Each list begins with the *tuning* frequency (for which the list is valid) and then contains up to 12 **pairs of frequencies** in sequence, each containing the *tuning* frequency and an alternate. If there are more than 12 possible alternative frequencies, the list continues in other lists in the same manner.

The order of the frequencies in each pair follow the rules below:

- If the order is increasing, the alternative frequency broadcasts the same programming as the *tuning* frequency.

- If the order is decreasing, the two frequencies have different programming.



Returning to the example of transmitters B, D and E in the previous paragraph (in which the coverage areas of D and E do not overlap), two more lists will be assigned to transmitter B, sorted according to the above criteria to take into account any different programming by some of the AFs.

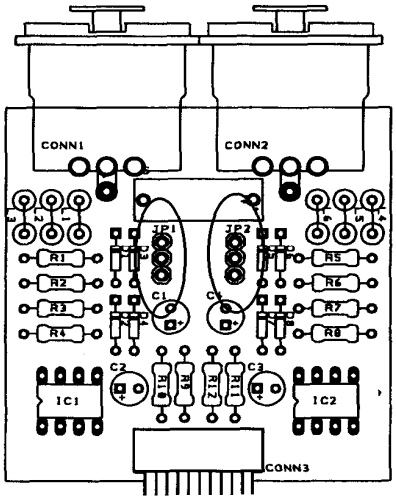
	AF1	AF2	
Tx B (tuning frequency: f Tx B)	f Tx B	f Tx D	Notice that the tuning frequency f Tx B is repeated twice in list 1: in the first position, then paired with f Tx D. Tx B broadcasts the same program as D if f Tx B < f Tx D, and different programs if f Tx B > f Tx D.
	f Tx B	f Tx D	
	f Tx D	f Tx B	

The AF lists for the other transmitters are compiled according to the same criteria, alternating the frequency pairs. NOTE: if the same tuning frequency is used by more than one transmitter within the same network, the corresponding AF lists must not be consecutive (for instance AF 1 and AF 2). Lists for different tuning frequencies must be placed between them.

19 HARDWARE SETTINGS

19.1 CHANGING THE INPUT AUDIO IMPEDANCE (*FM* VERSION)

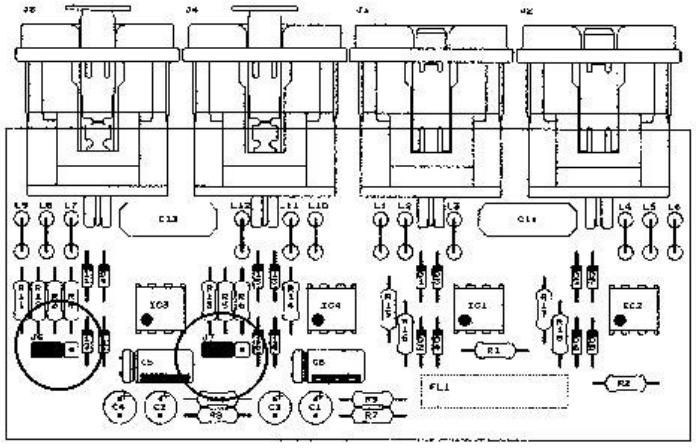
The analog input impedance may be set to 600Ohm, rather than 10kOhm, by moving the two jumpers JP1 and JP2 on the analog input board (see figure below).



JUMPER SET	FUNCTION
JP1	IMPEDENCE RIGHT INPUT 10KΩ (DEFAULT)
JP1	IMPEDENCE RIGHT INPUT 600Ω
JP2	IMPEDENCE LEFT INPUT 10KΩ (DEFAULT)
JP2	IMPEDENCE LEFT INPUT 600Ω

19.2 CHANGING THE INPUT AUDIO IMPEDANCE (*ST* VERSION)

The analog input impedance may be set to 600Ohm, rather than 10kOhm, by moving the two jumpers J6 and J7 on the analog input board (see figure below) to the right-hand position.



20 FIRMWARE E SOFTWARE UPGRADES

20.1 FIRMWARE UPGRADE

Falcon 15 comes from the factory with the most recent firmware installed just prior to shipping. When required, the firmware can be updated with the latest available version.

In order to upgrade the processor, please follow this procedure:

FW Upgrade can be performed on Windows 9x, ME, 2000, XP, NT platforms.

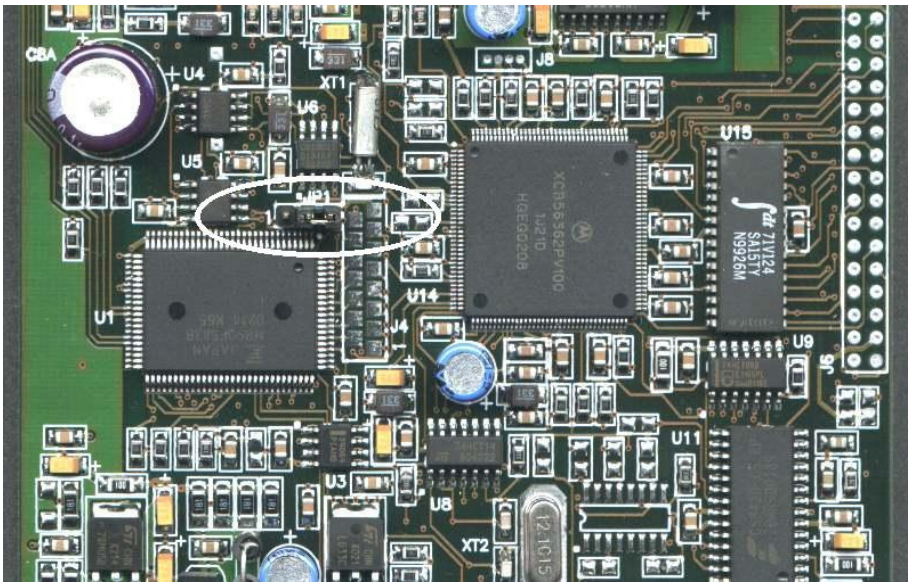
NOTE It is also possible to **install NEW plug-in** after purchasing (f.i., an MPX coder may be updated to MPX+RDS coder). For this aim, the processor must be retourned to the factory.

1) MAKING THE PROCESSOR READY FOR UPGRADING

A) shut off the unit

B) remove the equipment cover and the guarantee labels

E) set the jumper JP1 of the Mother board to the **LEFT (external**) position. Jumper is located near to the large battery, on the **left hand** (see highlighted jumper in the picture).



FIRMWARE PROGRAMMING NORMAL OPERATION

D) Connect the Falcon 15's **SERIAL** port **1** to that of the Host PC. Please insert (or remove) the serial connector only with processor turned off. A regular (i.e. not crossed) cable is required.

E) Turn the processor on.

F) make sure LED 1 on the front panel blinks (front panel display will be empty)

2) PC OPERATION

F) Close all opened applications on the PC**.**

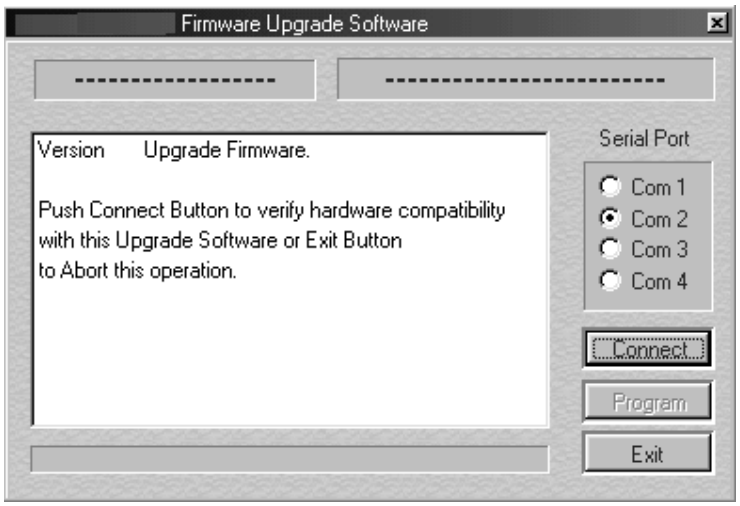
G) Access the **Fw UpGrades** folder

H) Double click the **file associated to the desired upgrade:**

- **Mpx_Upgrade** if Yr processor features **Stereo** Coder (Mpx output) **without RDS** coder (FM vers)
- **MpxRds_Upgrade** if Yr processor features **Stereo** Coder (Mpx) **with RDS** coder (FM vers)
- **BiChan_Upgrade** if Yr processor features **Stereo** output coder (ST vers)

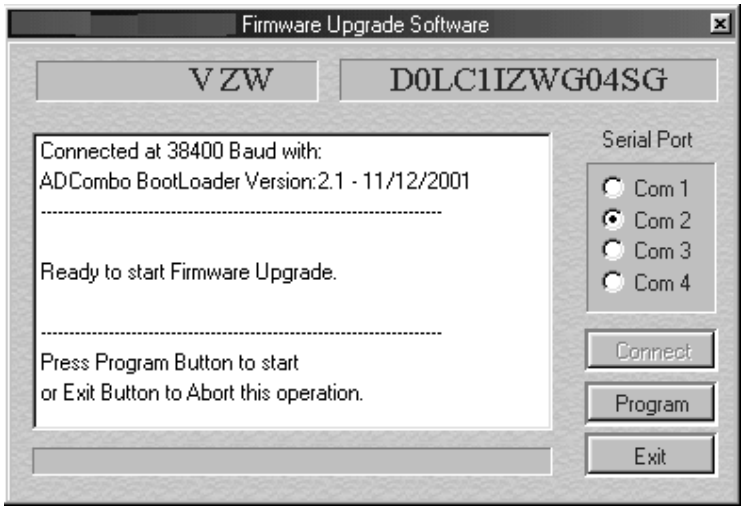
NB *to make sure of current version of Yr Falcon 15, please enter the Firmware Version page from the System Information menu.*

The following screen will be displayed:



I) Select the **PC serial port** on the screen

J) Click ***Connect*** button.



K) Make sure the Identification is correctly done (*Ready to start Firmware Upgrade* message + firmware code displayed in the right field), and click '**Program'** button**.** The upgrade will continue automatically.

L) Once you have completed the upgrade procedure, shut off the equipment.

M) Move the **jumper JP1** back to the previous position

N) Turn the processor back on.

20.2 PC SOFTWARE UPGRADE

It is recommended to completely **uninstall** the existing version before running the new one.

To uninstall the exisiting version, proceed as follows:

- enter the Windows «Control Panel»
- click on the « Install Applications » icon
- choose the item of current version from the list and select it
- click on the «Add/Remove» button
- confirm deletion of all proposed files

Access the PC Software folder

Run the Setup.exe file of the new Remote Control program

21 TECHNICAL SPECIFICATIONS

GENERAL FEATURES

Weight	Around 4.5 Kg
Dimensions	1 rack unit, 352 x 483 x 44 mm

AC Rate	220 Vac / 110 Vac
Preset curves	30, factory programmed

ANALOG STEREO AUDIO INPUT

Conversion	24 bit
Connector Type	XLR female el. balanced
Max Input Level	+ 20 dBu
Level Range	-12 dBu to 12 dBu (1 dB step)
Impedance	600Ohm / 10KOhm EMI -suppressed
AGC Range	+/- 20dB (Sensitivity Relative)

DIGITAL AUDIO INPUT (optional)

Connector Type	XLR el. bal. + optical Tos link
Formats	AES/EBU, SPDIF
Sampling Rates	32 KHz / 44.1 KHz / 48 KHz / 96 KHz
Configuration	automatic selection and jitter correction
Input Sensitivity	200 mVpp
AGC Range	0 to -20dBFs

AGC OPERATION

AGC Speed	0 to 6 dB/sec (adjustable - 0.2 dB step)
AGC Hold time	Selectable, from 0 to 3 sec

AGC Max Gain	Selectable 8, 10, 12, 15 or 20 dB

PROCESSING

N° of Bands	3 (Bass, Mid, High)
N° of presets	30
BASS Compress.	THR: related to the chosen Preset ATCK Time: 80ms, REL Time: 250ms Compr. Ratio: 1:INF
MID Compressor	THR: related to the chosen Preset ATCK Time: 30ms, REL Time: 90ms Compr. Ratio: 1:INF

HIGH Compress.	THR: related to the chosen Preset ATCK Time: 10ms, REL Time: 50ms Compr. Ratio: 1:INF
Broadband Limiter	ATCK Time: 5ms, REL Time: 50ms
Dynamic expander (noise gate)	Applied to high frequencies band Gate threshold adjustable between - 51dB and - 80dB Expansion ratio 2 : 1 (fixed)

STEREO AUDIO OUTPUT (ST version only)

Connector Type	XLR male el. balanced
Conversion	24 bit
Impedance	600Ohm / 10KOhm EMI -suppressed
Level	- 10 dBm to +14 dBm (0.5 dBm Step)

REMOTE CONTROL

Serial Ports	2 RS232 SubD 9P optically decoupled
Baud Rate	19200 Baud

LOW PASS 15 KHz INPUT FILTER

IIR 8Th-Order-Elliptic , 15KHz / -0.1dB, 17KHz / -60dB

BY-PASS MODE AGC Off, Gain Ofst 0dB,Out Lvl 0dB

Frequency Resp.	30 Hz-15 KHz (+/- 0.1 dB)
Output Noise	-90 dB (A-weighted)
THD	0.01%
PassBand Ripple	+/- 0.1 dB

SIGNAL PROCESS FILTERS

LP 400Hz	IIR 2th Order-Butterworth
BP 400Hz-5Khz	IIR 4th Order-Butterworth
BP 5Khz-15Khz	IIR 4th Order-Butterworth
High Fr. Denoiser	Threshold Adjustable –51 to -80 dB

MPX OUTPUT (FM version only)

Conversion	24 bit
Pilot Frequency	19 KHz ± 1 Hz
Pilot Injection	–15.5 to –25.0 dB (0.1 dB step) (from 5.6 % to 16.8 %)
Pilot Phase	Adjustable +/- 12 degrees (1 dB step)
S/N	>85 dB
Stereo Separ.	55 dB Typical on the whole band
Crosstalk M / S	60 dB

Crosstalk S / M	60 dB
38 KHz Suppr	Less than measurable level
MPX out level	-9.0 dBm to + 15.0 dBm (0.1 dBm Step)
Output Imped.	600 Ohm
Output Connector	BNC floating over chassis, EMI supp.
Pilot ref. output	TTL Level Wave
Preemphasis	50 / 75 usec

AUX INPUTS (1 and 2) (MPX version only)

Connector Type	floating BNC, EMI suppressed	**Impedance**	10KOhm
Input Level	- 40 to 0 dBm	**Purpose**	SCA, RDS inputs

RDS / RBDS CODER (FM version only)

Supported Standards:	RDS (Radio Data System), conforming to the standard CENELEC EN50067 RBDS (Radio Broadcast Data System) conf. to the standard NRSC
Standard coding methods	PI, TP, TA, M/S, RT, PSN, PTY, DI, AF (8 lists)
Custom coding methods	PS Sequence (up to 8 messages), PS Scrolling (up to 32 characters)
RDS subcarrier freq.	57 kHz +/- 3 Hz
RDS output level	Adjustable from – 44.0 dB to – 20.0 dB (0.1dB/Step)
Synchronization	To internal 19Khz pilot tone

22 WARRANTY

The manufacturer offers a 1-year ex works warranty.
Do not open the equipment. The warranty shall be voided if any of the warranty seals are broken.
The manufacturer shall not be liable for damage of any kind deriving from or in relation to incorrect use of the product.