

MODEL  
2000-C

## DUGAN - COURTROOM AUTOMATIC MIXER

Model 2000-C Dugan Courtroom Automatic Mixing System



### FEATURES

- Automatic Mixing with Dugan Speech System.
- 4 Configurable Summed Mic/Line Outputs For Logging Recorders, Per Frame
- 4 Configurable Mix-Minus Outputs Per Frame.
- Optional ALC Leveling Available.
- Pink Noise Generator For Sidebar Conversations
- Tone Controls On Each Input Channel.
- Logic Output On Each Input Channel For Camera Control.
- Mute, Group Mute, and All Mute Functions.
- Remote Gain Control Capability On Each Input & Output.
- U.S. Patents 3,992,584, & 4,864,627

The Model 2000-C Dugan Automatic Mixer is designed specifically for courtroom applications. The unit is designed around the patented Dugan Speech System. This mixing architecture provides vastly superior performance over gated type automixers.

The Dugan Speech System looks at actual signal levels, instead of just the number of open microphones, when deciding how the gain should be distributed. Rather than leaving unused microphones at a fixed gain setting, the Dugan Speech System turns down unused microphones, reducing acoustical echo, and redistributes that gain to microphones being used. This allows more gain before feedback on active channels.

The mechanical architecture of the Model 2000-C is card frame based. This allows microphone or line input circuits to be provided on a channel-by-channel basis. Each Model 2000-C chassis can accommodate up to 8 input cards. Frames may be linked together to provide more inputs and outputs.

An optional automatic level control is available to provide a more uniform output level, regardless of who is speaking, or how close they are to a microphone.

Each Model 2000-C Chassis incorporates 8 input card slots, one AUX input, 4 outputs for logging recorders, 4 mix-minus outputs, and 2 master outputs.

Each log output contains the sum of two input channels. In addition, each log output has provision to add additional input signals as required. Logging outputs can be PRE or POST mute, to allow recording of the judges microphone only, during sidebar discussions. They can be mic or line level. Each of the four mix-minus outputs is configurable to allow separate mixes and mix levels at each output. This system allows maximum gain before feedback in each area of the courtroom.

The input cards provide a wide variety of options. Features include mic/line switching, chairman override, bass and treble control, low cut filter, phantom power, mute, group mute, and all-mute, logic output, remote gain control of each input and the master output, and a mix-minus output, or a logging recorder output.

The Model 2000-C may be remotely controlled from Panja or Crestron systems by using appropriate relay cards, or analog DC output cards (See Touchpanel Application Note) from either manufacturer.

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Engineering Data

1/02

## **Input Selection - Microphone or Line**

Each input card has a selector switch that allows the card to be set for operation with a microphone, or a line level device. With the microphone position selected, internal 15 volt phantom power is available, or an external 48 volt phantom power may be used. In the line level position, the phantom power connection is automatically disabled.

Each input card also contains a gain selector switch. In the "HI" gain position, the microphone input provides 50dB of gain, and the line level provides 20dB of gain. In the "LO" position, the microphone input provides 30dB of gain, while the line level input provides 0dB gain.

## **Tone Controls & Low Cut Filter -**

Each input channel has a low cut filter, and a bass and treble control. The low cut filter is used to eliminate unwanted low frequency noise. The bass and treble control provide both cut and boost. This feature is used to optimize intelligibility and tone quality.

## **Mute Functions -**

Each input card has provision for 4 separate mute controls. The first mute control is an on-board slide switch to mute unused channels. The second mute control, individual channel mute, is activated by a closure to ground. This can be used to mute channels from remote locations. The third mute control is an on-board slide switch that assigns individual channels to the group mute bus. When the group mute is activated, by a remote closure to ground, or the logic closure on the judge's microphone channel, all inputs assigned to the group mute bus will be turned off. The fourth mute control is the all mute, activated by a remote closure to ground, which turns off all inputs.

## **Remote Gain Control -**

Each input channel, and the master outputs have provision for remote gain control. They may be controlled by accessory products manufactured by Protech Audio, or remote control products manufactured by Panja or Crestron. For applications assistance in using the Panja/Crestron products, see the touchpanel application note.

Each input may be individually controlled by a Protech Audio Model 2000-RVC-IN Remote Wall Plate unit. The wall plate unit contains a potentiometer, build-out resistors, and a three pin connector, all mounted on a printed circuit assembly. The printed circuit assembly may be removed from the single gang wall plate, to allow it to be mounted in custom wall plates. The gain range of each Model 2000-RVC-IN may be restricted by the rear panel controls on the chassis of the Model 2000-C.

The gain of the outputs may be controlled, in similar fashion to the inputs, by a Model 2000-RVC-OP.

In addition to the individual channel controls, Protech Audio also manufactures the Model 2000-CON Remote Control Console. Each console can control 8 input channels, one set of master outputs, and two ground closure circuits for controlling group mute or pink noise generator (for sidebar privacy). The Model 2000-CON can be custom labeled, for exact room setups.

## **Logic Closures -**

Each input card provides logic closure to ground, that is activated by someone speaking into a microphone, or audio being applied to a line level input. These closures can be used for camera queuing, or for judge's override of all other audio channels. Simply wiring the judge's logic closure to the group mute, will allow automatic override of the other inputs.

## **Pink Noise Generator -**

Each Model 2000-C Output card provides a built-in pink noise generator. The signal of the pink noise generator is activated by an external switch closure to ground. When activated, the pink noise signal appears at all mix-minus outputs, and the master outputs. This feature is used to provide privacy when the judge wants a bench conference (also called sidebar). The signal does not appear at the logging recorder outputs.

## **Master Outputs -**

Each Model 2000-C frame provides 2 master outputs, to allow a gallery reinforcement signal and an ancillary room or monitor output.

## **Mix-Minus Outputs -**

Each Model 2000-C Frame assembly provides for up to 4 mix-minus outputs. These outputs are configurable to allow custom mixes to be sent to different areas of the courtroom. The mix-minus approach to sound reinforcement allows a more gain before feedback, and makes system setup much easier.

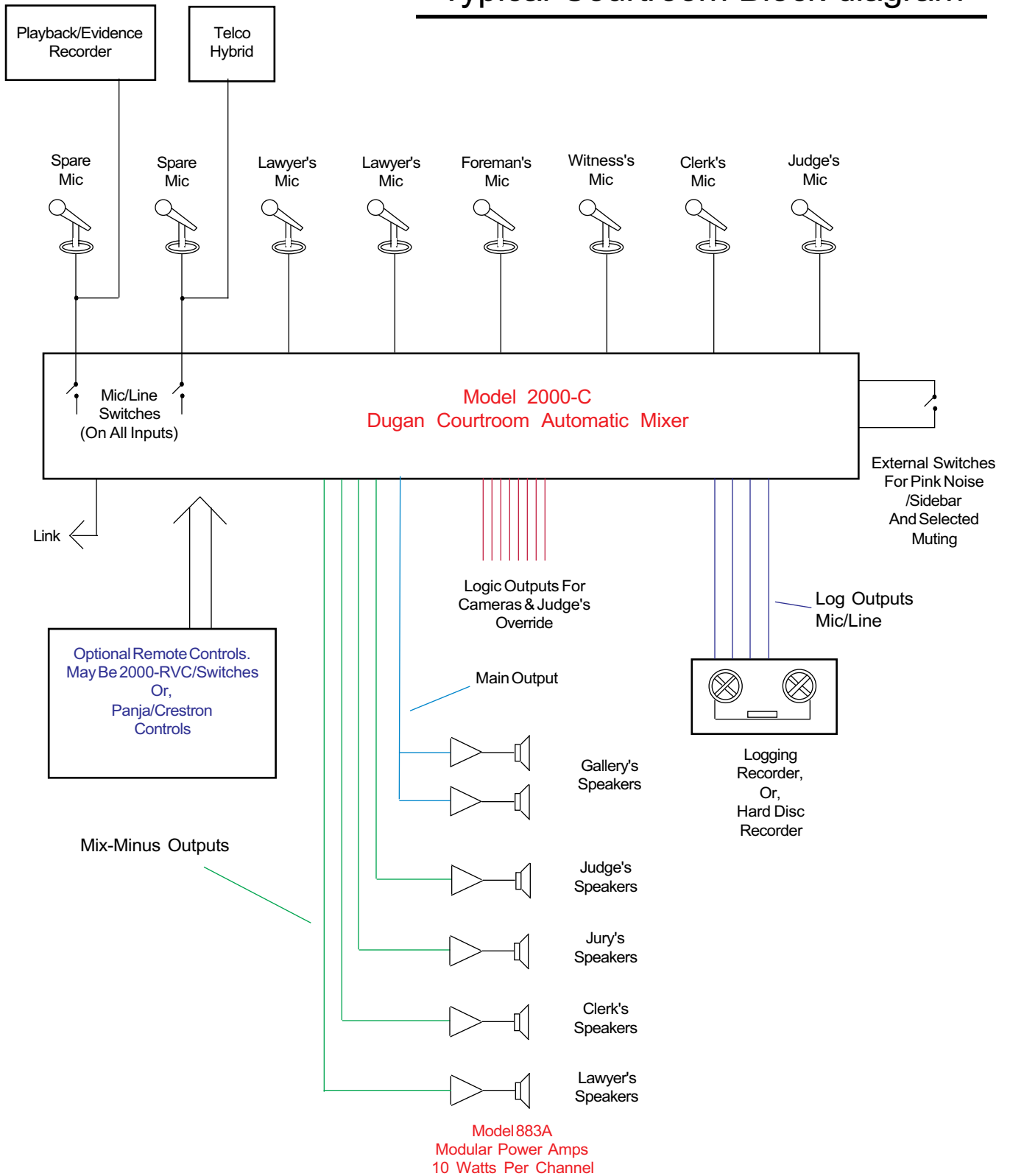
## **Logging Recorder Outputs -**

Each Model 2000-C frame provides up to 4 logging recorder outputs. As shipped from the factory, each logging output contains the sum of two input channels (if all 8 input cards are installed). Each logging output can be configured to contain up to four input channel signals. These outputs may be configured to be either pre or post mute. Each logging output also offers a slide switch to set the output to microphone or line level operation

## **Linking Feature -**

The Model 2000-C Frame is linkable, to create larger systems. They may also be linked to Model 2000 Dugan Automixers, for hybrid configurations.

# Typical Courtroom Block diagram



# ARCHITECT'S & ENGINEER'S SPECIFICATION

The automatic mixer shall use the Dugan Speech System of automatic mixing, incorporating 2 detectors for each input channel.

The automatic mixer shall be constructed in a card frame chassis (Model 2000-C-CH) holding up to 8 input cards (Model 2000-IN), one output card (Model 2000-OP), and a power supply card (Model 2000-PS-A). All cards shall be individually fused, and unpluggable from the front of the card frame, without requiring removal of wiring. The card frame chassis shall be capable of accepting other preamplifier, line amplifier, mixing and distribution cards. The chassis shall require no more than 3.5" of vertical rack space. The auto-mixer shall have a UL approved power supply. The unit shall be designed to mount in a standard 19" EIA rack.

Input cards shall accept balanced microphone or line level signals. The input cards shall have remote control

capability, mute-group mute and all mute capability, logic output, and selectable phantom power.

Each card frame shall have provision for 4 logging recorder outputs. Each logging recorder output shall contain the sum of two to four input channels. Each card frame shall have provision for 4 configurable mix-minus outputs. All gain, tone control, and mix-minus level controls shall be mounted on the rear of the auto-mixer chassis. The unit shall allow removal and replacement of modules without requiring readjustment of controls.

The output card shall have provision for remote level control, dual balanced outputs, AUX input, a pink noise generator and an optional automatic level control (Model 2000-AL).

The auto-mixer chassis shall be linkable to allow up to 64 input channels to operate simultaneously. The automatic mixer shall be: PROTECH AUDIO CORP. MODEL 2000-C

## SPECIFICATIONS, MODEL 2000-C

### INPUT SECTION

Input Gain Microphone.....	30-50dB, Switch Selectable, Plus Trim Adjustable
Input Gain Line.....	0-20dB, Adjustable
Input Tone Control.....	±12dB, Bass & Treble
Input Hi-Pass Filter.....	100Hz
Mute Attenuation.....	70dB, Min.
Maximum Input Level.....	-10dBv Mic, +20dBv Line
Input Impedance.....	1K Ohms Nominal Mic, 15K Ohms Line
Group Mute Control.....	Slide Switch Connection To Buss
Phantom Power.....	15VDC Internal, 48VDC External
Remote Control Range.....	+12dB, To -75dB

### OUTPUT SECTION

Logging Recorder Outputs, Summed.....	Pre or Post Mute, Mic or Line Level
Mix-Minus Outputs.....	4 Per Chassis, Active Balanced
Master Outputs.....	Two per Chassis, Active balanced
Master/Slave Operation.....	Slide Switch Controlled
Distortion + N.....	0.07% Maximum
Noise.....	-123dBV (150 Ohm Source)
Frequency Response.....	30Hz To 20KHz, ±0.1dB
Operating Temperature.....	0 To +70 Degrees C
Power Requirement.....	0.5 Amps/120VAC
Dimensions.....	3.5"H x 19"W x 10.5"D
Shipping Weight.....	Approx. 10Lbs.

## ACCESSORIES

Model 2000-662 Audio Distribution Amp Card, 1 In, 2 Out.  
Model 2000-663 Audio Distribution Amp Card, 1 In, 3 Out.  
Model 2000-664 Audio Distribution Amp Card, 1 In, 4 Out.  
Model 2000-665 Audio Distribution Amp Card, 1 In, 5 Out  
Model 2000-683A Audio Power Amplifier Card, 10 Watts  
Model 2000-588 Gate/Ducker Card, 2 Mic/Line In, Line Out.  
Model 2000-RVC Remote Volume Control  
Model 2000-CON Remote Console

Model 2000-674 Audio Mixer Card, 2 Line In, 1 Line Out.  
Model 2000-675 Audio Mixer Card, 3 Line In, 1 Line Out.  
Model 2000-676 Audio Mixer Card, 4 Line In, 1 Line Out.  
Model 2000-677 Audio Mixer Card, 5 Line In, 1 Line Out.  
Model 2000-617 Audio Limiter Card, Adj. Gain & Thres.  
Model 2000-633 Audio Compressor Card  
Model 701 Dual Channel Power Amplifier, 4 Watts  
Model 883A Single Channel Power Amplifier, 10 Watts

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