Reprinted from
October 1980 issue.

RECORDING
ENGINEER/PRODUCER

a standardized mobile snake splitter system

by Chris Michie

When JACK CRYMES became chief engineer for the Wally Heider Mobile in 1972, one of the most difficult problems involved with remote recording had to do with successfully splitting the microphone feeds to three separate mixers; the house, monitor, and recording consoles had to have access to any or all of the microphone lines. PA companies and touring groups commonly used custom stageboxes and snakes which were essentially hard-wired for their systems only, and the splits were not usually transformer-isolated. The onus was (and still

- the author -
***Chris Michie**'s first involvement with live audio was as House Sound Mixer for Pink Floyd in 1972. Since then he has toured in 18 countries and has mixed sound for acts as diverse as Blondie, Sarah Vaughn, Fripp and Eno, and the San Francisco Symphony. Recent jobs include the Playboy Jazz Festival and the live radio mix for the Monterey Jazz Festival, both with McCune Sound, and using the snake system described in this article.*

is) on the remote truck to derive their feeds with the minimum disruption to the existing setup.

Other than double-miking, which has obvious drawbacks, the usual method was to use large numbers of splitter boxes, usually situated next to the PA stageboxes. As Jack Crymes recalls: "Every show was a nightmare. It was not uncommon to have piles of cable three feet deep around the stageboxes and it took two men to trace a particular cable." Jack decided to design a snake splitter system that would be quick to install, extremely flexible in terms of its configuration, and would provide the necessary number of splits with provision for lifting ground (pin 1) on individual mike lines to eliminate the ground loops that plague such set-ups.

Designing The System

An essential part of the projected system, the muti-pin connector, was already installed on the Heider truck. TOM SCOTT, Jack's predecessor, had found a 150-pin connector from A-MP, and, having worked out the pin configuration for 50 pairs, had constructed a snake and stagebox using twenty-seven pair Belden cable. The splitter box design required a 1:1:1 turns-ratio transformer, which at the time was unavailable. DEANE JENSEN, who was at Heider's at the time, wound the prototypes. At the suggestion of Jack Crymes, multiple Faraday shields were included, one for each winding. These dramatically reduced the buzz being picked up from SCR lighting dimmers, a problem all too familiar to Jack and Deane.

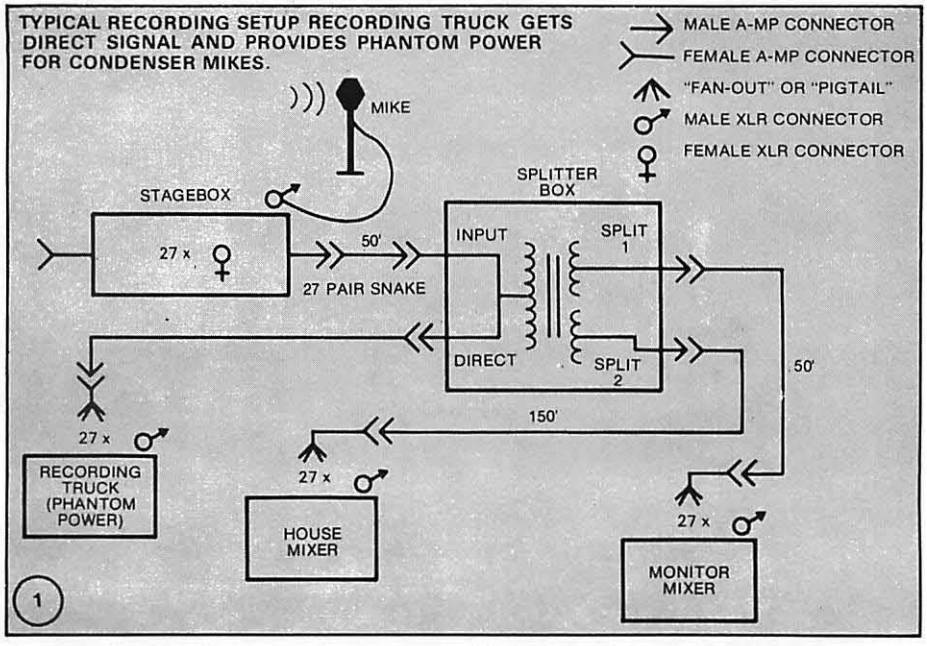
The completed system fulfilled all the requirements, and when Jack left Heider/Filmways both the trucks and Filmways Audio were completely equipped with the snake systems.

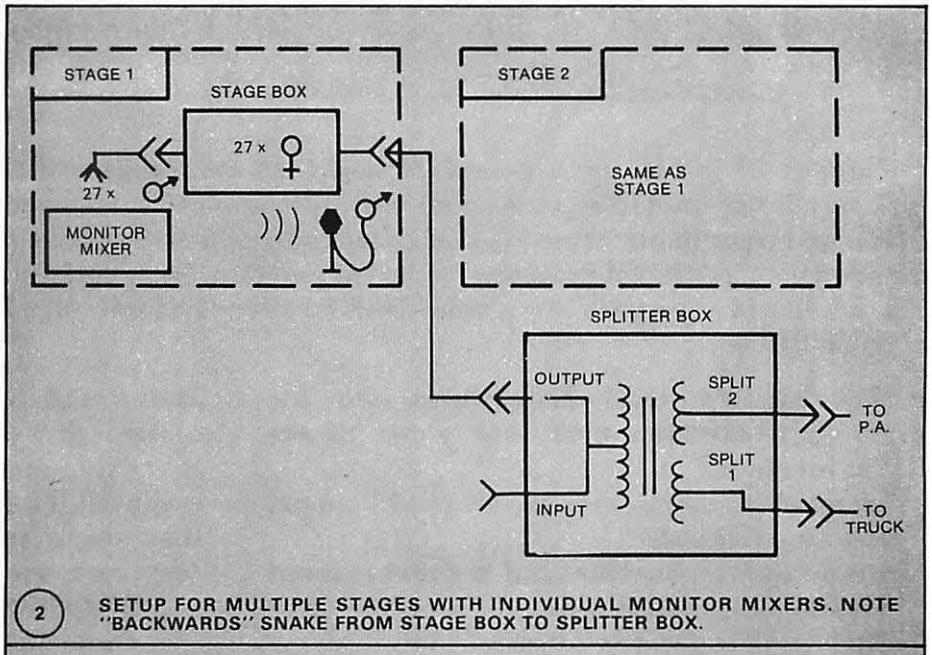
Typical Mobile Recording System

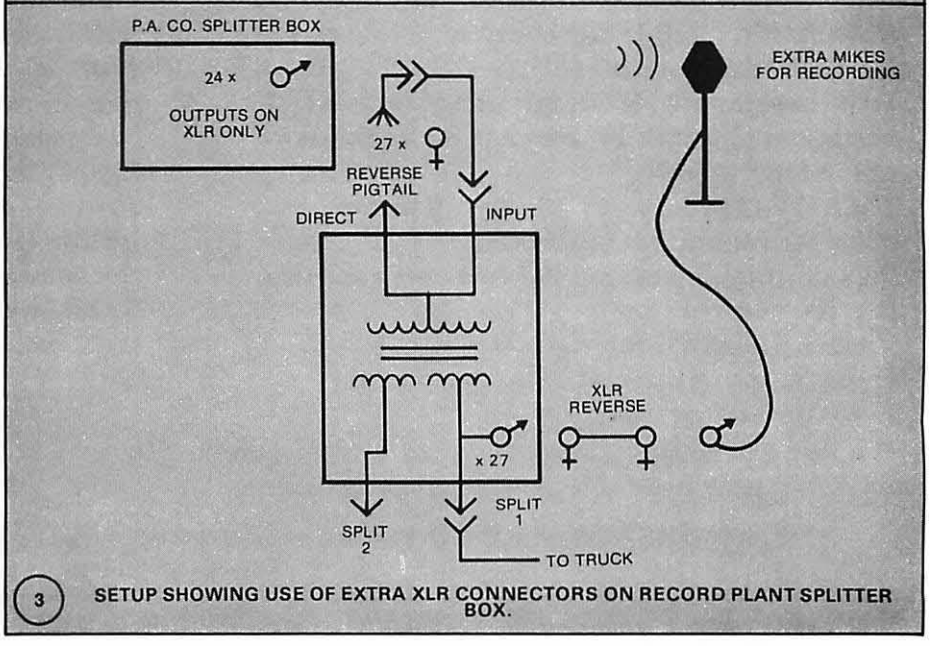
Since 1975 Jack has been chief engineer for the Record Plant Remote Recording Division, which he set up with TERRY STARK, and each of the three trucks (one more is under construction) is equipped as follows:

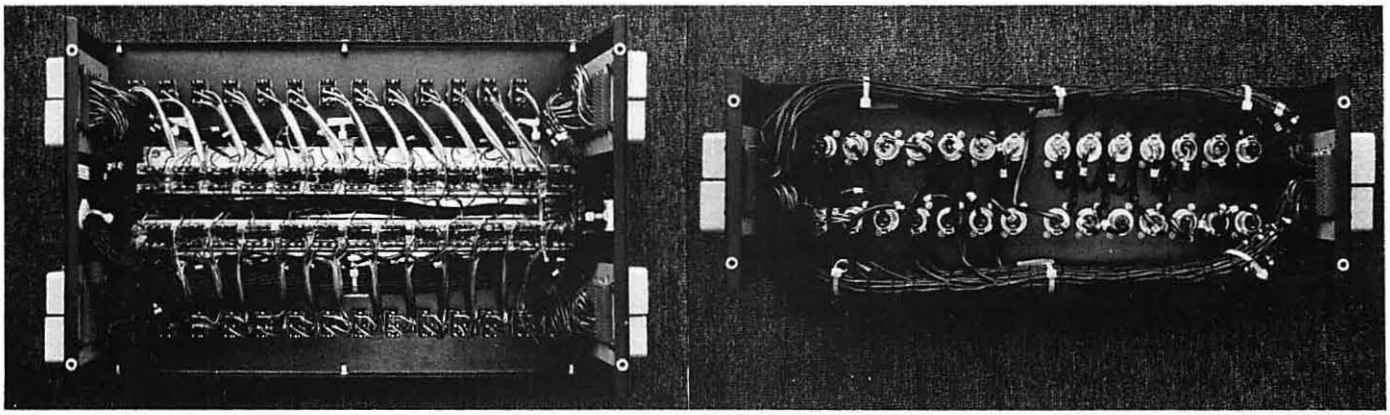
—Four 150 foot 27 pair snakes (Female A-MP connector to Male A-MP connector)
—Two 50 foot 27 pair snakes (Female A-MP connector to Male A-MP connector)
—Two 10 foot 27 pair snakes (Female A-MP connector to Male A-MP connector)
—Two Male and two Female "Pigtails" or "Fan-Outs" (A-MP to 27 XLR connectors on six-foot mic cables)
—Two Stage Boxes (termination boxes) (27 Female XLR connectors to one Male, one Female A-MP)
—Two Splitter Boxes (one Female A-MP, three Male A-MP plus 27 ground lift switches)

All snakes and pigtails have A-MP *plugs* which will mate with plugs *or* receptacles of the opposite sex. All stageboxes and splitter boxes have A-MP *receptacles* which mate only with plugs of the opposite sex. Snakes can thus be extended with ease and stageboxes may be "daisy-chained" together around the stage. The A-MP plugs can be connected or disconnected in under five seconds, making it simple to use one mixer for several stages, invaluable for festivals or TV shows.









(Left) 27-pair Splitter Box built by McCune Sound. Note ground lift switches and transformer mounting rails. ***(Right)*** 27-pair Stage Box with "loopthrough" connections. Photographs courtesy of McCune Sound, San Francisco, California

For flexibility Jack has included 27 Female XLRs on the splitter box paralleled to Split I, and pigtails come in both sexes so that feeds may be taken direct from male XLRs rather than by patching to a stagebox with short mike cables. He has also developed a number of tricks as a result of dealing with TV shows, where stage and set changes are made at alarming speed. Some sample setups are shown above.

Standardization

The title of this article implies that the system described is an industry standard, which is not strictly true. But it is a tribute to Jack's design that it has been adopted by so many others. In addition to the Record Plant and Heider/Filmways, the system is used by Stanal Sound, McCune Sound, A-1 Audio, and has been installed in several concert facilities, notably Concord Pavillion. (See *Sound Man's Guide to Venues #11, R-e/p, August 1980*). The A-MP connector was originally chosen with 50-pair snakes in mind and in fact the Doobie Brothers' system uses all 150 pins. McCune uses a 50-pair house and truck feed on large shows by combining the outputs of two complete 27-pair systems through a 2 by 27 to 50 adapter. (The last four lines on the second 27-pair are not used.)

A-MP CONNECTOR WIRING CONVENTION
H = Hot; C = Common; S = Shield

Figures Moulded On Contact Housing Block

	Block #1		Block #2		Block #3	
A	H		H		H	
B	C	Pair 1	C	Pair 17	C	Pair 33
C	S		S		S	
D	H		H		H	
E	C	Pair 2	C	Pair 18	C	Pair 34
F	S		S		S	
H	H		H		H	
J	C	Pair 3	C	Pair 19	C	Pair 35
K	S		S		S	
L	H		H		H	
M	C	Pair 4	C	Pair 20	C	Pair 36
N	S		S		S	
P	H		H		H	
R	C	Pair 5	C	Pair 21	C	Pair 37
S	S		S		S	
T	H		H		H	
U	C	Pair 6	C	Pair 22	C	Pair 38
V	S		S		S	
W	H		H		H	
X	C	Pair 7	C	Pair 23	C	Pair 39
Y	S		S		S	
Z	H		H		H	
a	C	Pair 8	C	Pair 24	C	Pair 40
b	S		S		S	
c	H		H		H	
d	C	Pair 9	C	Pair 25	C	Pair 41
e	S		S		S	
f	H		H		H	
h	C	Pair 10	C	Pair 26	C	Pair 42
j	S		S		S	
k	H		H		H	
m	C	Pair 11	C	Pair 27	C	Pair 43
n	S		S		S	
p	H		H		H	
r	C	Pair 12	C	Pair 28	C	Pair 44
s	S		S		S	
t	H		H		H	
u	C	Pair 13	C	Pair 29	C	Pair 45
v	S		S		S	
w	H		H		H	
x	C	Pair 14	C	Pair 30	C	Pair 46
y	S		S		S	
z	H		H		H	
AA	C	Pair 15	C	Pair 31	C	Pair 47
BB	S		S		S	
CC	H		H		H	
DD	C	Pair 16	C	Pair 32	C	Pair 48
EE	S		S		S	
FF	H	Pair 49	S	Pair 49	C	Pair 50
HH	C	Pair 49	H	Pair 50	S	Pair 50

How Much?

A system similar to that shown in Figure 1 represents an investment of close to $2,500.00 in A-MP parts and transformers alone, but the flexibility of the system and ready availability of compatible replacements for any component gives it a long working life. As an example, in 1973 Jethro Tull took delivery of a house sound console which could only accept mike inputs through a single multipin connector. The mating connector on the snake made a poor fit and a week into the "Passion Play" tour the cast-alloy connector housing shattered, putting the entire production in jeopardy until the next day off, when the connector was replaced. By contrast, the last two Playboy Jazz Festivals have been staged on a turntable, and set changes necessitate complete disconnection of the mike lines while the turntable revolves, and rapid reconnection before the first note! A McCune Sound snake/splitter system is used with duplicate stageboxes on both sides of the turntable and, despite as many as 60 disconnects/reconnects per show, not one audio line has been lost.

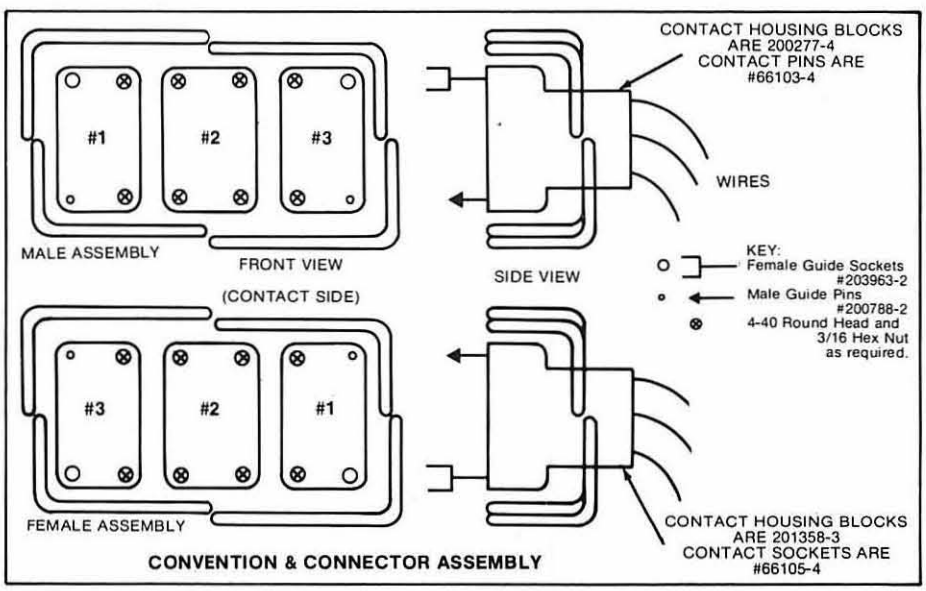
Similarly a recent Big Band Show at the L.A. Forum featuring three bands playing in rotation was handled with four snakes, three stageboxes, and a pigtail. Disconnects between sets were made at the side of the stage while the M.C. used a "hard-wired" mike to introduce the next act.

Conclusion

Any audio system is only as good as its weakest part, and the expense of the systems detailed above is more than justified by their reliability and the way in which they can be re-configured for different requirements, a feature often overlooked by newcomers to live audio. For an equipment rental company there are obvious advantages to a system that is compatible with both the client's state-of-the-art custom mixer and that "old tube mixer that sounds great on strings." Renting your back-up mixer to the support act becomes feasible with the addition of a pigtail and stagebox, and you can promise your client trouble-free remote recording.

This year's Monterey Jazz Festival featured split feeds to the house mixer, the Phil Edwards Remote (recording for NPR) and a McCune truck providing mono and

— *continued overleaf . . .*



CONVENTION & CONNECTOR ASSEMBLY

PARTS LIST

Does not include metalwork or cable. See note on construction.

Part Description	Part Number	Splitter Box Qty	Snake Qty	Stage Box Qty	Pigtail Qty	Reverse Pigtail QTY
Connector Body (Plug)	225004-1	-	2	-	1	1
Panel Mount Connector (Receptacle)	225005-1	4	-	2	-	-
Male Contact Pin Housing Block	200277-4	9	3	3	-	3
Female Contact Socket Housing Block	201358-3	3	3	3	3	-
Male Guide Pin	200788-2	8	4	4	2	2
Female Guide Socket	203963-2	8	4	4	2	2
Strain Relief Bushing	202038-1	-	4	-	1	1
Male Contact Pin	66103-4	243	81	81	-	81
Female Contact Socket	66105-4	81	81	81	81	-
1/2" (half-inch) 4-40 thread round-head machine screws	-	32	16	16	8	8
4-40 thread 1/4" (quarter-inch) Hex Nut	-	16	-	8	-	-
4-40 thread 3/16 inch Hex Nut ("Radio Nut")	-	32	-	16	-	-
Male XLR Connector	-	-	-	-	27	-
Female XLR Connector	-	-	-	-	-	27
Female Panel Mount XLR Connector	-	(27)	-	27	-	-
JE-MB—D Mic Bridging Transformer (or equiv.)	JB-MB-D	27	-	-	-	-

Splitter Box — Accepts mic-level inputs on snake and provides one direct output and two isolated splits to snake or pigtails for connection to mixer inputs.
Stage Box — Accepts mic inputs on XLR connectors and connects to 27-pair snake.
Pigtail (Fan-Out) — Connects snake or splitter box output to XLR inputs (Female).

PRICE LIST: A-MP PARTS
(As of September 26, 1980)

Part Number	Description	Price
225004-1	Connector Body (Plug)	$ 50.70
225005-1	Panel Mount Connector (Receptacle)	$ 7.32
200277-4	Male Contact Pin Housing	$ 2.76
201358-3	Female Contact Socket Housing	$ 2.76
200788-2	Male Guide Pin	$ 1.17
203963-2	Female Guide Socket	$ 1.34
202038-1	Strain Relief Bushing	$ 1.24
66103-4	Male Contact Pin	$ 169.32 per thousand
66105-4	Female Contact Socket	$ 192.00/1000*

**Price subject to Gold surcharge.*

PRICE LIST: JENSEN TRANSFORMERS

Part No.	Description	Price Schedule 1-19	20-39	100-249
JE-MB-C	2 Windings 2 Faraday Shields	$47.09	$40.74	$31.14
JE-MB-D	3 Windings 3 Faraday Shields	$79.99	$69.22	$52.89
JE-MB-E	4 Windings 4 Faraday Shields	$120.12	$103.93	$79.42

Effective January 1, 1988

stereo mixes for backstage monitoring and radio transmission respectively. Despite the apparent complexity of the system (and the state of some of the players' amplifiers), buzz and hum were marked by their absence throughout.

Notes On Construction

The A-MP Connector assembly is described in Information Sheet IS 2118, available from the manufacturer. The 4-40 thread HEX nuts in the accompanying parts list are substitutes for identical A-MP parts. The 4-40 round head machine screws are also substitutes for A-MP guide pins, as it was felt that four guide pins per connector were sufficient (see Convention and Connector Assembly). When connecting to Belden 8773 two Strain Relief Bushings are used, one slit lengthwise and enclosing the other. (A Strain Relief Bushing for cables of diameter 0.84" to 0.94" is A-MP Part #2020371.)

Everyone I have spoken to agrees that the A-MP Connector is very easy to work with and should take two to four hours to wire and assemble. A high quality crimping tool and a pin-extraction tool are essential. (Both are available from A-MP.)

The Splitter Box is the most time-consuming (and expensive) item to build. Metalwork should be designed to protect A-MP receptacles and ground-lift switches. Transformers must be mounted securely. Non-locking Female Panel Mount XLR connectors might be considered for Stageboxes, as some lock-release tags bend and break easily. On the other hand, one of the major TV networks insists on locking connectors for audio lines.

Cable manufacturers are highly competitive and comparisons are outside the scope of this article, but the author's experience with Mohawk W&C #22 twenty-seven pair leads him to recommend it for handling and weight, important considerations when dealing with 150-foot lengths. Neumann mike cable (three conductors and a shield) is also recommended for pigtails, and lengths of at least six feet should be used so that split mixing consoles are easy to reach. Sensible use of Panduit makes a potential rat's nest into a manageable and useful tool.

Ground lifts are provided on the splitter box, but each user has developed a different philosophy. Filmways/Audio has 81 miniature toggle switches on each box, one for each mike line on each output. Jack Crymes favors ground lifts on Split 1 only, leaving Split 2 grounded through its destination, the PA or monitor mixer. McCune has only one common ground line, normally number one, so that input must be used on all mixers.

An important safeguard implemented by BOB CAVIN at McCune is a one-amp fuse across the ground line to prevent damage to the snake and mixer in the event of, say, a guitar amp shorting to the PA system. Another modification is to provide bypass circuitry for one of the transformers, so that a line-level signal may be returned to the stage on the house snake. This is not recommended practice, but could prove invaluable in an emergency.

Metalwork will probably vary with the application, so drawings have not been included. Any questions should be directed to the author, c/o *Recording Engineer/Producer*. Further input on the subject of mike splitter snakes is most welcome. □□□