



LPFM

LOW POWER FM EQUIPMENT GUIDE



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One of the challenges in launching a new LPFM station is assembling a package of equipment that provides the reliability and ease of use required for broadcast use and also meets your budget requirements. Wheatstone Corporation has been providing equipment for broadcasters large and small for over 35 years, and we have put together this guide to assist you in choosing the right gear for your new venture!

Studio Equipment

- 1. Microphone** – choose a directional (cardioid) mic. This will provide better rejection of background noise. A mic without an On/Off switch will help you avoid having a mic accidentally switched off. Your audio board should handle the mic On/Off Function
- 2. Microphone boom arm** - for mounting your mic as in the photo on facing page.
- 3. Microphone processor** - a mic processor conditions your mic audio by giving it a consistent output, reducing unwanted background noise, improving intelligibility, and creating the most sonically pleasing on air sound for your talent.
- 4. Audio Source Equipment** - CD Players, Turntables, MP3 Players, Tape Machines. These will be determined by the various media types you intend to use for audio playback.
- 5. PC** - a PC may be used for audio playback of individual files. It may also be used in conjunction with automation software for playback of multiple audio files controlled by a schedule (playlist).
- 6. Monitor Speakers** - a good set of stereo speakers will work for this, though you may want to look into speakers specifically designed for this task. They are usually listed as "Studio Monitors"
- 7. Headphones** - look for the "closed ear" variety. This eliminates bleed into open microphones. Also look for headphones with 1/4" plugs - your audio board should have a 1/4" headphone output.
- 8. Audio Board (Console)** - the most critical piece of gear in your studio. The console mixes all your sources (mic, CD Players, PC, etc.) to create the program output that is sent to your on air processing and transmitter. A real broadcast board will offer speaker muting that mutes your monitor speakers when your mic is on, eliminating the possibility of feedback. It will provide a means of controlling an On Air Tally (light) to alert others that you are currently on air with a live mic. The console should not have numerous knobs and controls for unneeded functions, typical of many music store mixers. These provide many opportunities to do harm to your program! The console is also the most heavily used piece of equipment you will own, so reliability and build quality are of utmost importance.
- 9. EAS decoder** - you will be required to rebroadcast emergency alerts that you receive from the Emergency Alert System (EAS). The EAS decoder will receive these alerts for rebroadcast.
- 10. Phone Hybrid** - a phone hybrid separates incoming audio (the caller) from outgoing audio (the in studio talent). When these signals are separate you can insure that caller audio is not sent back to the caller. Broadcast audio consoles can create the return signal (called mix-minus, ie: the program mix, minus the caller audio).
- 11. FM Receiver / Modulation Monitor** - the Mod Monitor helps you make sure you are not modulating above FCC limits. Most Mod Monitors also have an audio output that can be used as your off air audio monitor. Your transmitter may have a deviation meter. If so it may be adequate for mod monitor use, in which case you'll need an FM tuner for off air monitoring. PLL varieties that stay locked on frequency are best.





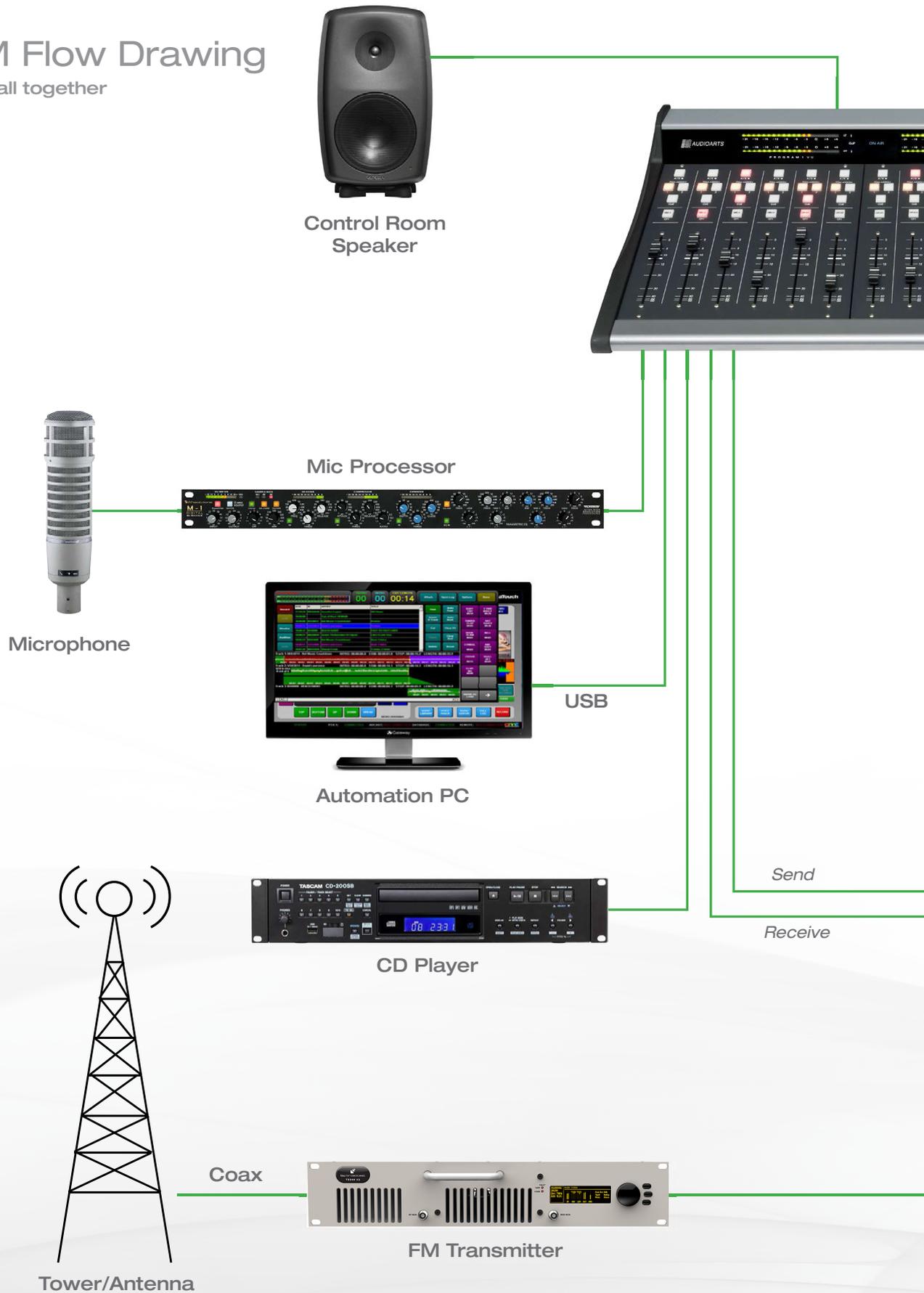
Transmission Equipment

1. **On Air Processor** - your on-air processor conditions your final program output before it is sent to the transmitter. It determines your overall station sound and allows you to broadcast the loudest, cleanest signal without overmodulating. It also contains a stereo generator to produce the composite signal required by your transmitter for FM Stereo broadcast.
2. **Transmitter** - depending on your antenna type and Height above average terrain (HAAT) you'll typically need a 100 to 200 watt transmitter.
3. **Antenna** - your dealer for RF equipment can help you choose a suitable antenna. Polarization and the number of bays are variables in this decision.
4. **Tower or mast** - various options here include leasing space on an existing tower, mounting your antenna on an existing structure such as a church steeple, or building your own dedicated tower. Your RF dealer can advise you here as well.
5. **Studio to Transmitter Link (STL)** - If your transmitter is in the same building as your studio or in near proximity you can use a balanced audio connection. For longer distances you can look at microwave links, unlicensed wireless Internet radios, or streaming over public Internet.
6. **Cables and Connectors** - in addition to the audio cabling required you will need good low attenuation coax cable to connect your transmitter to the antenna



LPFM Flow Drawing

putting it all together





low power FM

Let us help with your system!

Wheatstone's Audioarts consoles are the finest analog consoles available AND represent the greatest value.



Audioarts 08 Audio Console

Made for the demands of professional broadcasting, the Audioarts 08 is designed for fast-paced, live on-air, streamed or produced applications with easy access to controls. In one compact frame, the Audioarts 08 covers all the basics with a single stereo mixing bus (balanced or unbalanced output); two mic inputs (one for guest, and one for host); USB input to play in audio from a PC; USB output to record directly to PC recording software; mix-minus telephone output for interfacing to a telephone hybrid; monitor, headphone and cue for off-air monitoring; speaker mute for muting monitor speakers when the mic is on (eliminating the possibility of feedback); and unbalanced or balanced inputs/outputs for interface with consumer or professional grade equipment.



Audioarts AIR-1 Audio Console

The Air-1 has everything you need for on-air, production, news applications, and podcasting at a fraction of the cost of larger consoles. The Air-1 accepts two mono microphone inputs and six stereo inputs that can be routed to one or both of the console's stereo outputs, along with a comprehensive metering and monitoring section usually found in larger designs. Bottom-mounted dipswitches are included for easy programming. A USB audio port provides access for a computer or automation system to send and receive console audio.



Audioarts AIR-4 Audio Console

The Air-4 has four microphone preamps built in, which allows the use of a host microphone and three guest microphones without the use of any external mic preamps. It gives you 12 input faders (with A-B source select), a thirteenth fader with talkback and auto mix-minus for call-ins, external machine control, two program busses, built-in CUE speaker and Control Room, headphone and studio monitoring control.

With basic features like machine control, cue, talkback, and mix-minus included, it's perfect for smaller stations looking to upgrade as well as for larger facilities in need of an auxiliary studio or newsroom console. Add patchable USB connectivity for PC news, production workstations or streaming audio, and the Air-4 is perfect for local radio stations and Internet broadcasts.



Audioarts AIR-5 Audio Console

The Air-5 audio console is a 16-fader console with USB input/output connectivity that has all the essentials for smaller studios or for newsrooms. The Air-5 has four microphone preamps built in, which allows the use of a host microphone and three guest microphones without the use of any external mic preamps. It gives you 16 input faders, plus auto mix-minus for call-ins, two program busses, built-in CUE speaker and CR, and headphone and studio monitoring control.

With basic features like cue, talkback, and mix-minus included, it's perfect for smaller stations looking to upgrade as well as for larger facilities in need of an auxiliary studio or newsroom console. Add USB connectivity for PC news, production workstations or streaming audio, and the Air-5 is perfect for news and internet broadcasts.

low power FM

Let us help with your system!

Processing is an integral part of your broadcast. It keeps levels in check, makes you sound your best, and can really make you stand out.



FM-25 On Air Processor

The FM-25 includes intelligent two-band AGC technology — or iAGC — coupled to a multiband limiter and stereo generator. The combination provides automatic, real-time program density control for a consistent, spectrally-balanced sound regardless of density variations in incoming source material. Other features of the FM-25 include stereo enhancement and program adaptive L-R control for multipath mitigation. The composite output signal is available as traditional analog via twin rear panel BNC connectors and simultaneously as Wheatstone’s baseband192 digital multiplex technology.

The FM-25 represents a true value for the LPFM broadcaster, and can be packaged with an Audioarts Air-1, Air-4 or O8 mixer for on-air, production and processing at an affordable price.



FM-55 On Air Processor

Our FM-55 audio processor is ideal for LPFM or any FM station requiring sound consistency across a variety of source material. We engineered a new multiband iAGC — or intelligent AGC — coupled to a five-band compressor and limiter so that you can produce a consistent, spectrally-balanced sound regardless of density variations in incoming source material.

Add the FM-55 to an Audioarts Air-1 or Air-4 console, and you’ll have just about everything you need for on-air, production and processing at an affordable price.



M-1 Voice Processor

The features on the M-1 include a four band parametric EQ, hi and lo pass filters, de-esser, expander, and our proprietary Vorsis dynamics processing. The unit comes loaded with factory designed presets, and designing your own is easy thanks to the Quick Save and Quick Compare functions. A simple graphic user interface allows quick recall of different presets so each talent can have customized settings perfect for them.



M-4IP USB Voice Processor

The M4IP-USB is a four-channel DSP-based BLADE-3 voice processor with four completely independent channels of high-quality, low-noise, high-dynamic range and accurate transient response voice processing in an IP networked rack unit.

The M4IP-USB combines four high-quality microphone preamps, four channels of Vorsis embedded microphone processing, and a WheatNet-IP BLADE interface, allowing you to place four microphone inputs anywhere in your WheatNet-IP Intelligent Network (although it also works just fine as a standalone processor). The preamps and processors are accessed and controlled from any point on the network via its Windows-based GUI.

Four independent USB ports are built in to facilitate the individual use of each processor output by separate computers.

The M4IP-USB is a great way to maximize your investment in on-air talent by combining four mic processors into a single rack space, accessible from anywhere.



Designed and built by
 Wheatstone Corporation
 600 Industrial Drive | New Bern NC 28562-5440 USA
 phone 1.252.638-7000 | fax 1.252.635-4857
 wheatstone.com | sales@wheatstone.com

Wheatstone
 BROADCAST AUDIO PERFECTIONISTS®