Soundcraft

SAC2000

USER MANUAL

SOUNDCRAFT SAC2000 STEREO ON-AIR CONSOLE

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SOUNDCRAFT SAC 2000 - "ON AIR" CONSOLE

The Soundcraft SAC 2000 is a stereo "on air" console designed to meet the requirements of todays highly sophisticated radio stations. The SAC 2000 is a fully modular broadcast console and integrated into the design are optional features which would normally be provided by engineer's "black boxes". These options are simple to install and make the console an extremely economical investment.

The three most significant features are; a built in sequencer, which allows any combination of "cart" machines to be started in sequence, two remote control inputs, which enable the broadcaster "in the field" to start music and commercial material, and an "Air Control" module which provides full control over profanity delay for security during talk shows and selects between PGM1 and PGM2 as the air source.

The SAC 2000 also solves the problem of interfacing to a wide variety of "cart" machines, two-track tape machines and turntables, by providing a universal logic interface. This is a bi-directional opto-isolated system that can handle anything from TTL to 24V relay logic. Any polarity is acceptable, and, in fact, even AC signals are acceptable.

All inputs and outputs are electronically balanced, this reduces the degradation of signal quality which is introduced by the more normal transformer coupled designs, and ensures superior transient response, minimal phase shift, and excellent common mode rejection, even at high frequencies.

The three stereo buses, PGM1, PGM2 and AUDITION, are differential for maximum R.F immunity. All fader and mute functions are performed by high quality solid state voltage controlled devices.

Three VU meters, (PPMs optional), are provided to display mono sum, PGM1, PGM2 and either AUDITION or what ever is selected to the control room monitor. A phase meter is fitted below the Audition/Monitor meter, and displays the phase relationship of any stereo source assigned to these meters.

Two timers are provided; a MACHINE timer, which resets and restarts every time a machine module is turned on, and a MIC timer, which resets and restarts if a mic channel is turned on and no other mic channels are active. The MIC timer will continue to run until all mic channels are OFF.

All input modules are interfaced to the outside world by 38-pin EDAC/ELCO style connectors, except the mic inputs which are on female XLR connectors. The main outputs and patch points are on XLR connectors to allow for rapid re-plugging if necessary.

INPUT MODULES - COMMON FEATURES

The input modules have features that are
common to all, even if different optional
features have been selected. These are; the
precision, multiturn presets, for input gain
control, routing to the three stereo buses, a
cue switch, large illuminated ON/OFF buttons
and a long-throw P & G fader.

1. Input gain control

The input gain of each module is pre-set by
the engineer using the precision, multiturn
presets. There is adjustment for line inputs
from -10 to +8dBv.

2. Routing facilities

a) PGM1
    Pressing the PGM1 button routes the signal
    in the channel to the PGM1 stereo bus.

b) PGM2
    Pressing the PGM2 button routes the signal
    in the channel to the PGM2 stereo bus.

c) AUD
    Pressing the AUD button routes the signal
    in the channel to the stereo AUDITION bus.

3. Channel fader

The channel fader is a long throw linear
fader.

4. Cue system

The Cue system allows for "push-push" cue,
using the cue switch and an LED indicates Cue
status. Cue is cancelled by another push of
the switch or by turning the module ON. There
is a jumper option available which mutes the
module when Cue is activated.

5. On/off switching

Pressing the ON button will turn the module
ON, and, if a stereo module, will start "cart"
machines, turntables etc, or if a mono module,
will give a tally for external use. The ON
button will not illuminate if the module is
not routed to any of the three stereo
outputs. A jumper option allows a start
command to be issued before the module VCA
ramps up, thus allowing turntables to come up
to speed.

Pressing the OFF button will turn the module
OFF. In the case of a stereo module set up
for "cart" machine operation, the button will
not illuminate until a READY signal has been
received. On mono modules a tally is
available for external use. Both mono and
stereo modules may be turned ON and OFF by
external control.

Any input module will also be jumpered so that
ON/OFF is controlled by the fader. Moving the
fader smartly away from the infinity position
will turn the module ON, returning the fader
to infinity will turn it OFF.

6. Cough and Duck facilities

Mic inputs are provided with facilities to cut
the signal from the microphone to prevent
extraneous noises from being transmitted, eg.
cough suppression.

The Cough facility is activated by a second
push of the ON button. If remote ON/OFF is
being used, the Cough facility is also
enabled.

Ducking can be used when it is required to dim
the transmitted signal whilst the operator
talks over the music etc. This facility is
provided on "machine" channels and is entered
by pressing the ON button for a second time.

STEREO INPUTS

Four types of stereo inputs are available; the simple stereo input for general purpose use, a stereo input with equaliser, a stereo input with sequencer/remote control option and a stereo input with four way source select.

1. Stereo Input

The simple stereo input module contains the features that are common to all modules, (see Input modules - Common features), but the single gain control is replaced with gain control presets for both Left and Right.

2. Stereo Input with Equaliser

a) LOW PASS FILTER
   The low pass filter operates at 5kHz with an ultimate slope of 12dB/octave.

b) HIGH PASS FILTER
   The high pass filter operates at 100Hz with an ultimate slope of 12dB/octave.

c) HF (High frequency)
   15dB of boost or cut is available at 15kHz with a shelving characteristic.

d) HI MID
   15dB of boost or cut is available at 3kHz with a "bell" shaped characteristic.

e) LO MID
   15dB of boost or cut is available at 300Hz with a "bell" shaped characteristic.

f) LF (Low frequency)
   15dB of boost or cut is available at 50Hz with a shelving characteristic.

g) EQ
   The EQ may be switched in and out of the signal path independently of the high and low pass filters.

3. Stereo Input with Sequencer

The optional sequencer with its remote switching capability is an extremely useful unit, allowing a series of carts to be fired in turn. Also, there is the facility to allow music or commercial material to be switched on from a remote source.

a) SEQ
    When SEQ is pressed that channel is placed in a sequence. If a channel is selected in error then simply press the OFF switch. The sequence will commence left to right and continue back round again to any reselected "seq".

    The sequencer can only be enabled if the cart machine is in READY mode. If for some reason one of the carts in the sequence becomes dislodged the sequencer will bypass this and go to the next cart in the sequence.

    To use the sequencer it is essential that a "trip" cue is present on the carts used.

    The sequencer need not necessarily be used just for cart machines since a turntable or two-track machine may be programmed to be the end of a sequence, thus allowing a fully automatic commercial break going straight into a music number.

    If a sequencer module is moved to another console position the 2-way push-on link must be removed. Similarly any position not occupied by a sequencer must have the jumper fitted. This can be found above the 64-way connector on the motherboard.

b) MUSIC/SPOT
    MUSIC and SPOT are used to allow external
    automatic control of module ON. Provided
    the module is in READY, (or the OFF lamp
    is illuminated), any module may be enabled
    to MUSIC or SPOT in the same way as SEQU.
    However, only one module may be assigned
    to each of the two remote control buses at
    any time. Applications of the facility
    are: Remote control of music sources or
    commercial breaks using the outputs from a
    touch tone decoder, (for example), to
    activate the system. Automatic
    identification of the station to any
    network using satellite network ready
    commands.

MONO INPUTS

The mono inputs have the same common features as the stereo input modules. (Routing, channel fader and Cue system). There are two options available for the mono inputs, both are capable of handling mic or line levels by jumper selection. A source selection switch provides audio and remote logic switching for A or B input and any monitor muting requirements follow this section. The Gain is factory set for -40dBu input.

1. Equaliser option

a) LOW PASS FILTER
    The low pass filter operates at 5kHz with an ultimate slope of 12dB/octave.

b) HIGH PASS FILTER
    The high pass filter operates at 100Hz with an ultimate slope of 12dB/octave.

c) HF (High frequency)
    15dB of boost or cut is available from 1.2kHz to 20kHz with a shelving characteristic.

d) HI MID
    15dB of boost or cut is available from 300Hz to 4.8kHz with a peak/dip characteristic.

f) LF (Low frequency)
    15dB of boost or cut is available from 20Hz to 320Hz with a shelving characteristic.

g) EQ
    The EQ may be switched in and out of the signal path independently of the high and low pass filters.

The mono modules are also capable of sending
and receiving machine commands via the
universal logic interface, and particular
provision is made for full control of ON/OFF
functions with tally from a remote control
panel situated, for example, in a news booth.
The cough suppresion system mentioned earlier
is also active under remote control. In
addition, there is a talkback facility so that
pressing a T/B switch will automatically
switch the module pre-fade signal to the cue
system where it will be heard on the monitors.
The operations Mic channel has a special 2-way
connection to the monitor modules.

TELCO INPUT

The SAC 2000 Telco input provides the
facilities to handle four telco sources
without having to tie up normal input modules.
This module allows the engineer to speak to
callers as well as allowing 2-way conversation
for "phone-in" programmes.

Four mix-minus feeds are returned to the
hybrid and "voice present" LEDs aid the
engineer in identifying the caller.

Turning any section ON readies the talkback
system from the operator's mic to talk to the
relevant mix-minus feed. Therefore, when the
Telco module is selected to CUE, two-way
conversation may occur over the Cue system.
This situation is cancelled when Cue is forced
off by module ON. Whilst in Cue only the
operator can speak to the caller.

The caller's mix provides a feed for talk show
guests in a studio.

a) TELCO MIX
    This controls the level of the overall mix
    of the four telco inputs.

b) LEVEL POT AND ACTIVE LED
    The level pot control the level of the
    individual telco inputs and the "Active"
    LED gives the engineer a visual caller
    indication.

The fader controls the 4 VCAs so that a
correct balance is obtainable at all times.

REMOTE SWITCH MODULE

This module contains two identical sections
each containing eight interlocking source
switches with LEDs. Also provided are:
Stereo level control with centre detent CAL
position, balance control, and an UNCAL switch
to defeat the normal line up. Status LEDs
accompany the L and R mode switches.

1.   Source Select

Signal from a remote source is received when
the appropriate source select button is
pressed.

2.   Trim and Balance

The Trim control adjusts the level of the
incoming signal and the Balance control
corrects or deliberately creates any error in
stereo matching before the fader.
This allows the level of the left and right
channels to be adjusted independently, should
the need arise.

3.   Stereo/Mono switching

With both L and R out the module operates in
stereo.

With either L or R switched in, both channels
of the module are fed by either the left or
right input.

With both switches pressed, both channels of
the module are fed by a mono sum of the left
and right input.

Associated LEDs provide a visual indication of
whether the source is L, R, mono or stereo.

The remote module must be used in conjunction
with other stereo modules. For a normal
stereo module the output of the 8-way selector
will be the only input to the stereo module.
If the 4-way source selector is used the
output of the remote module appears on input
C.

CUE MASTER

The Cue master contains the source selection
for the Mono output. It also includes the
summing amp, level controls and output
amplifiers for the stereo AUDITION bus and
auxiliary sends 1 and 2. The two Auxiliary
sends are an option on input modules.

1. Source selection

Pressing any of these button routes the
appropriate source to the Mono output.

2. Cue Level

The Cue system comprises of a summing and
output amplifier to the monitor modules and
the rear connector panel.

The rotary volume control adjusts the level of
the cue signal if a dedicated CUE speaker is
used. The feed is cut by the Control Room
mute bus. The MONO meter fitted in the meter
panel switches to display the CUE signal when
any module is switched to CUE.

MONITOR MODULES

There are two types of Monitor module
available and four slots are provided on the
console for these.

Each module contains two separate stereo
outputs, one with no level control for
external use and one with a level control and
EQ.

1. Control Room Monitor

a) SOURCE SELECT
    Pressing any of the Source Select buttons
    dictates which signal is being heard on
    the Control Room monitors and headphones.

b) METER SELECT
    When pressed the monitor source is
    metered. When not pressed the audition
    bus is metered, except on a 10 channel
    console when it can be PGM2.

c) HF
    15dB of boost or cut is available at 12kHz
    with a shelving characteristic.

d) LF
    15dB of boost or cut is available at 50Hz
    with a shelving characteristic.

e) MONITOR
    The monitor pot controls the level of the
    control room monitors.

f) MONO CHECK
    The Mono check button allows the operator
    to check for mono compatability and also
    to check the phase of the output signal.

g) AUTO
    AUTO Enables CUE to be automatically
    switched to the monitor speakers when any
    input module Cue is activated. Jumpers
    determine whether Cue is on both speakers
    or on one side only. In either case, the
    exisiting monitor source is allowed to
    leak through so that the operator may stay
    in touch with reality.

h) HEADPHONE LEVEL
    This controls the level of the headphone
    amplifier. The source is the same as for
    the monitor speakers except that the Cue
    active always switches 'phones to Cue.

2. Studio Monitor

The Studio Monitor module is similar in operation to the Control Room Monitor module with the exception that there is no meter select switch, AUTO switch or headphone level.

Instead there is a Talkback switch, which is driven by the patch return of the operators mic module, this will inject Talkback into the monitor signal path, attenuating any signal present.

Each monitor module will be muted by the relevant mute bus, which is activated by turning on any input module that has been jumpered to that bus.

AIR CONTROL MODULE

1. Air Source

PGM1 and PGM2 determine which of the two main
stereo buses is selected as the air source.
The output from this selection is fed to the
Delay Send connectors, the monitor Air source
and, under normal circumstances, the AIR
output connectors.

The electronics for PGM1 and PGM2 are on
separate boards which can be removed from the
front of the console. This means that if, for
some reason, one of the PGM boards fails the
other may be used whilst the board that has
failed may be taken out and repaired. This
means that the loss of a PGM board does not
mean that a station has to go "off air".

2. Delay

DELAY switches the AIR output to be after the
delay line, the current AIR source button and
the LED beside the air switches on the monitor
module, (if AIR is the current selection),
gently flash and all the audio and logic for a
pre-determined cart machine is switched away
from its input module to be ready to act as a
"fill in" cart, if a "fill cart" option is
present, in the event of a profanity. This
means that an expensive cart machine does not
have to be permanently tied up for this
occasional duty.

Exiting DELAY mode is done in two ways; either
by pressing the relevant PGM1 or PGM2 switch,
(which will be dimly lit), in which case
everything instantly returns to normal, or
press DELAY again. The DELAY switch will now
flash loudly, indicating an interim condition,
and the AIR monitor selection now receives the
delay line output. When the operator hears
his end message go through, he may return to
real time operation by turning ON any module.
The previous AIR selection, (PGM1 or PGM2),
will immediately return.

3. Dump

Pressing DUMP will do one of two things, jumper selectable, depending on whether "catch up" or fixed delay is being used; In catch up mode, a command is issued to the delay to dump its memory and start accumulating again. Fixed delay is more complicated; a command will be issued that will switch the output of the "fill cart" to AIR and start the machine. Upon receiving END cue, the delay line output is re-connected to AIR. Should no cue be received or the cart fail to start, a pulse from a default timer, set to either 7mS or 3.5mS, will cause a return to delay line output.

OPERATION

Introduction

This operation section is intended to provide guidelines on how
to use the different modules available for the SAC 2000, and
their options, in relation to a broadcast situation.

Initial Considerations

The most important initial consideration is for the station
engineer to set up the correct, preset, level on all input and
output modules. This should be preset to give the optimum
signal to noise ratio for both the console and the transmitter.
These would normally be set at the beginning of the day and then
left, the fader is then used by the operator to allow any
adjustments in level to be made whilst on-air.

Prior to a broadcast, an operator may wish to set up his/her
first commercial break. The carts would be placed in their
respective machines such that a ready cue is sent to the
console. The operator may then set up his/her sequence on the
stereo input modules with the optional sequencer. The module
with the first cart machine is not selected as SEQ since this is
started by pressing the module ON switch, however, if he/she
then wanted, say cart machines 2 and 3 which are on stereo input
modules 4 and 5, to follow then SEQ would be selected on modules
4 and 5. If this was to be followed directly by a music track
then the module with the appropriate turntable or tape machine
would also be selected for SEQ, eg module 2 is patched up for a
second turntable and SEQ is selected.

NB: A sequence may only be set up if the carts are provided
with a trip cue.

At this stage the operator also selects which stereo output is
the on-air programme, ie. PGM1 or PGM2.

Programme Broadcast

The operator switches his/her mic input on by selecting ON, this
now routes the mic signal to the selected on-air bus and the mic .
is now live. If the operator needs to cough during talking
he/she need only press the ON button again to activate the voice
suppression system.

On finishing the introduction to the programme the operator may
now wish to play the first track whilst talking over the track
introduction. The operator presses the ON button on, say,
stereo input module 1, which is patched into turntable 1. This
starts the turntable, (or if he/she has opted for fader start
then simply raise the fader on the appropriate module), with the
control logic taking into account the take-up speed of the
turntable. To talk over the introduction of the record the
operator presses the ON button again on stereo input module 1
and this activates the duck system. The operator would release
the ON button when he/she has finished talking and the turntable
level is brought up to the level determined by the fader and the
pre-set level.

At the end of a track the operator could go into a commercial
break, using the sequence set up beforehand. This is entered by
pressing the ON button on the module which is patched into the
first cart machine, eg stereo input module 3. After, the
console has received the appropriate trip cue the next cart
machine in the sequence is fired, ie. cart machine 2 patched
into stereo input module 4. If for any reason this cart has
become dislodged then the console jumps to the next cart in the
sequence, ie. cart machine 3 patched into stereo input module
5. At the end of this sequence of carts the second turntable
has been selected to play and this will follow directly on.

Ofcourse, once a sequence has been played the operator can set
up another sequence so that the next commercial break is ready.

In order to monitor what is going out on-air there are two
monitor modules on the SAC2000, the Control Room Monitor and the
Studio monitor. The Control Room monitor provides monitoring
facilities for the operator and the Studio monitor provides the
facilities for monitoring in a separate studio.

On both the Control Room monitor and the Studio monitor the
operator can monitor any one of eight different sources,
selected via the source select buttons.

Normally during a broadcast the operator would listen to the
on-air signal, by selecting PGM1 or PGM2, over the Control room
Monitor speakers or Headphones. If a profanity delay is being
used the operator may monitor the signal before the delay line,
by selecting AIR, should a profanity occur the operator can hear
the profanity and act accordingly to ensure that it does not go
out on-air. (See Air control module.)

The Studio monitor module is provided with a TALKBACK button to
allow the operator to speak to any 'guests' in the studio
without any signal going out on-air.

Should a programme involve some form of phone-in then the Telco module is provided so that the operator can send the correct signals to the correct place and ensure that sound quality from any telephone lines is not too poor.

Pressing the relevant numbered button the operator receives the call, the associated LED gives the operator a visual indication of which caller he/she is talking to. A Mix-minus feed enables the caller to hear only the operator thus avoiding any confusion.

On receiving a call an operator may first want to explain to the caller what will happen before the call goes on-air. To enable easy two-way conversation the module is placed in CUE and the operator activates the talkback system, thus preventing his/her mic going out on-air. When in CUE only the operator can talk to a caller, callers cannot talk to each other. Once the module is ON the CUE system is cancelled.

The TELCO MIX control provides a mix of callers only to be sent to a guest headphone system.

Normally, during a phone-in programme a profanity delay is used as you never know what the caller is going to say! To place the "on-air" source in delay simply select DELAY on the Air Control module. This switches the output to be after the delay line, gently flashes the current air source LED, and switches all the audio and logic for a pre-determined cart machine away from its normal input to act as a "fill-in" cart in the event of a profanity. (If this option is fitted.)

On the occurence of a profanity the operator simply presses the DUMP button. In the case of "catch-up" delay this issues a command to the delay to dump its memory and start accumulating again. If the operator is using a fixed delay, pressing DUMP will switch the output of the "fill-in" cart to air and start the machine. Upon receiving an end cue, the delay line output is re-connected to AIR. Should the cart fail to start, a pulse from a default timer will cause a return to delay line output.

A second method of removing any profanity is a separate remote
control of DUMP, CUT and AIR provided on the producer's
monitor. The AIR switch lets the producer listen to the final
air output after the delay line. When a profanity occurs, and
if he/she can remember exactly when it happened, the producer
may monitor the delayed signal until just before the profanity
occurs and then hold the CUT button until it is heard to go
through. This allows for much finer editing than just hitting
DUMP or holding CUT.

In order to exit DELAY mode either·press the relevant PGM1 or
PGM2 switch and everything will return to normal or press DELAY
again. The DELAY switch will now flash loudly, indicating an
interim condition, and the AIR monitor selection now receives
the delay line output. When the operator hears his/her end
message go through, he/she may return to real-time operation by
turning ON any module. The previous AIR selection will return
immediately.

In situations where the operator needs to receive signals from a
number of outside sources the Remote control module becomes an
extremely useful module.

The Remote control module enables a number of inputs to be sent
out on air, without having to use existing stereo input
modules. When a remote source is selected, one of eight, the
start logic from the stereo input that the Remote module is
connected to is automatically routed through to the audio
source. eg. Should an OB signal be the remote source then the
line from this source is connected to the appropriate input and
the relevant numbered button pressed. Left and right gain trim
controls are provided so that should the left and right outside
signals differ in level, for some reason, then this can be
corrected accordingly.

OPTIONAL JUMPERS

The Soundcraft SAC2000 console contains a number of different jumper options, (push-on links), on the Mono/Mic and Stereo modules which allow the user to select cough facilities, mute and cue facilities etc.

Jumpers available on Mono/Mic Input

J1	+48V Phantom power available on Mic input A
J2	+48V Phantom power available on Mic input B
J3	Variable Cough
J4	Fixed Cough
J5	Control Room Mute - Mic Line A
J6	Studio 1 Mute - Mic Line A
J7	Studio 2 Mute - Mic Line A
J8	Fitted when Cue is required
J9	Fitted when Machine timer is required
J10	Fitted when Mic Timer is required
J11	Enables Pan defeat
J12-\	Enables Mic Line input A to receive Low input
J13-/	levels.
J14-\	Enables Mic Line input B to receive Low input
J15-/	levels.
J16	Fitted when there is no EQ option
J17	When fitted the insert point is by-passed
J18	Fitted when the insert point is required
J19	Fitted when there is no EQ option
J20	Fitted to Mute signal when Cue is in operation
J21	Control Room Mute - Mic Line B
J22	Studio 1 Mute - Mic Line B
J23	Studio 2 Mute - Mic Line B
J24	Fitted to enable Pan
J25	When fitted channel on/off is activated by fader up/down motion
J26	Studio 3 Mute - Mic Line A
J27	Studio 3 Mute - Mic Line B

The following jumpers are fitted as standard on Mono/Mic Modules:

J4	J16
J5	J17
J8	J19
J10	J20
J12	J21
J13	J24
J14	J25
J15	

If EQ is fitted J16 and J19 are omitted.

Jumpers available on Stereo Input

J1-\	Fitted for instantaneous on/off and stop/start.
J2-/	NB: Do not fit for Turntables.
J3	Fitted for latching START/START (Turntables)
J4	Fitted for latching STOP/STOP (Turntables)
J5	Fitted for fixed 10dB duck
J6	Fitted for variable duck
J7	Fitted when it is required that the OFF lamp follows the channel off and not cart READY TALLY.
J8	Fitted for Cue Mutes module
J9	Fitted when it is required that the OFF lamp follows READY TALLY, (carts)
J10	Fitted for permanent ON enable (not carts)
J11	Fitted for Control Room Mute
J12	Fitted for Studio 1 Mute
J13	Fitted for Studio 2 Mute
J14	Fitted for Studio 3 Mute
J15	Fitted when Machine timer required
J16	Fitted when Mic timer required
J17	Fitted if there is no EQ option
J18	Fitted if there is no EQ option
J19	Fitted when insert point required
J20	Fitted when insert point required
J21	Fitted when not using isert point
J22	Fitted when not using insert point
J23	Fitted if there is no EQ or input select option
J24	When fitted channel on/off is activated by fader up/down motion

The following jumper options are fitted as standard:-

Without EQ	With EQ
J1	J1
J2	J2
J6	J6
J7	J7
J10	J10
J15	J15
J17	J21
J18	J22
J21	J25
J22	
J23	
J24	

NB: For Cart modules Jumpers 7 and 10 should be REMOVED and J9 should be FITTED.

Jumpers available on Monitor

J1	Fitted when Studio Monitor is required
J2	Fitted for Control Room Monitor
J3	Fitted for Control Room Monitor
J4	Fitted for Control Room Monitor
J5	Fitted when Cue is required Left and Right
J6	Fitted when Cue is required on one side and dimmed programme signal on the other.

The same PCB is used for both Studio and Control Room Monitors and the jumpers are provided to select between the two.

Jumpers available on Telco

Odd jumpers give pre-fade for guest mic.
Even jumpers give post-fade for guest mic.

J2, J4, J6, J8 are fitted as standard.

OPTO-ISOLATED LOGIC INPUT AND OUTPUT

1. Outputs (Start, Stop)

A floating transistor emitter and collector are available at the output. If pull down is required connect the emitter to machine logic ground and collector to machine START and STOP.

If pull up is required connect the collector to the machine logic +volts and the emitter to machine START and STOP.

2. Inputs (Ready, Run, Trip, End)

Both ends of a circuit, comprising of a resistor in series with an LED, are available to control module logic functions.

If pull downs are required, (open collector transistors for example), connect + lines to machine logic +volts and - lines to READY, RUN, TRIP, END.

If pull ups are provided connect - lines to machine logic ground and + lines to READY, RUN, TRIP, END.

If relay contacts are provided, (closed = active), it is best to treat these as pull downs. Connect + lines to machine logic +volts, - lines to each appropriate relay pole and relay N.O. contacts to machine logic ground.

NB: 1. A.C. signals of +8dBu will also activate the SAC2000 logic inputs.
    2. D.C. voltages between 3V and 24V may be applied safely.

CONNECTOR PIN OUTS FOR STEREO AND MONO INPUTS

EDAC	26WAY	64WAY	STEREO I/P	MONO/MIC I/P
V	1	C24	STOP E	
X	2	A24	STOP C	OFF TALLY C
Z	3	C25	START E	
DD	4	A25	START C	ON TALLY C
JJ	5	C26	RUN -	
PP	6	A26	RUN +	ON
RR	7	C27	READY -	B LOGIC ENABLE
SS	8	A27	READY +	A LOGIC ENABLE
TT	9	C28	END -	
NN	10	A28	END +	OFF
HH	11	C29	TRIP -	
CC	12	A29	TRIP +	T/B
F H J M N T	13		AUDIO GND	AUDIO GND
AA,EE,FF KK,LL,MM	14		AUDIO GND	AUDIO GND
W	15	C20	L IN -	
Y	16	A20	L IN +	
P	17	C19	R IN -	
U	18	A19	R IN +	
D	19			
K	20	A18	L INS SND	INS SND
B	21			
C	22	C18	R INS SND	
E	23	C17	L INS RET -	INS RET -
A	24	A17	L INS RET +	INS RET +
R	25	C16	R INS RET -	
L	26	A16	R INS RET +	PRE FADE (INT T/B)

CONNECTOR PIN OUTS FOR INPUT SELECT OPTION AND REMOTE MODULE

EDAC	26WAY	INPUT SELECT	UPPER A	LOWER B
V	1	LEFT A -	LEFT 1 -	LEFT 5 -
X	2	LEFT A +	LEFT 1 +	LEFT 5 +
Z	3	RIGHT A -	RIGHT 1 -	RIGHT 5 -
DD	4	RIGHT A +	RIGHT 1 +	RIGHT 5 +
JJ	5	$\overline{\text{START A}}$	$\overline{\text{START 1}}$	$\overline{\text{START 5}}$
PP	6	$\overline{\text{STOP A}}$		
RR	7	LEFT B -	LEFT 2 -	LEFT 6 -
SS	8	LEFT B +	LEFT 2 +	LEFT 6 +
TT	9	RIGHT B -	RIGHT 2 -	RIGHT 6 -
NN	10	RIGHT B +	RIGHT 2 +	RIGHT 6 +
HH	11	$\overline{\text{START B}}$	$\overline{\text{START 2}}$	$\overline{\text{START 6}}$
CC	12	$\overline{\text{STOP B}}$		
F H J M N T	13			
AA,EE,FF KK,LL,MM	14			
W	15	LEFT C -	LEFT 3 -	LEFT 7 -
Y	16	LEFT C +	LEFT 3 +	LEFT 7 +
P	17	RIGHT C -	RIGHT 3 -	RIGHT 7 -
U	18	RIGHT C +	RIGHT 3 +	RIGHT 7 +
D	19	$\overline{\text{START C}}$	$\overline{\text{START 3}}$	$\overline{\text{START 7}}$
K	20	$\overline{\text{STOP C}}$		
B	21	LEFT D -	LEFT 4 -	LEFT 8 -
C	22	LEFT D +	LEFT 4 +	LEFT 8 +
E	23	RIGHT D -	RIGHT 4 -	RIGHT 8 -
A	24	RIGHT D +	RIGHT 4 +	RIGHT 8 +
R	25	$\overline{\text{START D}}$	$\overline{\text{START 4}}$	$\overline{\text{START 4}}$
L	26	$\overline{\text{STOP D}}$		

NB: If the 8-way output from the remote module is connected to a 4-way select module, the remote selection will appear on input C.

CONNECTOR PIN OUTS FOR TELCO MODULE

EDAC	26WAY	64WAY	DESCRIPTION		
V	1	C24	OUT 4 -	\	
X	2	A24	OUT 4 +	|	
Z	3	C25	OUT 3 -	|	
DD	4	A25	OUT 3 +	\ MIX MINUS OUTPUTS	
JJ	5	C26	OUT 2 -	/ TO HYBRID	
PP	6	A26	OUT 2 +	|	
RR	7	C27	OUT 1 -	|	
SS	8	A27	OUT 1 +	/	
TT	9	C28	TELCO MIX -	-\ MIX OF CALLERS	
NN	10	A28	TELCO MIX +	-/ ONLY	
HH	11				
CC	12				
F H J M N T	13				
AA,EE,FF KK,LL,MM	14				
W	15				
Y	16				
P	17				
U	18				
D	19	C32	IN 2 -	\	
K	20	A32	IN 2 +	|	
B	21	C31	IN 1 -	|	
C	22	A31	IN 1 +	\ TELCO INPUTS FROM	
E	23	C30	IN 3 -	/ HYBRID	
A	24	A30	IN 3 +	|	
R	25	C29	IN 4 -	|	
L	26	A29	IN 4 +	/	

INPUT MODULE CONNECTOR (DIN 61412)

COMPONENT SIDE VIEW

	A	C	
TRIP OUT	* 32 *	TRIP IN	
MUSIC SET	* 31 *	MUSIC DETECT	
SPOT SET	* 30 *	SPOT DETECT	
(T/B+) TRIP +	* 29 *	TRIP -	(T/B-)
(OFF+) END +	* 28 *	END -	(OFF-)
READY +	* 27 *	READY -	
(ON+) RUN +	* 26 *	RUN -	(ON-)
(ON TALLY C) START C	* 25 *	START E	(ON TALLY E)
(OFF TALLY C) STOP C	* 24 *	STOP E	(OFF TALLY E)
+24	* 23 *	+24	
LGND	* 22 *	LGND	
+48	* 21 *	+48	(FLASH BUS)
(IN+) L IN +	* 20 *	L IN -	(IN-)
R IN +	* 19 *	R IN -	
(SND+) L INS SND	* 18 *	R INS SND	(SND-)
(RET+) L INS RET +	* 17 *	L INS RET -	(RET-)
(XLR PIN 2) (MIC OUT +) R INS RET +	* 16 *	R INS RET -	(MIC OUT-)
+ 17	* 15 *	+ 17	
- 17	* 14 *	- 17	
AGND	* 13 *	AGND	
AGND	* 12 *	AGND	
PGM1 L+	* 11 *	PGM1 L-	
PGM1 R+	* 10 *	PGM1 R-	
PGM2 L+	* 9 *	PGM2 L-	
PGM2 R+	* 8 *	PGM2 R+	
AUD L+	* 7 *	AUD L-	
AUD R+	* 6 *	AUD R-	
AUX 1	* 5 *	AUX 2	
CUE	* 4 *	CUE EN	
MACHINE TIMER	* 3 *	MIC TIMER	
(C/RM) MUTE 1	* 2 *	MUTE 2	(STUDIO ONE)
(STUDIO TWO) MUTE 3	* 1 *	MUTE 4	(STUDIO THREE)

OUTPUT MODULE CONNECTOR (DIN 61412)

CUE MASTER 64 WAY

COMPONENT SIDE VIEW

<u>A</u>   <u>C</u>

```
        AUD L SND  * 32 *  AUD R SND
           L RET +  * 31 *  L RET -
           R RET +  * 30 *  R RET -
       PGM1 L OUT +  * 29 *  PGM1 L OUT -
       PGM1 R OUT +  * 28 *  PGM1 R OUT -
       PGM2 L OUT +  * 27 *  PGM2 L OUT -
       PGM2 R OUT +  * 26 *  PGM2 R OUT -
        AUD L OUT +  * 25 *  AUD L OUT -
        AUD R OUT +  * 24 *  AUD R OUT -
              +24  * 23 *  +24
             LGND  * 22 *  LGND
            FLASH  * 21 *  FLASH
      AUD SUM OUT +  * 20 *  AUD SUM OUT - (GND)
                   * 19 *
        CUE SPKR +  * 18 *
        CUE SPKR -  * 17 *
        MONO SUM +  * 16 *  MONO SUM -
              +17  * 15 *  +17
              -17  * 14 *  -17
             AGND  * 13 *  AGND
             AGND  * 12 *  AGND
        AUD BUS L+  * 11 *  AUD BUS L+
               R+  * 10 *  R-
            AUX 1  * 9  *  AUX 2
              CUE  * 8  *
                   * 7  *
                   * 6  *
        AUX 1 OUT +  * 5  *  AUX 1 OUT -
        AUX 2 OUT +  * 4  *  AUX 2 OUT -
          CUE OUT +  * 3  *  CUE OUT -
                   * 2  *
         C/RM MUTE  * 1  *  CUE EN
```

OUTPUT MODULE CONNECTOR (DIN 61412)

MONITOR 64 WAY

COMPONENT SIDE VIEW

	A	C
AUX MON L+	* 32 *	AUX MON L-
AUX MON R+	* 31 *	AUX MON R-
MAIN MON L+	* 30 *	MAIN MON L-
MAIN MON R+	* 29 *	MAIN MON R
	* 28 *	
EXT I/P L+	* 27 *	EXT I/P L-
EXT I/P R+	* 26 *	EXT I/P R-
L METER +	* 25 *	L METER -
R METER +	* 24 *	R METER -
+24	* 23 *	+24
LGND	* 22 *	LGND
FLASH	* 21 *	FLASH
T/B MUTE	* 20 *	
	* 19 *	
AIR MNTR L+	* 18 *	AIR MNTR L-
AIR MNTR R+	* 17 *	AIR MNTR R-
MONOSUM +	* 16 *	MONOSUM -
+17	* 15 *	+17
-17	* 14 *	-17
AGND	* 13 *	AGND
AGND	* 12 *	AGND
PGM1 L+	* 11 *	PGM1 L-
PGM1 R+	* 10 *	PGM1 R-
PGM2 L+	* 9 *	PGM2 L-
PGM2 R+	* 8 *	PGM2 R-
AUD L+	* 7 *	AUD L-
AUD R+	* 6 *	AUD R-
AUX1 +	* 5 *	AUX1 -
AUX2 +	* 4 *	AUX2 -
CUE +	* 3 *	CUE -
T/B +	* 2 *	T/B -
MUTE	* 1 *	CUE EN

OUTPUT MODULE CONNECTOR (DIN 61412)

AIR MODULE 64 WAY

COMPONENT SIDE VIEW

```
                               A      C

              END +   *  32  *  END -
            START C   *  31  *  START E
 DELAY RLA PULL DOWN  *  30  *  NC
       FILL CART L+   *  29  *  FILL CART L-
       FILL CART R+   *  28  *  FILL CART R-
                      *  27  *
                DUMP  *  26  *  DUMP TALLY
                 CUT  *  25  *  CUT TALLY
                 AIR  *  24  *  AIR TALLY
                 +24  *  23  *  +24
                LGND  *  22  *  LGND
               FLASH  *  21  *  FLASH
              DUMP C  *  20  *  DUMP E
        DELAY SND L+  *  19  *  DELAY SND L-
        DELAY SND R+  *  18  *  DELAY SND R-
        DELAY RET L+  *  17  *  DELAY RET L-
        DELAY RET R+  *  16  *  DELAY RET R-
                 +17  *  15  *  +17
                 -17  *  14  *  -17
                AGND  *  13  *  AGND
                AGND  *  12  *  AGND
         MAIN AIR L+  *  11  *  MAIN AIR L-
         MAIN AIR R+  *  10  *  MAIN AIR R-
             PROD L+  *   9  *  PROD L-
             PROD R+  *   8  *  PROD R-
         AIR MNTR L+  *   7  *  AIR MNTR L-
         AIR MNTR R+  *   6  *  AIR MNTR
             PGM1 L+  *   5  *  PGM1 L-
             PGM1 R+  *   4  *  PGM1 R-
             PGM2 L+  *   3  *  PGM2 L-
             PGM2 R+  *   2  *  PGM2 R-
                      *   1  *  NEXT EVENT BUS
```

SAC 2000 BUS

OUTPUT MODULE CONNECTOR (DIN 61412)

16 WAY PIN OUTS

ST 2, 3, 4		ST 5, 6		
1	L INS SND +	AUX MON L+		
2	L INS SND - (AGND)	L-		
3	R INS SND +	R+		
4	R INS SND - (AGND)	R-	}	C/RM & STU 1
5	L INS RET +	MAIN MON L+		
6	L INS RET -	L-		
7	R INS RET +	R+		
8	R INS RET -	R-		
9	L OUT +	AUX MON L+		
10	L OUT -	L-		
11	R OUT +	R+		
12	R OUT -	R-	}	H/PHONE & STU 2
13	A GND	MAIN MON L+		
14	A GND	L-		
15	NC	R+		
16	NC	R-		

10 WAY PIN OUTS

	ST7	ST8	ST9	ST10	ST11
1	AUX1 +	+24	MAIN AIR L+	DUMP C	DUMP ENABLE (LO)
2	AUX2 -	DELAY RLA	L-	DUMP E	DUMP (HI)
3	AUX2 +	START C	R+	DELAY SND L+	DUMP TALLY (LO)
4	AUX2 -	START E	R-	L-	CUT (HI)
5	CUE +	END +	PROD MON L+	R+	CUT TALLY (LO)
6	CUE -	END -	L-	R-	AIR (HI)
7	MONO +	FILL CRT L+	R+	DELAY RET L+	AIR TALLY (LO)
8	MONO -	" " L-	R-	L-	LGND
9	NC	" " R+	NC	R+	+24
10	NC	" " R-	NC	R-	LGND

SAC 2000 PERFORMANCE SPECIFICATION

Frequency Response

-0.2, +0.0dB   20Hz-20kHz

Headroom

Max. output not less than +20dBu for unbal outputs. Not less than +24dBu for bal outputs.

Noise

Microphone inputs: EIN better than -128dBu
Line inputs: EIN better than -90dBu
(Both measured at 20kHz bandwidth, source res= 150 Ohm)

Input Common-Mode Rejection

Mic inputs: Better than 65dB at 1kHz
                    Better than 50dB 20Hz-20kHz

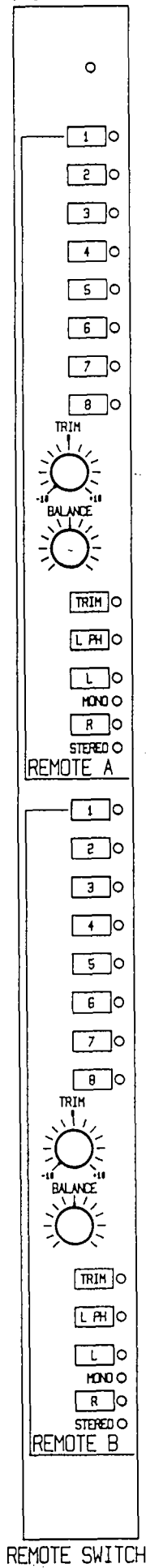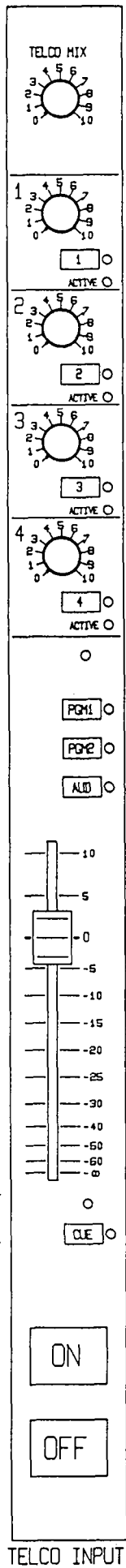Line inputs: Better than 40dB at 1kHz

Distortion

Less than 0.015% at 1kHz
Less than 0.03% 20Hz-20kHz
(+10dBu output, via any path)

Crosstalk

Better than:

	1kHz	20kHz
Unrelated channels:	-90dB	-75dB
Stereo L-R:	-85dB	-65dB
Fader off-ratio:	-90dB	-85dB

TELCO INPUT

REMOTE SWITCH

DRG No. MI 2359

NOTES.

HOLE INDEX.

TOLERANCE.
All imperial dimensions ±0.010
All metric dimensions ±0.25mm
All angles ±0.50°
Unless otherwise stated.

THIRD ANGLE PROJECTION

MATL.

DRG.

TRCO:

CHKD.

FINISH.

SCALE.

TITLE. SAC 2000
Input Module

DRG No. MI 2359

DRG No. MI 2627

STEREO MODULE

GAIN OL OR

BAL

PGM1
PGM2
AUD

CUE

ON

OFF

STEREO MODULE OPTIONS

SEQUENCER OPTION

SPOT
MUSIC
SEQU

EQUALISER OPTION

5kHz
100Hz
HF
HMID
LMID
LF
EQ

4 WAY SOURCE OPTION

A
B
C
D
L MONO
R STEREO

PRODUCTION OPTION

AUX1
AUX2

MONO MODULE

GAIN OA OB

PAN

PGM1
PGM2
AUD

CUE

ON

OFF

MONO MODULE OPTIONS

EQUALISER OPTION

5kHz
100Hz
HF
MID
LF
EQ

A
B

PRODUCTION OPTION

AUX1
AUX2

NOTES

HOLE INDEX

GENERAL TOLERANCES	
Delete where not applicable.	
± 0.50 mm (0.020")	
± 0.25 mm (0.010")	
± 0.12 mm (0.005")	
All angles ± 0.50°	
Hole centres ± 0.004	
Unless otherwise stated	

MATL		DRN		TITLE.	SAC 2000
FINISH		TRCD			MONO & STEREO
SCALE		CHKD			MODULES & OPTIONS

THIRD ANGLE PROJECTION
THIS DRAWING TO COMPLY TO BS308

DRG No. MI 2627

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