BUILD THE GHOSTBUSTERS.

ECTO-I





BUILD THE GHESTBUSTERS... CONTROL CON

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LIGHTS, CAMERA, TERROR!

Stop-motion artist Jim Aupperle.







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TO OUR READERS

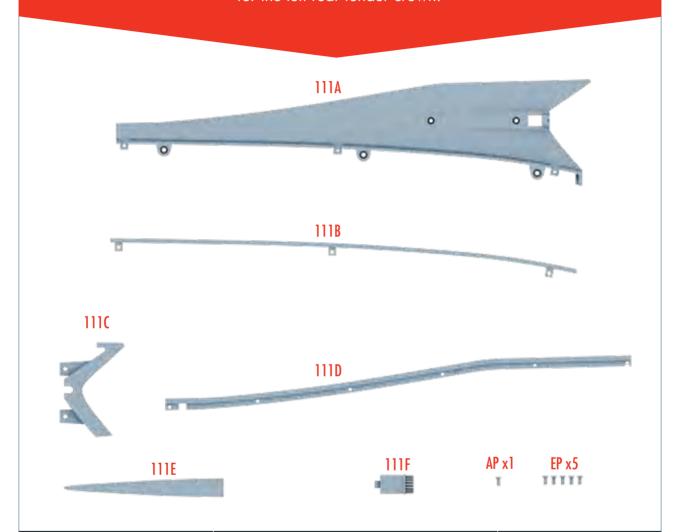
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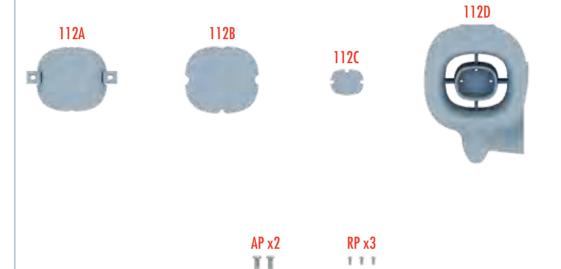
In this stage, you receive the first parts for the left rear fender crown.



PART NUMBER	DESCRIPTION	QUANTITY
111A	left rear fender crown	1
111B	LEFT REAR FENDER CROWN LOWER TRIM	1
111C	LEFT REAR FENDER CROWN REAR TRIM	1
111D	LEFT REAR FENDER CROWN UPPER TRIM	1
111E	left rear fender crown central trim	1
111F	LEFT REAR OUTER LIGHT HOUSING	1
AP	1.7×5MM	1 (+1 SPARE)
EP	1.7×4MM	5 (+2 SPARE)

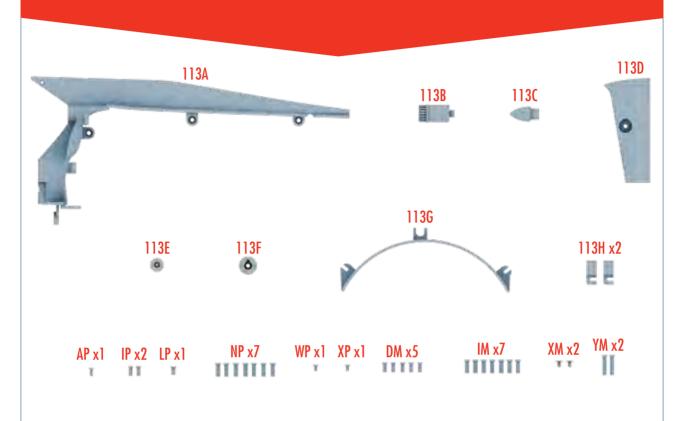
In this stage, you receive parts for the left rear reflector and the left rear outer light.

112E



PART NUMBER	DESCRIPTION	QUANTITY
112A	LEFT REAR REFLECTOR CUP	1
112B	left rear reflector outer lens	1
112C	left rear reflector inner lens	1
112D	LEFT REAR REFLECTOR HOUSING	1
112E	left rear outer light lens	1
AP	1.7x5MM	2 (+1 SPARE)
RP	1.2x3MM	3 (+1 SPARE)

In this stage, you receive the final parts for the left rear fender crown.



PART NUMBER	DESCRIPTION	QUANTITY
113A	left rear fender crown inner]
113B	LEFT REAR INNER LIGHT HOUSING]
113C	left rear inner light lens	1
113D	left rear fender rear panel	1
113E	GAS CAP	1
113F	GAS CAP BODY	1
113G	LEFT REAR VVHEEL COVER	1
113H	Wire Cover	2
AP	1. <i>7</i> x5MM	1 (+1 SPARE)
IP	2×5MM	2 (+1 SPARE)
LP	2.3×4MM	1 (+1 SPARE)
NP	2.3x6MM	7 (+2 SPARES)
WP	1. <i>7</i> x3MM	1 (+1 SPARE)
XP	2×8MM	1 (+1 SPARE)
DM	2.3x5MM	5 (+2 SPARES)
IM	2.3×6MM	7 (+2 SPARES)
XM	2x4x5MM	2 (+1 SPARE)
YM	2.3×11MM	2 (+1 SPARE)

In this stage, you receive several exterior parts for the Ectomobile, including side skirting and the rear fender.

114A

114B

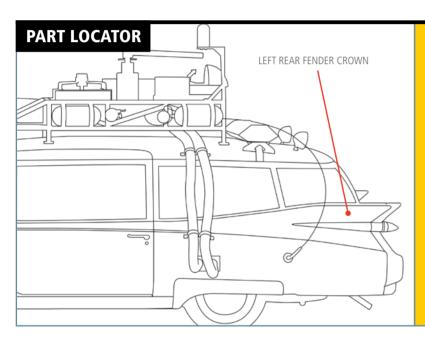


PART NUMBER	DESCRIPTION	QUANTITY
114A	LEFT SKIRTING	1
114B	right skirting	1
114C	rear bumper	1
114D	REAR LICENSE PLATE	1
114E	INDICATOR STALK	1
AP	1. <i>7</i> ×5/WM	2 (+1 SPARE)
JP	2.3×5/WM	2 (+1 SPARE)
VP	1. <i>7×7W</i> M	6 (+2 SPARES)
BM	1.7×4/WM	2 (+1 SPARE)
DM	2×5/WM	1 (+1 SPARE)
IM	2.3x6MM	1 (+1 SPARE)



STAGE 111 LEFT REAR FENDER CROWN

In this stage, you fit the trim to the left rear fender crown.

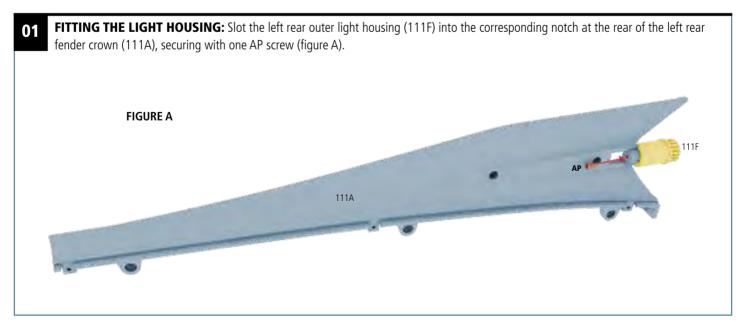


TIP: LEFT AND RIGHT

The instructions throughout this collection will mention the left and left sides of the car. The left and the left (as well as front and rear) of the car are relative to the driver.

Similarly, some of the parts will have an "L" or "R" engraved on them to indicate which side they are intended for.

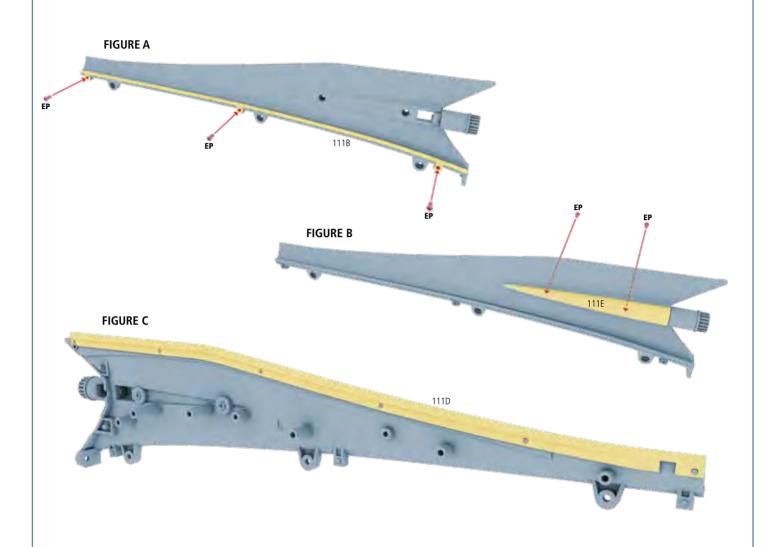
KEY: The illustrations are color-coded to help you identify which parts are being assembled. **RED** Highlights where the new part/s fit and screw in **YELLOW** Identifies the new part/s. **GRAY-BLUE** Indicates the previous assembly on to which the new part is fitted.





FITTING THE TRIM: Begin by fixing the lower trim (111B) to the bottom of the fender crown (111A) using three EP screws (figure A). Next, secure the central trim (111E) next to the light housing with two EP screws from behind (figure B).

Finally, push the upper trim (111D) into place at the top of the fender crown (figure C). This uses pins and will be held in place further once the fender crown inner is fitted in phase 113.

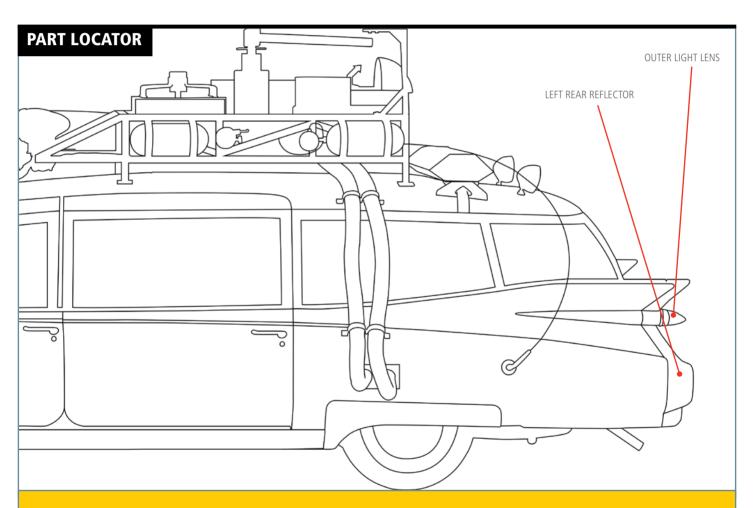






LEFT REAR REFLECTOR AND OUTER LIGHT

In this stage, you assemble the left rear reflector and fit the outer light lens.



TIP: REFLECTOR INNER LENS

When fitting the reflector inner lens, make sure that the textured side is facing inwards, and the smooth side facing outwards.

KEY: The illustrations are color-coded to help you identify which parts are being assembled.

RED Highlights where the new part/s fit and screw in

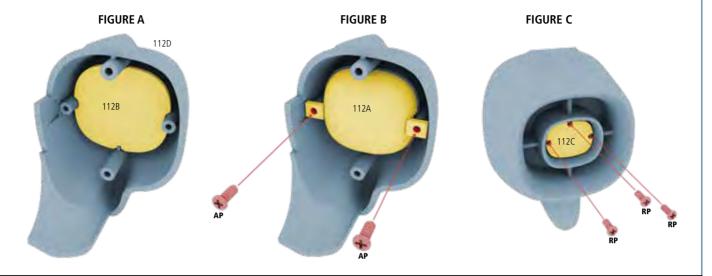
YELLOW Identifies the new part/s

GRAY-BLUE Indicates the previous assembly on to which the new part is fitted.



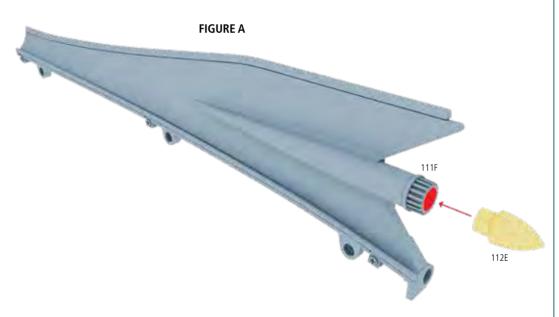
ASSEMBLING THE REFLECTOR: Place the reflector outer lens (112B) in the center of the left rear reflector housing (112D) (figure A), then cover with the reflector cup (112A) and secure with two AP screws (figure B).

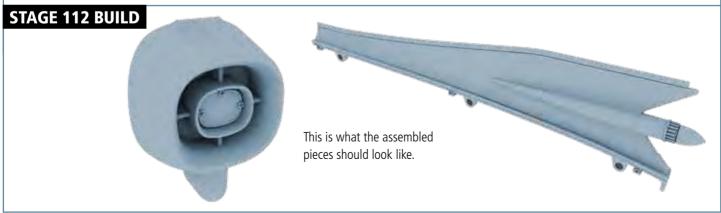
Turn the housing over and place the inner lens (112C) into the center of the housing. Fix with three RP screws (figure C).



102 FITTING THE OUTER LIGHT LENS: Recover the fender crown from the previous assembly phase. Carefully but firmly, push the left rear

phase. Carefully but firmly, push the left real outer light lens (112E) into the light housing (111F) (figure A).

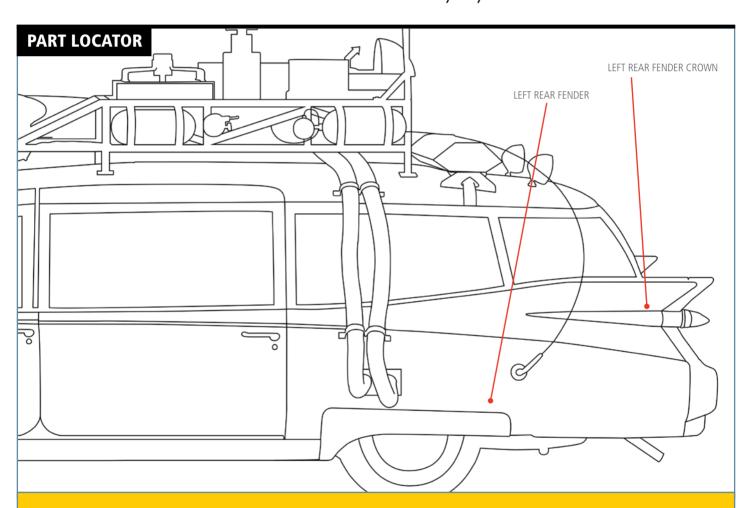






FINISHING THE LEFT REAR FENDER CROWN

In this stage, you finish assembling the left rear fender crown and fit the left rear fender to the body of your model.



TIP: HANDLE CAREFULLY

Unpack all the parts carefully, and to avoid losing any of the smaller pieces, work on a tray or keep the parts in a bowl until they are assembled.

KEY: The illustrations are color-coded to help you identify which parts are being assembled.

RED Highlights where the new part/s fit and screw in

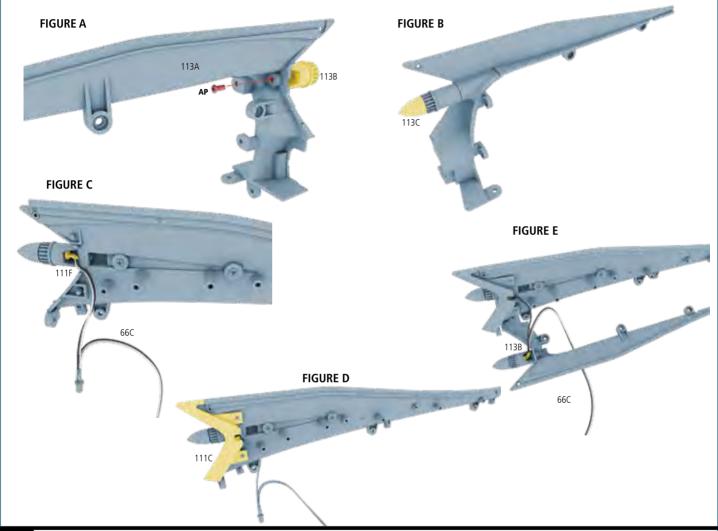
YELLOW Identifies the new part/s

GRAY-BLUE Indicates the previous assembly on to which the new part is fitted.

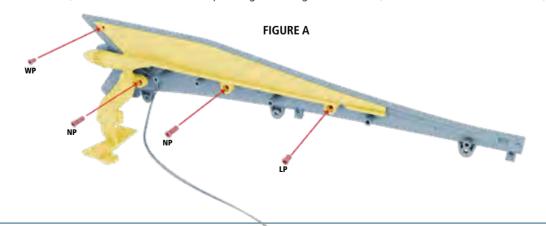


INSTALLING THE INNER LIGHT: Begin by fixing the left rear inner light housing (113B) to the fender crown inner (113A) using one AP screw (figure A). Then, push the inner light lens (113C) into the end of the housing (113B) (figure B).

Next, return to the chassis section and unplug the left tail light LED (66C, marked with an "Q") from the PCB. Slot the bulb at the end of the wire into the outer light housing (111F) (figure C). Then, push the left rear fender crown rear trim (111C) into place onto the two pins at the rear end of the fender crown (figure D). Finally, slot the remaining bulb from the left tail light LED (66C) into the inner light housing (113B) (figure E).

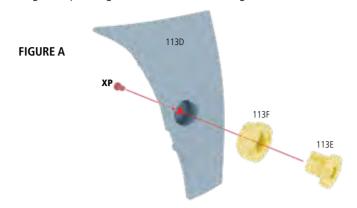


FITTING THE FENDER CROWN PARTS TOGETHER: Ensuring that the bulbs remain in the light housing and the cable is threaded as shown, secure the two fender crown parts together using two NP screws, one LP screw and one WP screw (figure A).



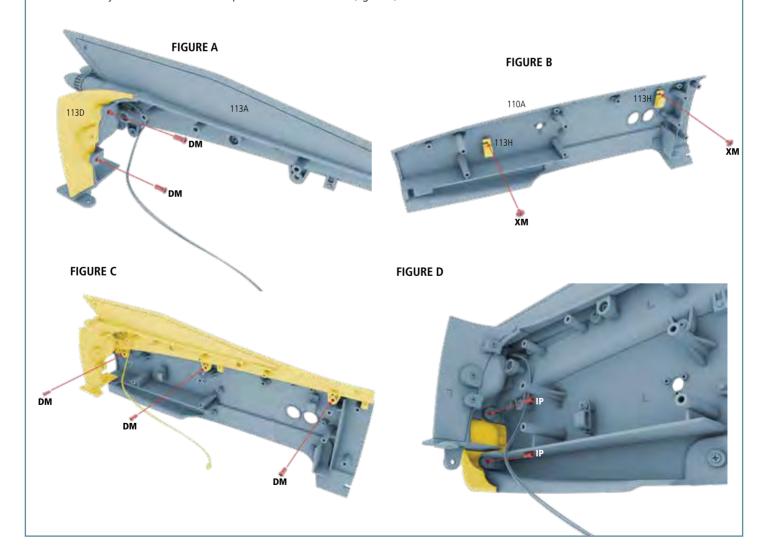


FITTING THE GAS CAP: Insert the gas cap (113E) into the gas cap body (113F) and push this assembly into the left rear fender rear panel (113D), securing these parts together with one XP screw (figure A).



ADDING THE FENDER PARTS: Take the assembled left rear fender panel (113D) and secure it to the fender crown inner (113A) with two DM screws (figure A). Then, return to the left rear fender (110A) and secure the two wire covers (113H) to its interior using two XM screws (figure B).

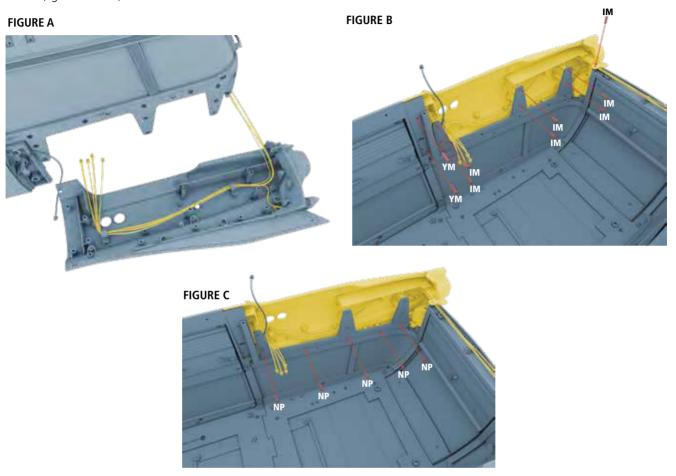
Secure the assembled fender crown from steps 1-3 to the fender panel using three DM screws (figure C), then secure the reflector assembly to the rear of the fender panel with two IP screws (figure D).

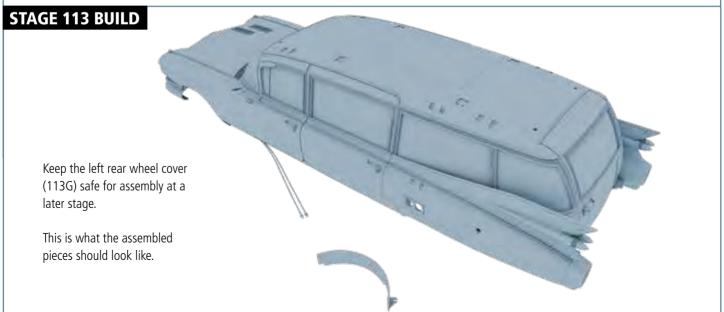




FITTING THE FENDER TO THE FRAME: Thread the left and right tail light cables (66C, 66D), the rear door switch (66F) and right rear door switch (66J) through the wire covers as shown in figure A, so the cables do not get in the way of the fender panel as you secure it to the body frame.

Place the fender panel into place on the body rear frame and secure it from the inside with two YM screws, seven IM screws and five NP screws (figures B and C).

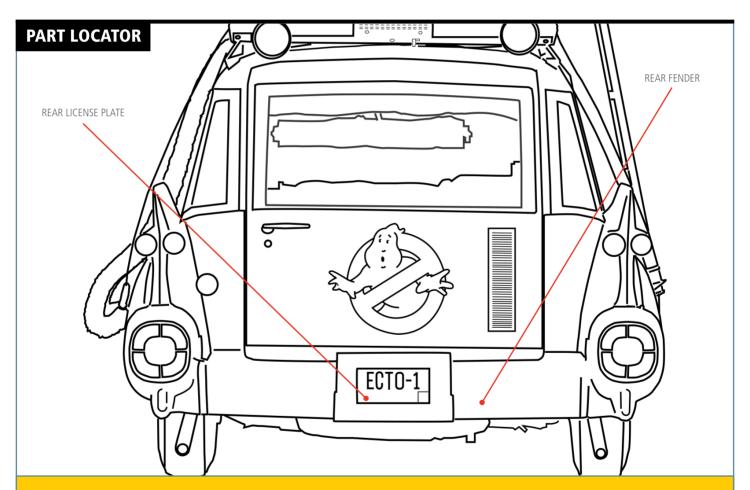






STAGE 114 SKIRTING, REAR FENDER & REAR LICENSE PLATE

In this stage, you fit skirting to both sides of the model, as well as securing the rear license plate and fender.



TIP: PROTECT THE CABLES

Before you fit the left skirting, make sure that the ceiling light LED cable (66E) is out of the way of the parts that will be screwed together.

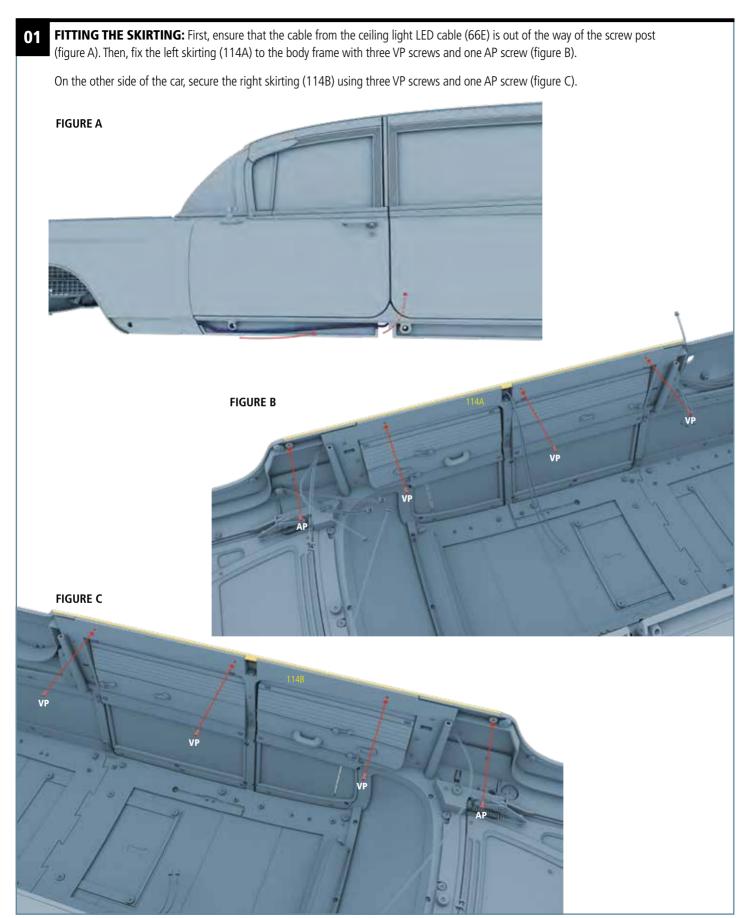
KEY: The illustrations are color-coded to help you identify which parts are being assembled.

RED Highlights where the new part/s fit and screw in

YELLOW Identifies the new part/s

GRAY—BLUE Indicates the previous assembly on to which the new part is fitted.







FITTING THE LICENSE PLATE: Push the rear license plate (114D) into the center of the rear bumper (114C), fixing from behind with two BM screws (figure A).

FIGURE A BM BM 114C

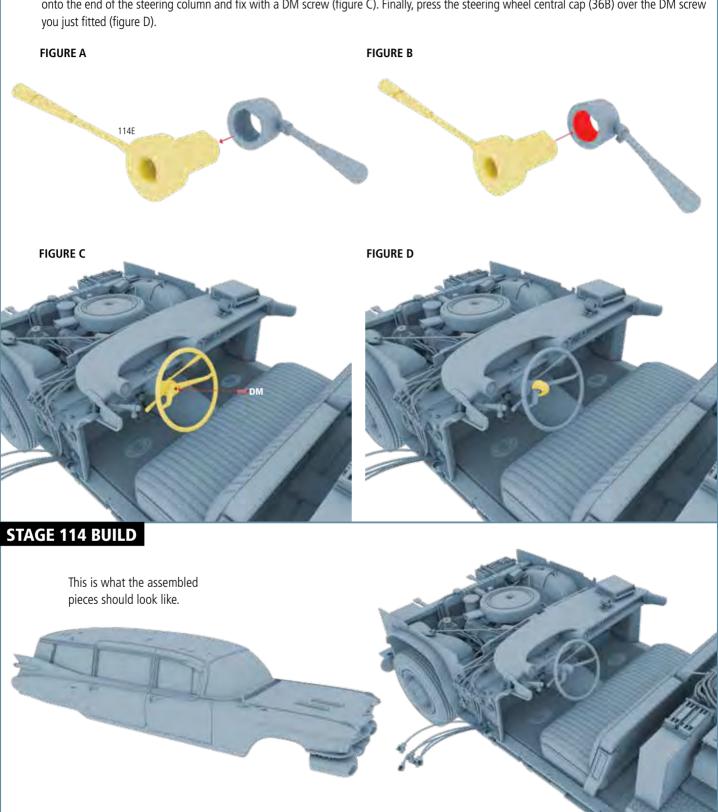
INSTALLING THE REAR BUMPER: Slot the rear bumper into the space at the back of the car's frame, and secure with one IM screw and two JP screws (figure A).





04 FITTING THE STEERING WHEEL: Return to your indicator assembly from phase 36, and replace the indicator stalk (36C) with the new version (114E) you receive with pack 114 (figures A and B).

Then, push these parts onto the steering column, so the new indicator stalk (114E) is on the left side of the car. Push the steering wheel (36A) onto the end of the steering column and fix with a DM screw (figure C). Finally, press the steering wheel central cap (36B) over the DM screw





THE APOGEE EFFECT

With ILM at capacity, Apogee was brought in to handle three last-minute effects sequences for *Ghostbusters II*. VFX supervisor Sam Nicholson looks back on miniature mayhem, filming in reverse, and uncontrollable extras.

O SOONER HAD APOGEE'S VFX SUPERVISOR

Sam Nicholson landed in New York City than he was met by a member of the *Ghostbusters II* production crew and driven straight to the set. After all, there wasn't a moment to lose. With just three months before the film's scheduled release date, a number of new sequences had been added that required additional location photography and extensive VFX work. With ILM already at capacity, other VFX studios were brought in to handle the additional shots, including Available Light, VCE, and John Dykstra's Apogee, Inc.

Nicholson's job on his first day was to supervise the effects in the sequence in which the ghost train speeds through a terrified Winston. However, his *Ghostbusters* experience did not get off to the easiest of starts. "[The Tunnel nightclub] was a tunnel with real tracks, and it was a very difficult location to shoot in," Nicholson remembers. "They had set up the sequence [by the time I arrived], but no one had thought about putting the light of the train on the set! So I talked to the DP about how I had envisioned it and how we really needed the headlight of the train. It probably took about an hour to rig the

light up in the tunnel, and we rethought the sequence on the fly. And then Ivan Reitman came out and blew his cork. 'Who ordered this light?' I was the new guy who had just arrived, and everyone pointed at me and said, 'He did!' Ivan wasn't real happy about that."

To make matters worse, there were further delays after Nicholson requested a wind machine to blast off Hudson's safety helmet and make his hair stand on end. "I would have preferred these things to be covered in pre-production, but I had just been hired," Nicholson says. "The crew were very accommodating, but it just took a little more time than Ivan was happy with."

Despite the initial challenges, it didn't take long for Nicholson and Reitman to build a close rapport as they worked to craft the most thrilling sequence possible. "Once I had some time to get integrated to the show, Ivan and I became really good communicators. It was

the only time I can remember where, when we screened dailies, it was just me and the director in the screening room. I think Ivan likes having a single source of communication. He gives you a great deal of creative freedom, but he is very specific about what he wants."

The live-action Tunnel footage was combined with black-screen photography of a 25-foot miniature antique train. The miniature was made all the more effective thanks to Apogee's model supervisor Grant McCune rigging it with steam effects and reactive lighting, as well as the fact that the sequence was shot at high-speed.

The model work and live-action footage were composited together by Apogee's talented optical team, who Nicholson remembers as resembling some kind of biker gang. "The whole team had big long beards, tattoos and leather jackets. I think they all rode Harley-

BELOW Ernie Hudson was blasted with a wind machine and bathed in the glow from a large headlight, before the footage was blended with the model shot.





ABOVE LEFT TO RIGHT

Theater-goers flee from the monstrous ghost; Rick Lazzarini works on his puppet, which was filmed at Apogee; the Washington Square ghost causes chaos. Davidsons home or something! It wasn't a touchy-feely group, and you had to make sure you had proper elements and really know your shit going in."

The completed last-minute ghost train sequence was a resounding success, providing the extra dash of horror, humor, and spectacle that Reitman and the producers had felt the story needed. "At the end of the day, it worked out really well," Nicholson says. "Coming in late and hitting the ground running was a real challenge, but it was an interesting sequence."

NIGHT OF THE GHOULS

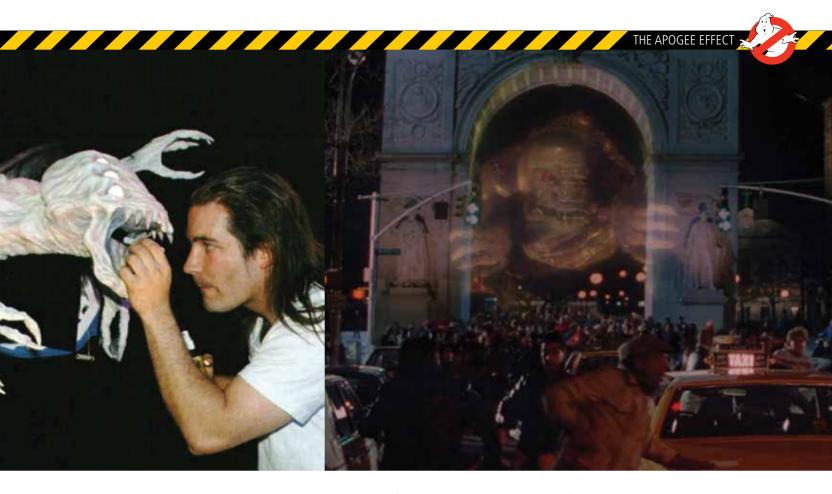
In addition to supervising the ghost train, Nicholson oversaw two other key VFX sequences: the theater ghost and the Washington Square ghost. The former involved shooting Rick Lazzarini's wonderfully monstrous puppet at Apogee and compositing it with live-action footage of theater-goers fleeing from the ghoul in New York. "We tried to use as much interactive lighting as we could [for the live-action footage]. The trick was to get the [extras playing the] audience to react specifically to the ghost – is it coming from the right or the left? – just so everybody wasn't reacting to the same thing at the same time."

Like the train, Lazzarini's puppet was shot at 48

frames per second, helping create a smooth, ghostly look. It was also filmed in reverse, making it much easier to create the effect of the puppet's mouth covering the camera lens (even if puppeteering fast in reverse was something of a challenge for the puppeteers). "We tried everything in the book to make the ghosts do things that were cool," Nicholson adds. "There was a lot of reactive lighting that could be enhanced in post, and there was a fair amount of rotoscoped optical effects, like the [theater ghost's] eyes. We spent weeks shooting laser effects, kinetic lights, and rear projection to create elements that could be manipulated optically to give the ghosts a glow and sweeten those sequences."

WHEN EXTRAS ATTACK

Unlike the theater ghost puppet, the Washington Square ghost was built and filmed at Phil Tippett's studio. However, Nicholson was tasked with supervising the live-action footage of the horrified crowd at Washington Square Park. This ended up being a larger-scale affair than the theater ghost scene – much larger, in fact, than was originally planned. "I have a very distinct memory of it," Nicholson laughs. "It was a Saturday night in New York. They had blocked up a few streets and we filled them with cabs. We had about 200



extras that we had met with, and we told them, 'We want you just to be scared and run past the camera in this direction.' But when people in New York heard there was a big crowd scene for *Ghostbusters*, everyone wanted to be in it. And, of course, on Saturday night in New York, everybody's kind of hammered, right? So it got to about 11 o'clock, and, after people poured out of the bars and clubs, the crowd swelled from about 200 people to 2000. When they called action, this wave of people came at us. They weren't going around the cars, they were going *over* the cars, giving it everything they had. At one point we had to run with the camera, trying to protect it from this mass of people. It was nuts, man. It's only time I've had to run away with a camera after you call action! But Ghostbusters was very popular with the people in New York."

The popularity of the original *Ghostbusters* was both a blessing and a curse, something Nicholson was all too aware of. "*Ghostbusters* was a very successful, wonderful movie. I was a big fan and I understood the dynamics of it. But the audience had extremely high expectations for the sequel. And if the story isn't as good, everyone blames the visual effects!"

Something else Nicholson was cognizant of was that Apogee's effects needed to seamlessly blend in with the

work of ILM, who had created the bulk of the film's VFX. "This was in the days of less compartmentalization [of different VFX companies] on shows. Now, everybody trades assets at the very beginning. But this was never intended to be a split, and it wasn't like a big, happy family. It was a very fast pick-up and we were on our own. But our work had to be ILM quality. It couldn't stand out as being any less than ILM."

In 1989, the same year as Ghostbusters II was released, Nicholson established his own effects company, Stargate Studios. Over 30 years later, it is one of the leading VFX/post-production companies in the industry, having worked on The Walking Dead, Heroes, and hundreds of other shows. But while Apogee may have been a small part of his long career, Nicholson looks back fondly on his time with the company – and is very happy to have a Ghostbusters movie on his resume. "I had a great experience at Apogee during that time. The people that I worked with were wonderful. We had this crazy intersection of people there who went on to do amazing stuff in the industry, like [production supervisor] John Swallow, who became head of visual effects at Universal. You think, 'Wow, we were all just kids then!' I'm very proud to have been part of that little piece of film history."



LIGHTS, CAMERA, TERROR!

puppets were used for the sequence in which Dana and Louis transform into Terror Dogs. These were replaced with full-size puppets later in the sequence.

Jim Aupperle looks back on lighting and filming the stop motion Terror Dog sequence—and reveals how he ended up measuring a Pasadena road in the middle of the night.

core trio who brought to life the stopmotion Terror Dog that chases Louis out of his apartment and through Central Park. Working with Randy Cook, who sculpted the final puppet and supervised the sequence, and Mike Hoover, who was the motion control computer operator, Aupperle was responsible for lighting and operating the camera.

Aupperle had already forged a close working relationship with Randy Cook on *Caveman* (1981) and *The Thing* (1982), while he'd also displayed his stopmotion talents on cult favorites like *Flesh Gordon* (1974) and 1977's *Planet of Dinosaurs* (which he co-wrote). But back in the early-80s, before computers gave animators

much more information to work from, stop-motion was an arduous process that involved even more painstaking attention to detail than it does today.

"We shot against blue screen – the first time I'd done so as other shows had used rear-projection," he remembers. "We needed to analyse the plates [of the live action footage] so we could match everything together. There wasn't always a lot of information from the on-set photography, so I borrowed the prism set-up and boresight from the [Boss Film] editorial department to line up exactly where the dog was supposed to go. We wanted to make sure that the perspective was correct so that the dog's foot would be in the correct place when the optical department composited it in."



One of the most important aspects they needed to focus on, Aupperle says, was making the lighting consistent between the live action and animation. "We needed to analyse the exterior scenes in New York and the interiors in the apartment to work out where the shadows and highlights and colors were. Nowadays things are done with computer and they have a grey sphere [incident meter] that can take light readings, but that wasn't standard in those days."

STREET SMARTS

While the camera was largely locked off, the stop-motion trio did have to factor in a complex shot in which the Terror Dog runs across the street and leaps over the wall. "When we got the shot, there was a pan from right to left across the street where the dog was supposed to go, and there was a section where a car slams on the brakes as the dog lands in front of it," Aupperle recalls. "But the production had to close down the street in New York to get the [live-action] footage, and they weren't allowed to go back to get the measurements of the street. My recollection is that Richard Edlund thought we hadn't been given enough information to get the shot done – but Mike Hoover and I were excited about doing it. Richard said, 'If you can figure it out how to do it, we'll go ahead.'"

The answer partly came from a technical article in the SMPTE Motion Imaging Journal. "It told you how you could figure out the dimensions of a shot based on the lens and what's in the shot! After reading that, I figured that most city streets are more or less the same width, so I went to downtown Pasadena at night when there was nobody around and measured across Colorado Boulevard. We were also lucky that the beginning of the

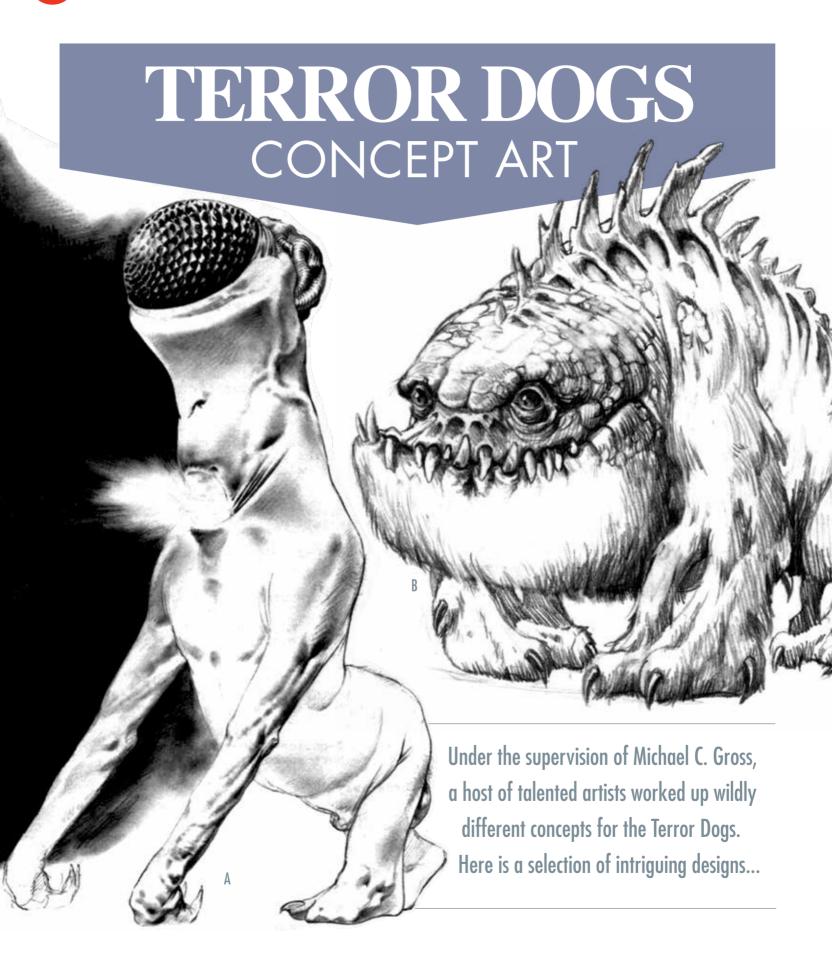
[live action] shot was filmed against the front of the building. There was recognisable geometry in the doorway and the bricks, and we were able to guess at those dimensions. Working from that we figured out the camera position for the dog as it moved across the street... We showed it to Richard Edlund so he could see how it was lining up. I remember Mike and I were in suspense. After Richard looked at it, he grinned and gave us a big thumbs up. Mike and I were so excited! Today there's a whole match-move department that can figure out geometry that matches camera moves, but we didn't have any of that."

When Aupperle saw the final cut of *Ghostbusters* he was surprised at how wonderful it was – not least, he says, because it contrasted so sharply with the work print he had previously seen. "A lot of us were pretty disappointed when we saw the rough assembly. So when we saw the finished film we were like, 'Is this the same thing we saw back then?' I loved it. It's one of my favorite projects that I've worked on."

cause havoc at Louis's apartment. The most complex part of the sequence was the dog's run across Central Park West, which incorporated a camera pan.

BELOW Randy Cook, seen here with Jim Aupperle, places the Terror Dog into the correct pose prior to filming. The puppet was attached to a model-mover rig.



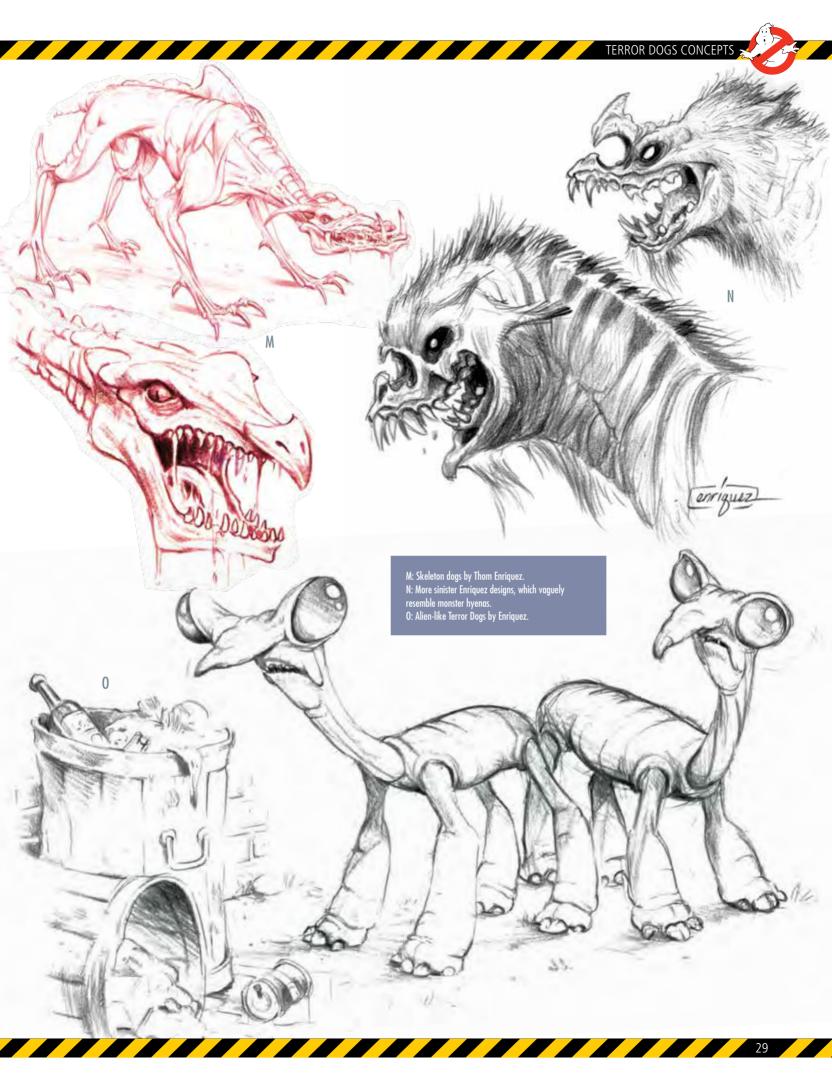














A MONTHLY LIST OF ALL THE THINGS THAT MAKE GHOSTBUSTERS GREAT.



uring the early scene in the Reading Room of New York Public Library in *Ghostbusters*, Peter questions whether Ray has any actual paranormal experience. "Of course you forget, Peter, I was present at an undersea unexplained mass sponge migration," says Ray. "Ooh, Ray, those sponges migrated about a foot and a half," mocks Peter.

It's one of several fleeting references to paranormal activity in the film – some real events (like the Tunguska incident), others apparently made up (like the Philadelphia mass turbulence of 1947). The 'mass sponge migration' falls into the latter category, although some sponges are capable of moving a couple of millimetres to improve their position.

The incident is fleshed out in a flashback in issue 2 of the IDW comic *Ghostbusters: Year One* (2020), which sees Ray and his fellow researchers boarding a submersible in the 1970s to track undersea sponges. "It was an event that had never been seen before by human eyes," recalls Ray. "We happened upon a race. Those sponges were really moving, literal inches at a time."

The line originally recorded by Dan Aykroyd was, "Well, I was at an unexplained multiple high-altitude rockfall once." However, this was re-recorded as the "mass sponge migration" line by the actor during post-production.



Photo: Twilight Zone Expedition Team 2007, NOAA-OE. / Wikimedia Commons

It's obviously a producer's dream for a film to play to a cross-section of all audiences as much as possible, because if it's going to do that it will be successful and a lot of money is made. As a director it's an extraordinary thrill, because it means somewhere in the process of the storytelling I'm communicating to a very broad audience.

▲ Ivan Reitman discusses how he reacts to making a hit movie as both a director and producer (Ghostbusters II EPK, 1989).

Whenever you can, actually put a script into Billy's hand, as if you were a process server... you gotta look him in the eye [and say], 'You did receive this.'

▲ Dan Aykroyd tells Vanity Fair about the process of getting Bill Murray to consider a script (2014).

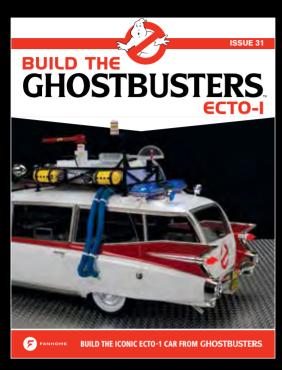
If an actor I'm doubling is a little shorter than me, I work a little bit lower and don't stand up so straight in case there's a picture on the wall and I blot out the frame. Because if the real actor was under that picture, people would notice me suddenly blocking it out! You have to be thoughtful and take pride in your job.

▲ Tony Brubaker, stuntman on Ghostbusters and Ghostbusters II, lets us into some of his trade secrets.





YOUR PARTS



STEVE NEILL *Ghostbusters'* sculptor and puppeteer.



ACROSS THE BOARD

Ghostbusters II storyboard artist Chris R. Green.

