



# Falcon 50 FM

6 Band - Digital Audio FM and DAB Processor



- Dual LCD front display version available
- Automatic or manual switching between inputs
- 50 factory presets + 50 user-definable
- Built-in High Performance Stereo Generator
- Dual composite outputs
- ITU-compliant MPX power control
- Widest range of processing controls
- Improved peak limiting system
- Analog and Digital Stereo I/O
- Day-part automation
- Software Remote Control via serial, USB & IP
- Optional DAB output module

Relying on Axel Technology's extensive know-how in audio processing techniques, the Falcon 50 has been designed and built using a new approach that incorporates the most up-to-date components and technologies. Its efficient design allows the Falcon 50 to produce top-level results in a cost-effective way.

The largest control set allows you to paint a truly unique and competitive on-air sound: from detailed and flat to heavy and loud. Its exceptional audio quality is maintained even at extreme settings.

Whether your audio system contains analog, digital or both formats, the Falcon 50 can be configured to fit in perfectly. A sophisticated module allows flexible switching between inputs, e.g. for emergency purpose. Fail-safe operation is assured by an internal bypass on all the audio and MPX I/O circuits.

Two Composite Baseband Outputs are provided, each with independent level control. The MPX clipping stage is user-enable and adjustable. MPX power can be limited accordingly to ITU R-BS 412 Specification.

Two serial RS232 ports, an USB port and a TCP/IP Ethernet connection (the latter available as an option) permit remote control and monitoring from almost any location through the use of a standard PC and the dedicated control software which comes with the unit.

Falcon 50 set up is quick and easy, thanks to a wizard based on less/more controls. User-configurable remote control functions (including preset programming) are available through optocoupled inputs. For more convenience, a complete day-part automation is also completely self-contained.

Basato sull'ampio know-how acquisito da Axel Technology nel campo del processamento audio, Falcon 50 è stato progettato e realizzato utilizzando il più moderno design e le più moderne tecnologie. La sua efficiente architettura consente di ottenere risultati di altissimo livello al miglior rapporto qualità / prezzo.

L'ampio set di controlli permette di disegnare un 'sound' veramente unico e competitivo: sia esso dettagliato e neutro o incisivo e forte. L'eccezionale qualità audio è mantenuta anche nelle condizioni più estreme.

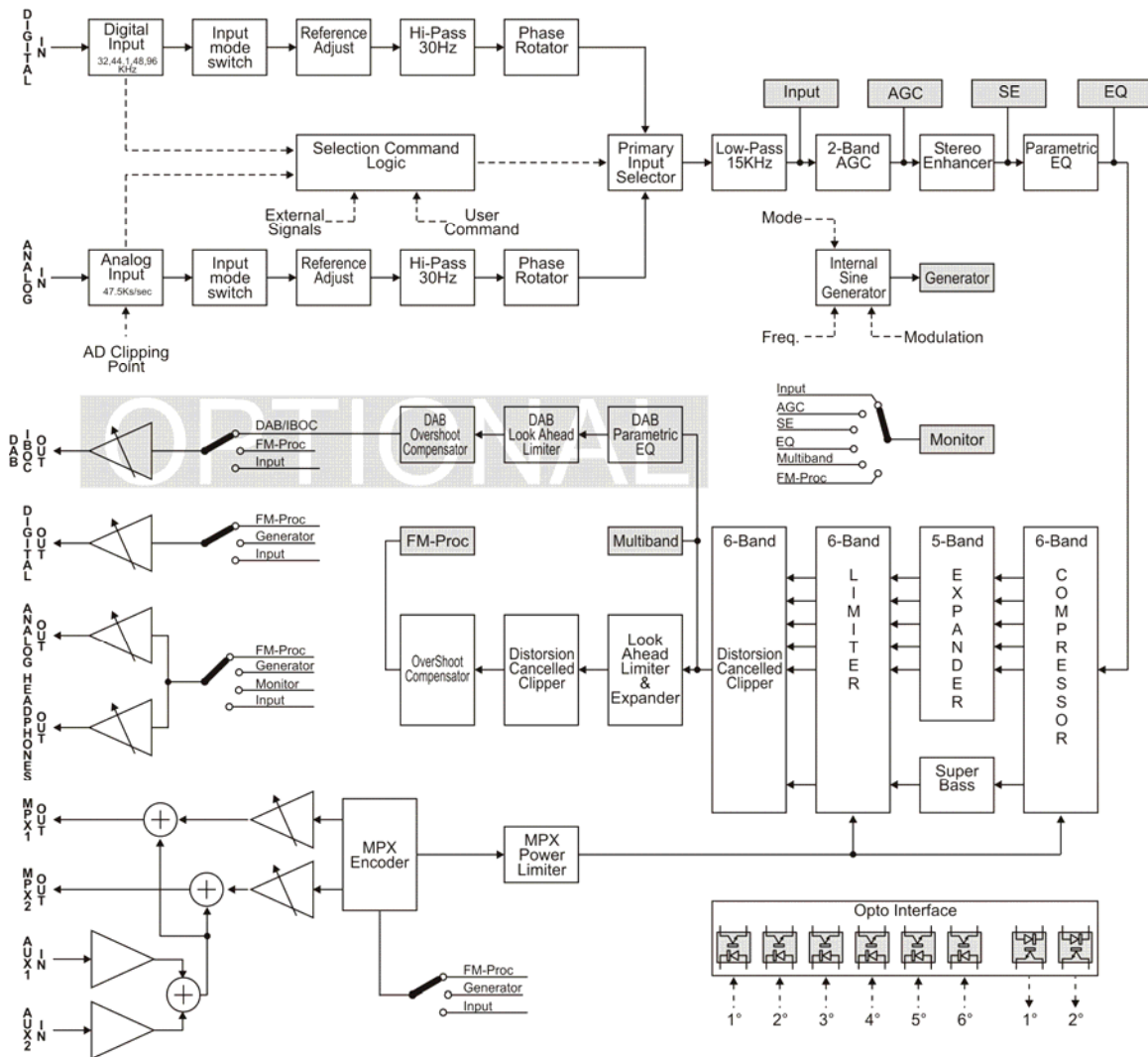
Falcon 50 si adatta perfettamente sia a sistemi audio di tipo analogico che digitale. Un sofisticato modulo consente una flessibile commutazione tra gli ingressi, ad esempio in caso di emergenza. Bypass interni su tutti i circuiti audio e su quello MPX assicurano la continuità di trasmissione in ogni condizione.

Due sono le uscite MPX fornite, ognuna delle quali dotata di controllo di livello indipendente. Uno stadio di clipping Mpx è abilitabile e regolabile. La potenza di uscita Mpx può essere limitata in conformità alle norme ITU.

Due porte seriali RS232, una porta USB ed una connessione Ethernet TCP/IP (disponibile su opzione) permettono il controllo remoto a qualunque distanza e da qualunque Pc dotato del software di controllo a corredo.

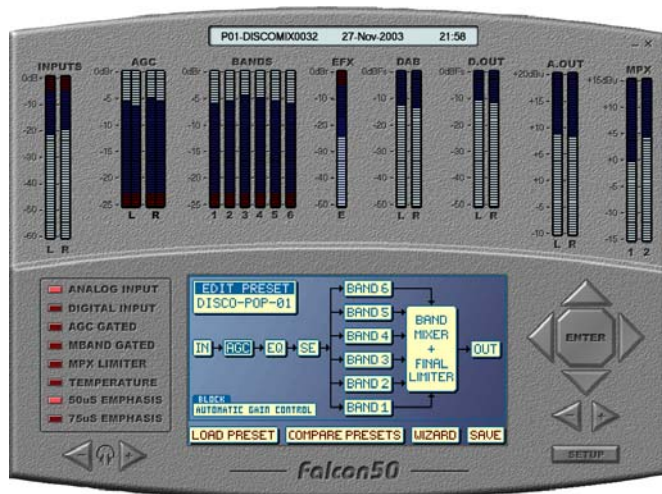
Il set-up del Falcon 50 è semplice e rapido, grazie anche ad una procedura *Wizard* di tipo *less / more*. Varie funzioni di controllo remoto (tra cui il cambio di preset) sono configurabili e disponibili su ingressi fotoisolati. Il cambio di preset è inoltre totalmente programmabile tramite un apposito scheduler su base settimanale.

# Block diagram



Remote control software screen displays current level of multiple parameters. Controls are grouped accordingly to the processor's block diagram. Double clicking on each block will let You access the associated parameters.

Suitable presets can be build by the Administrator and three-level lock functions can be applied to ensure no unintended change of settings by the daily user.



Il pannello del software di controllo remoto mostra il livello corrente di tutti i parametri di lavoro. I controlli sono raggruppati secondo lo schema a blocchi del processore: Un doppio click su ciascun blocco darà accesso a tutti i parametri associati a quel determinato blocco. Possibilità di definire vari livelli e diritti di accesso, dall'Amministratore, all'editore della radio all'utente base

## A sophisticated 6 Band process

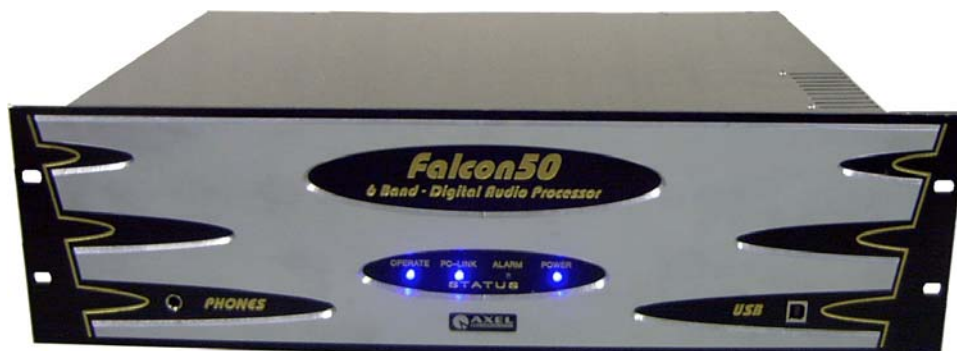
Main features of Falcon 50 architecture are:

- Bi-channel, two-band AGC. Selectable coupling between bands and Left/Right channels
- Integrated effects: STEREO ENHANCER, SUPER BASS, BRILLIANCE. 3-band parametric equalizer
- Cross frequencies between bands selectable among 5 banks containing 6 filters each
- Capability for a virtually reduced number of bands thanks to elastic coupling between band compressors
- Complete set of controls for each band: Clipping Level / Mode, Threshold, Attack & Release time of limiters and compressors, Threshold + Expansion factor of Expanders
- “Solo” function for separated listening of each band
- 6 band mixing before final Limiter
- Full-antialiased process with X8 over-sampling
- Separated process for signals DAB/IBOC compliant (available as an option)

## Un sofisticato processo a 6 bande

Le principali caratteristiche dell'architettura del Falcon 50 sono:

- AGC a due Bande, con struttura bi-channel. Accoppiamento selezionabile tra le due bande e tra i canali destro e sinistro.
- Effetti integrati: STEREO ENHANCER, SUPER BASS, BRILLIANCE. Equalizzatore a 3 Bande parametrico
- Frequenze di incrocio delle bande selezionabili tra 5 banchi di 6 filtri ciascuno
- Possibilità di operare virtualmente con un numero minore di bande grazie all' accoppiamento elastico tra i compressori delle varie bande
- Completo set di controlli per ogni banda: Modalità e Livello di Clipping, Threshold, Tempi attacco / rilascio di compressori e limiters e Threshold/fattore di espansione degli Expander
- Funzione “solo” per l'ascolto indipendente di ciascuna banda
- Mix delle 6 bande prima del Limiter finale
- Processo full antialiased con fattore di sovracampionamento X8
- Processo separato per la generazione di segnali adatti alla trasmissione in sistema Dab o IBOC (su opzione)



“blind” version

## TECHNICAL SPECIFICATIONS

GENERAL	
Dimensions	3 rack unit, 352 x 483 x 132 mm
Weight	Around 7 Kg
~ AC Rate	230 Vac 50 Hz / 110 Vac 60 Hz +/-10%
Power consumption	25 VA
Type of power supply	Transformer- based

AC MAINS FUSE	
Ratings	315 mA (for 230 Vac), 640 mA (for 115 Vac)
Dimensions	5 x 20 mm glass tube
Type	Timed (slow blow)

<b>SYSTEM PERFORMANCE (FM ANALOG)</b>	
<b>Minimum Processing Delay</b>	Delay is as low as technically possible: max 4 msec for all processing curves.
<b>Frequency response (Bypass Mode; Analog Processing Chain)</b>	Follows standard 50µs or 75µs pre-emphasis curve 30 Hz-15 KHz (+/- 0.1 dB)
<b>Pre-emphasis selection</b>	Analog L/R output and Digital output can be user configured for flat or pre-emphasized output.
<b>Process Sample Rate</b>	Depending on processing performed, from 47.5 to 760 KHz
<b>Total System Distortion</b>	Less than 0.008% on the whole band- (0.005% @ 1Khz)
<b>Noise</b>	The Falcon50's noise floor, in bypass mode, is primarily governed by the dynamic range of the 24-bit Crystal Semiconductor CS4272 A/D Converter, which has a specified Dynamic Range of 114 dB. The signal processing core uses a 24-bit architecture, which provides a 24x6 = 144 dB dynamic range
<b>Total system separation</b>	Greater than 70 dB, 30 Hz – 15 kHz
<b>Defeatable Analog FM Processing delay</b>	10 sec maximum, for perfect synchronization between analog and HD Radio at the receivers.

<b>AUDIO PROCESS CONTROLS</b>	
<b>Processed Bands</b>	6
<b>Agc Bands</b>	2
<b>Compressors</b>	6
<b>Limiters</b>	6
<b>Expanders</b>	6
<b>Speech Detector</b>	Yes
<b>Sound Enhancing Controls</b>	Stereo Enhancer, Super Bass & Brilliance
<b>Band Mixing &amp; Solo Control</b>	Yes
<b>Parametric Equalizer</b>	Yes
<b>Mpx power Limiter</b>	Yes
<b>Look Ahead Process</b>	Yes

<b>ANALOG AUDIO INPUT</b>	
<b>Input Configuration</b>	Stereo / Mono L+R / Mono R / Mono L. Flat or pre-emphasized (at 50µs or 75µs), software-selectable.
<b>Input impedance</b>	600 ohms / 10K ohms electronically balanced jumper selectable
<b>Nominal Input Level</b>	Software adjustable from --10dBu.0 to +15.0 dBu
<b>A/D Conversion</b>	Crystal Semiconductor CS4272, 24 bit, 128 oversampled 192Khz delta sigma converter.
<b>Max Input Level</b>	24dBu
<b>Input Signal-to-Noise</b>	112 dB (A weighted)

<b>ANALOG OUTPUT</b>	
<b>Configuration</b>	Stereo. Flat or pre-emphasized (at 50µs or 75µs), software-selectable. +-3µs software-selectable preemphasis correction
<b>Source Impedance</b>	50 ohms
<b>Load Impedance</b>	600 or greater, balanced or unbalanced. Termination not required, or recommended.

<b>Output Level</b>	(100% peak modulation):Adjustable from -5 dBu to +20 dBu peak, into 600 ohms or greater load, software-adjustable. 120% Peak Modulation Allowed
<b>Stereo CrossTalk</b>	> -70 dB, 20 Hz–15 kHz
<b>Signal-to-Noise</b>	>100dB (A Weighted)
<b>Distortion</b>	0.005% THD
<b>D/A Conversion</b>	Crystal Semiconductor CS4272 128x oversampled 192Khz Sigma Delta

<b>DIGITAL AUDIO INPUT</b>	
<b>Connector Type</b>	XLR female & optical tos/link. XLR transformer balanced & floating. 110 Ohm impedance
<b>Formats</b>	AES3/EBU & Spdif
<b>Input Rates</b>	32/44.1/48/64/88.2/96KHz with automatic selection and jitter correction
<b>Nominal Level adj</b>	From 0.0dBFs to -25dBFs (0.1dBu Step)
<b>Dynamic Range</b>	125dB (Typ), 122dB (Min)
<b>Resolution</b>	16 / 20 / 24 bit
<b>Input Modes</b>	Stereo, Mono L+R, Mono L, Mono R, L/R Swapped, separated R & L polarity inversion
<b>Phase Rotator &amp; Hi Pass Filter</b>	Selectable & Configurable separately from Analog Input

<b>DIGITAL AUDIO OUTPUT</b>	
<b>Connector Type</b>	XLR male & optical tos/link. XLR transformer balanced & floating. 110 Ohm impedance
<b>Formats</b>	AES3/EBU + S/Pdif
<b>Sample Rates</b>	32/44.1/48/64/88.2/96KHz internal or synchronized to Digital Input / AES-EBU SYNC Input
<b>Output Level</b>	From -25 dBFs To 0.0 dBFs (0.1dBFs Step)
<b>Word Length</b>	16 / 20 / 24 bit
<b>Configuration</b>	Two Outputs, one for analog FM processed signal, one for HD/DAB processed signal. The FM output can be configured in software as flat or pre-emphasized (50 or 75 usec).

<b>COMPOSITE BASEBAND (MPX) OUTPUT</b>	
<b>Configuration:</b>	Two electrically independent outputs. Software based level adjustment.
<b>Connectors</b>	Two BNC, floating over chassis ground, EMI suppressed.
<b>Source Impedance:</b>	10 Ohms. Single-ended and floating over chassis ground.
<b>Load Impedance:</b>	50 Ohm or greater. Termination not required or recommended.
<b>Output Level Range:</b>	from -10dBu to +15dBu Software selectable.
<b>Pilot Level:</b>	Adjustable from 5.0% to 20.0%, software controlled.
<b>Pilot Stability:</b>	19 kHz, $\pm$ 0.5 Hz. (available on special order). Standard: 19 kHz, $\pm$ 1 Hz
<b>D/A Conversion:</b>	Burr Brown PCM1738, 24-bit sigma delta D/A converter.
<b>Signal-to-Noise Ratio:</b>	-95 dB (Bypass mode, de-emphasized, 20 Hz – 15 kHz bandwidth, referenced to 100% modulation, unweighted).
<b>Distortion:</b>	$\leq$ 0.01% THD (Bypass mode, de-emphasized, 20 Hz – 15 kHz bandwidth, referenced to 100% modulation, unweighted).
<b>Stereo Separation:</b>	Greater than 70 dB, 30 Hz – 15 kHz
<b>Linear Crosstalk:</b>	>-80 dB, main channel to sub-channel or sub-channel to main channel (referenced to 100% modulation).

<b>38 kHz Suppression:</b>	>= 70 dB (referenced to 100% modulation).
<b>Pilot Protection:</b>	> -65 dB relative to 10% pilot injection, $\pm$ 1 kHz.
<b>57 kHz (RDS/RBDS) Protection:</b>	better than -50 dB.
<b>Maximum Load Capacitance:</b>	5nF

<b>DAB-IBOC OUTPUT MODULE (OPTIONAL)</b>	
<b>Connectors</b>	XLR male & optical tos/link
<b>Formats</b>	AES3/EBU
<b>Sample Rates</b>	the same as the Digital audio Output
<b>Output Level</b>	0.0 dBFs to – 25.0dBFs (0.1dBFs Step)
<b>Group Delay</b>	5 ms

<b>DAB-IBOC MODULE CONTROLS</b>	
<b>Low Pass Filter</b>	On/Off, Gain & Slope
<b>Mid Range Filter</b>	On/Off, Gain & Width
<b>Hi range Filter</b>	On/Off, Gain & Slope
<b>LookAhead Limiter</b>	Drive & LookAhead Time
<b>Overshoot Comp.</b>	On/Off

\*All DAB Parametric equalizer filters are processed at 47.5 Ksamples/sec.

\*The LookAhead Final Limiter & The Overshoot Compensator are processed at 190 Ksamples/sec

<b>COMPUTER INTERFACE</b>	
<b>Connection capabilities</b>	Serial, Modem , 10/100BaseTX Ethernet. and USB
<b>Modem:</b>	Any dial-up modem – either GSM or Pots - can be connected to Serial Port for remote control. Modem and other external equipment is not supplied.
<b>Serial Port:</b>	1 Standard RS-232 opto-isolated,38400 Baud
<b>TCP/IP Ethernet:</b>	RJ45 connector for 10-100 Mbps networks using CAT5 cabling
<b>Universal Serial Bus (USB)</b>	Two optoisolated USB 2.0 ports (front + rear)
<b>Pc Control Software</b>	Dedicated, running on Windows XPsp2 or Windows 2000 Professional sp4.
<b>PDA Control Software</b>	Dedicated, running on Windows CE.

<b>GPI/O INTERFACE</b>	
<b>Remote Control Trigger Interface</b>	Six (6) inputs and Four (4) Outputs opto-isolated and floating.

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