

BY D. W. FOSTLE

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A living room wall in Mike McLean's southern-California condo is covered with records. Fifty feet of meticulously crafted cabinetry encases an immense collection. When Martha Reeves, Marvin Gaye, Mary Wells, Smokey Robinson, Stevie Wonder, The Supremes, The Temptations, and The Four Tops set the hooks of their hits into the mind of a nation, Mike McLean was Motown's chief technical engineer. Although he rejects any theory of his own importance, it is difficult to exaggerate his impact on "The Sound of Young America." As the maximum Motown technologist, McLean designed, built, or specified nearly everything in the Detroit studios.

Typical items in the McLean archive: Sir Thomas Beecham and the London Philharmonic on Columbia Masterworks 78s; von Karajan conducts the Berliner Philharmoniker; box sets of virtually any opera recorded interposed by the cubic yard with Beethoven, Berlioz, and Brahms. There are Motown sides in this vast accumulation, but very few. After a hard day at Hitsville, Mike McLean often relaxed with a six-pack and the Wagner Ring Cycle.

MASTER OF THE MOTOWN SOUND

It's not really surprising that his taste would run in that direction. McLean's father Archie collected art, antiques, and Persian rugs (the family home was furnished like a minor annex of the Detroit Institute of Arts). His prime passion, however, was classical music. Starting in the late '40s, his house became a gathering place for men who shared that love. They listened, and they talked of the music and the devices that could re-create it in their homes. Hi-fi was young, and, in the company of those men, so was Mike McLean. What follows is the story of how the boy reared in that musical tradition came to be a man at the epicenter of a new and utterly different genre, and of how the now-legendary Motown sound was created and captured in the studios he designed.

D.W.F.

D. W. FOSTLE WORKED FOR MIKE McLEAN AT MOTOWN FOR TWO YEARS IN THE EARLY '70S. DESPITE THE EXPERIENCE, THEY STILL SPEAK.

Mike, how did you get a job at Motown Records when you were just 20 years old?

I was very excited about the idea of buying a \$2,000 Ampex 351-2 portable tape recorder, because, like my mentor Max Stroup, I wanted to go out and record orchestras. I had a fantasy about how I would do this if I could only acquire the right equipment. Max worked at Chrysler, as an acoustical measurements engineer. He believed in keeping busy, so at night he'd build Williamson amplifiers

driving me crazy. I looked in the paper, and lo and behold, there's this ad in the *Detroit News*: "Electronic Technician, must have knowledge of Ampex equipment." I didn't have a car at the time; my license was confiscated for hot-rodding. I called up my friend John Windt, and he drove me down to the Hitsville building at 2648 West Grand Boulevard, in Detroit, Michigan. It was a cold winter day in January of 1961. I was interviewed by Berry Gordy, and he took me into the control room. They had an Ampex 351

two-track, which they were using as their multitrack, and an Ampex 400 like the one old Max used. That was for the final mono mixdown. There was an old 1930s-vintage Western Electric broadcast console. They'd put the band on one track and the lead vocal on the other, then mix the two together.

When Berry took me into the control room, he turned up the monitor. There was a hum, and he asked me why they had the hum. I said, "Well, maybe that's an open grid; maybe you have an input without anything plugged into it picking up hum." He asked about four or five questions of that nature,

and he seemed to be extremely pleased. I went home, and two or three days later they called and asked me to come back. I took the bus down, and they hired me. Seems to me I held out for \$50 a week, which was what I had got for pumping gas and greasing cars.

Twenty-six hundred dollars a year?

I guess that's right. That certainly is a conservative salary by today's standards. I had to subdue my obsession with this tape recorder; I could deal with having my own Ampex machine later as long as I had access to them. I was hired as a maintenance technician.

So they were recording hits like "Money" and "Get a Job" with two Ampexes and a prewar Western Electric console. What other gear did they have?

The monitor system consisted of two Electro-Voice Aristocrat cabinets, which were designed to be used with a 12-inch speaker, but they had mounted a 15-inch Altec-Lansing 605A Duplex coaxial in each one. The 605 was a descendant of the 604 series; it was characterized by very high efficiency and a tendency to be very heavy on the midrange. It was a real earbuster. When you had a bunch of brass playing loud and turned that speaker up, you could really do a number on your ears. The speakers were up near the ceiling in each corner of the control room, but they lacked bass and were thin-sounding.



for hi-fi hobbyists. So my dad got one. I grew up in surroundings where people liked to build high-quality audio equipment and listen to classical music.

Stroup played clarinet in the Plymouth Symphony Orchestra, so he was in a position to make recordings.

He had a big Klipsch horn-loaded speaker that he'd built, and he recorded using a Stephens condenser mike, which was a remarkably high-performance, natural-sounding omnidirectional microphone. Back in those days I had two experiences that were awesome and thrilling: One was listening to Max's tapes, which had this wide, almost supernatural dynamic range—no compressors, no nothing. Compared to 78-rpm records or LPs, it was just breathtaking; drums had tremendous impact, and there was a stunning clarity to the instruments. The other was hearing the live, mono FM broadcasts done with a Telefunken U-47 condenser mike hung over the University of Michigan Band. You'd hear these fantastic transients—the impact sounds took your breath away. It was hi-fi heaven.

How old were you then?

Somewhere between 9 and 12 years old. Max Stroup got me all jazzed up. My heroic image of what was cool was to own an Ampex in a beautiful black case, just like Max's. By the time I was 19, I needed a job. The last job I'd had was in a gas station for 50 bucks a week. I was in a pretty tough position, lusting for this \$2,000 machine. It was a total obsession,

Mike McLean,
Chief Technical
Engineer of Motown
studios, circa 1966.



Session musicians
during a break in
recording at Motown
studios.



MOTOWN

These speakers were driven by a Pilot Radio stereo amplifier, 35 watts per channel, with a pair of EL-34 output tubes. Same outputs and similar circuits to the Dynaco Stereo 70. There was a companion Pilot preamp that was used as the monitor control.

How many positions on the Western Electric board?

I believe that console had eight 600-ohm rotary pots made by IRC. It came with the old Western Electric preamps, which had big tubes from the 1930s, with five or six prongs on them. Four Altec broadcast preamps had just been added to replace the preamps built into this old funky console. And they'd just bolted a Fairchild 660 mono compressor/limiter into the rack. Today the Fairchild has become something of a cult classic.

What sort of mikes did Motown have in 1961?

There was a Neumann U-47 and a U-48. I'm not sure, but one may have had the Telefunken name on it. I think there were a couple of Electro-Voice 666s, two RCA 44-BXs, and an RCA 77-DX. That's all I remember. They'd just gotten the Neumanns and were having a lot of trouble with them. There was a chronic problem with overloading the mike preamps because of impedance mismatching. The first solution was to back away from the mike. Eventually, we learned to put an impedance-matching pad on the output, which made the Neumanns compatible with American preamps.

Who was engineering sessions at this time?

The number-one guy was Robert Bateman. He was a very talented fellow and was producing a group called the Satin Tones. His sidekick was Brian Holland. In those days, Robert Batemen was the big shot, doing all the mixing. Berry would come in and say, "C'mon Robert, I'll show you how to make you a better mix." They'd go back and forth, doing their thing about how to do a good mix; Brian would stand by, a hangdog little helper. Berry Gordy worked the same way, a kind of one-man record-making machine, working out arrangements and everything else.

MY HEROIC
IMAGE OF WHAT
WAS COOL
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AMPEX IN A BEAUTIFUL
BLACK CASE.

Are you saying Gordy and Bateman went out on the floor and adjusted the drum mike?

Absolutely. Whoever was producing the session would press "Record" on the Ampex, move mikes—whatever. Sometimes Berry would play piano on Robert Bateman's sessions, and Robert sang backup on Berry's. Sometimes Berry sat at the board when Bateman sang with his group. They were doing all of this stuff. Robert Bateman was a very brilliant, creative person, and what he accomplished was remarkable.

Were the early Smokey Robinson sessions done that way?

Either Berry Gordy or Robert Bateman would mix those. Smokey, at that time, was

not into mixing. Later on, Smokey did some of his own mixing. The basic idea back then was that if anybody had a bright idea for a hit record, we'd all figure out how we could get the thing on tape.

What did they use for reverberation then?

They'd just built an echo chamber in the attic of the Hitsville building in Detroit. That was the only building then. The chamber was very crudely made with some parallel walls, some flutter echo, and poor sound isolation; as I remember it, they just nailed up some plasterboard. There was a door at each end. It was about as basic as you could imagine. Pop Gordy, Berry's father, was in the construction business, and he had one of his guys build it to verbal instructions. I

think the chamber had an RCA 44-BX microphone. What the speaker was I can't possibly remember. My experience over the years is that it doesn't make much difference what you use in a chamber.

marvin Gaye



Early studio
monitor setup at
Motown utilized Bozak
drivers.



So that was Motown at the time Barrett Strong cut "Money (That's What I Want)" for Berry Gordy?

Yes. However, I will say this. Because of the flutter echoes in the chamber, it had an unusual characteristic sound that seemed to be highly favored by many people who used it. In fact, some consider it

to be one of the major constituents of the Motown sound. We built much more sophisticated chambers with non-parallel surfaces, thicker, harder walls, beautifully polished and varnished plaster—all the things it said to do in Harry F. Olson's book [*Musical Engineering*]. They didn't seem to think those fancy chambers were as satisfactory as the crude original one with flutter echoes.

So a big contributor to the early Motown sound was that primitive chamber?

Apparently, yes. On the other hand, in his autobiography, *To Be Loved*, Berry Gordy says that the EMT-140 reverberation plate was the best. We bought the first one about three months after I arrived. The 140 was a great big plate of 1/32-inch-thick steel, stretched on a frame. Moving one was like moving a piano. Eventually we built a doghouse for the EMT plate outside the building. We knocked a hole in the basement wall to duct warm air to it.

What did Motown use for equalization?

There was a Pultec EQP-1A and an old, passive, 600-ohm Hycor. That, plus the Fairchild limiter, was the basic setup. It wasn't long before we ordered two more equalizers. One was the general purpose EQP-1A, and the other was a Pultec MEQ-5 that added more flexibility to midrange EQ. Those were New York-caliber professional pieces.

And cult gear today. So what was the next big project?

It was a console. But we were totally mystified. We didn't even understand what was required to design a simple, passive, 600-ohm

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THE FIRST BOZAK
WENT INTO BERRY
GORDY'S OFFICE
FOR LISTENING TO
REFERENCE ACETATES.

early period I'd sit around assembling electronic stuff, waiting for some crisis to arise.

This is the same console with the Emcor frame that's now in the Motown museum?

The same one, with many later modifications. We never actually used the relay box I built. Another thing we did at that time: I was crazy about Bozak speakers. I thought they were great because I was a hi-fi fan, and my Dad and I had them at home. So I thought they would be better. The fact of the matter is that this was a totally sideways move. It was even dumber than that, because the Altec-Lansing speaker was an industry standard. So we went into some weird hi-fi thing, hardly a move forward.

The first Bozak went into Berry Gordy's office for listening to reference acetates. Pop Gordy, Berry's dad, made the cabinet. "Wait'll you hear this, boss. These are so great!" That's what I said. So there was a different sound in Berry's office from in the control room.

It sounds like the console took a while. . .

It was a hodgepodge mess. Meanwhile, there was a lot of talk about how we had to get a three-track, half-inch machine. When we went to New York, all the big boys were using that. And, of course, we wanted sel-sync, which allowed you to overdub. Back then, a three-track Ampex sold for about \$5,000, the price of a new Cadillac. In the meantime, my obsession with having my own recorder led me to the point where I thought, "What the hell, now that I've had a chance to work on these Ampex 351-2 machines, and to look at the

manuals and keep them going, maybe I could build one." There was a recorder built by Edgar Leshner, who was an aeronautical engineering professor. As a sideline he was building recorders in his basement that were similar to an Ampex 351 in concept. The price was much more reasonable, and I bought one

of his bare decks for \$300; my old man lent me the money. I scavenged a head assembly, built the electronics, and eventually got the thing going.

Building your own recorder was training for building the Motown three-track?

Training in the sense that these possibilities became blindingly real to me. I could see that the circuits were simple enough that I could cookbook copy them. You know, why not? What the hell, I've got the same machine if I do this, why pay \$2,000? My game plan, having grown out of

Smokey Robinson and the Miracles, left, and, below, the Temptations.



resistive mixing network. When I got a copy of Howard Tremain's *Audio Cyclopedica*, it was like manna from heaven.

We wanted a three-bus board to be compatible with the three-track, half-inch tape machine standard. We got a bunch of war-surplus relays—brand-new, beautiful, hermetically-sealed relays—for the bus-assign matrix. Wiring that gave me something to do for about three weeks.

So Motown then was build first, design later?

There was a tendency to think up a part of the system that we'd need, then design just enough to build it. When you have 12 inputs and three outputs, you need a lot of relays there. In this





the lust to own an Ampex, was directly transferable to a three-track for Motown.

So I proposed this to Berry Gordy, and he was a little wary at first. He thought it was pretty weird. He's wondering: "McLean's a genius, but he's gonna build me a three-track recorder like at Columbia studios in New York? He's gonna put it together himself? That's a little far-fetched." But to me it was no big deal; I knew how to punch a chassis, mount tube sockets, wire parts, and follow a schematic. The Leshner deck solved the transport problem.

How long did it take you to convince Berry Gordy that you could brew up a three-track at less than a quarter of the price of the real thing from Redwood City?

It took a few days. The third time I nagged him, he said, "All right, let's do it." I was just a little too confident, and he was just a little too hungry for a cheap three-track. So I started to hand-draw the circuits; I got one circuit from the 351, another from an Ampex 600, and one from an Altec mixer, for the outputs. By the fall of 1961 we had a 98%-complete three-track and part of a console. That's when Berry told me I was now in charge of the engineering department and raised me to \$80 a week. He really pumped me up. I'm thinking, "Zowie! Wow! Now I'm the chief engineer!"

So I hired a couple of friends, and we went on a crash program to stick it all together and get the three-track setup running. I think "Please, Mr. Postman" was the first hit recorded on the three-track.

What was the basic setup?

We had an Altec 1567-A mike mixer for track one, the lead vocal, and ran that through the Fairchild 660 limiter. The rhythm section was routed to an Ampex MX-10 mixer and laid down on track three. The rest of the band—the horns, back-up vocals, and whatever—was on track two through the console. Tracks two and three were cut together, and the lead was sometimes an overdub. It got hairy when there were strings. Sometimes the reverb was recorded on the tracks; other times it was added later. Same for EQ. Different people worked different ways. Everything was recorded and mixed on that one board.

But it was just like a city there. Every day new people arrived. Berry Gordy hired his brother, George, and said "I'm going to make

you a mixing engineer." Berry would listen to the mixes that his brother made and send him back to try again. An evolution gradually took place. They would bring in new people who weren't skilled and have them work the night shift, learning how to mix. They worked on the albums, which didn't have nearly the same quality requirement as singles. All these lame tunes that weren't good enough to release as singles would wind up being mixed by these characters on the night shift for the albums. The attitude was: "Now we've got a hit, we've got to get the cover album out." That was a whole different level of production, which was much less quality-oriented. It didn't have to be diddled and fiddled to the nth degree; they were just filling up an LP.

What was the rest of the process?

The end product, as far as magnetic tape was concerned, was always a mono, quarter-inch, full-track master tape at 15 ips. That went to

the disc room to get a reference acetate cut. Gordy and his buddies would sit there and evaluate the acetate. They'd have several acetates for a single, a whole reel of masters of the same tune



† The Supremes



† The three-track record/mix board in Motown's studio in Detroit, circa 1963. "Please, Mr. Postman" was the first hit recorded on the three-track.



that were cut on acetates. Berry might try a mix, or Brian Holland or Robert Bateman or another producer might do one.

They'd kick it around, listening in Berry's office. I have a picture in my mind of Berry listening to some early Temptations stuff in that room. It was very rudimentary—just the Bozak speaker, a Dynakit amp, a turntable, and a few chairs. He'd say things like: "We got to remix this and bring out the violins, and we got to have a better rhythm in this little part here. Push it up to get more feeling." They'd run down and do another mix. The mixes were sent to Bell Sound, in New York, to have the reference acetates cut. That was an incredible pain in the ass, so Berry decided we had to have our own reference acetate cutter. I went to New York to buy a disc lathe in 1962. As far as he was concerned, there was no such thing as listening to the tapes.

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NEXT MONTH: MIKE MCLEAN, BERRY GORDY, AND THE QUEST FOR THE TRUE SOUND.