

The camera manufactured here at Tektronix is the Cadillac of oscilloscope photography devices, keeping pace with the advancement of Tektronix scopes, developed and manufactured with Tek's traditional reliability and precision.

Mechanical Engineering Camera Development project leader Maurie Merrick thought back to mid-1959 when he came to Tektronix from nearby Sawyer's, Inc. The need for an oscilloscope camera had already been established when Maurie was "turned loose" on the camera project.

### Camera Needs Realized

The electronics industry wanted improved cameras because:

1. In certain applications the cathode-ray-tube trace traveled too fast to be seen by the human eye or accurately measured. A **record** was needed;

2. A person's mind couldn't remember complicated data or store many details until they could be recorded. A **permanent**, precise record was needed;

3. In unmanned scope observation, **random pulses or timed applications** needed to be recorded automatically;

4. Customers felt that trace-recording cameras would **economically** benefit their operations.

Tektronix needed to manufacture an oscilloscope camera because:

1. We were established as the supplier of, and applications advisor for, the world's most reliable, accurate and complete oscilloscope;

2. Customers began to ask advice on how to obtain permanent records for their findings;

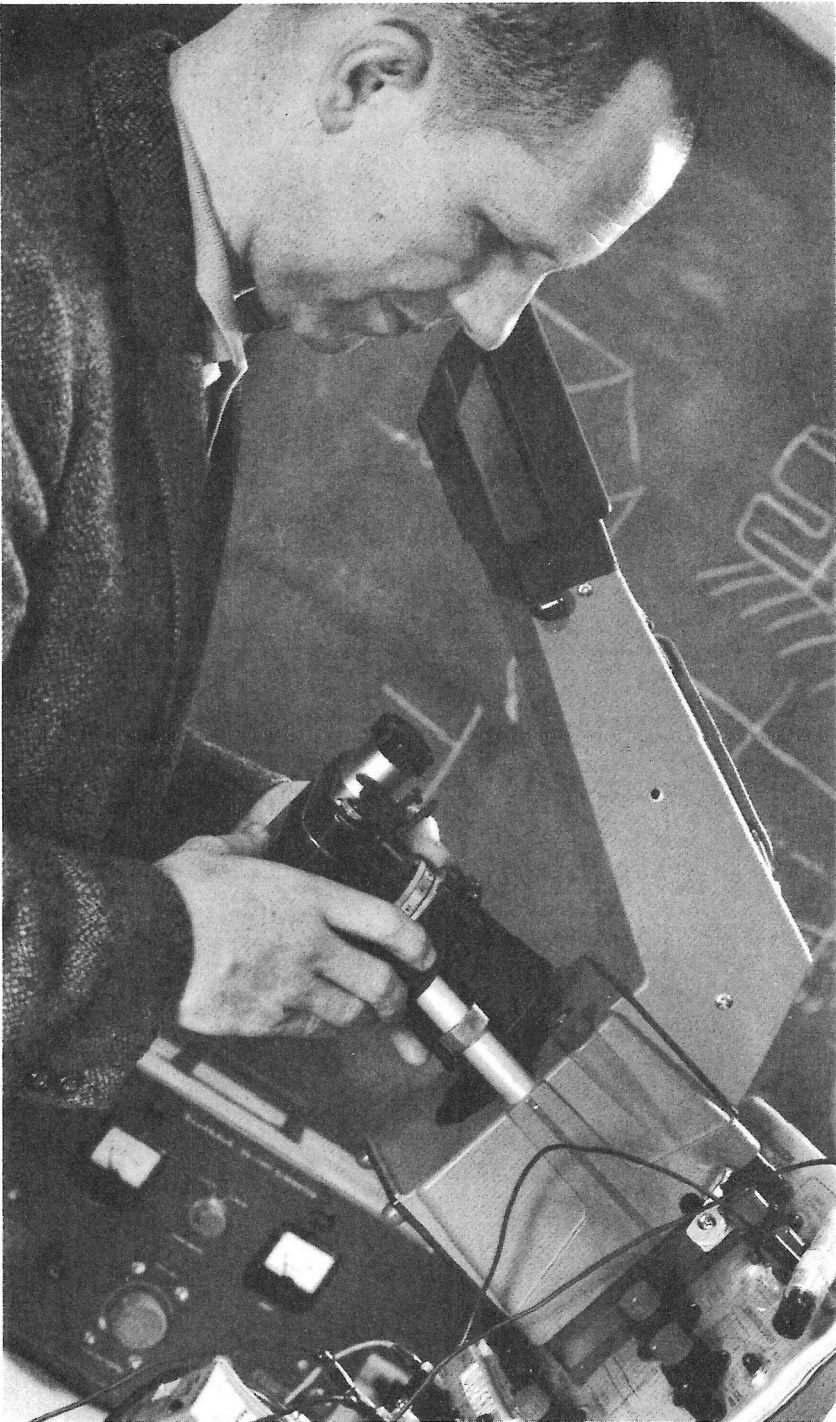
3. By 1957, several instrument manufacturers had come out with oscilloscope cameras;

4. Tek felt that in a camera of this type, to be used with Tek scopes, certain features would have to be added;

5. Tektronix lost sales to customers who wanted to purchase the oscilloscope and camera from the same manufacturer;

6. Field engineers were applying pressure to the "folks at home," pointing out the need for a Tek-made camera.

Maurie recalls, it was during 1957 and 1958 that Tektronix realized the need to manufacture this product. Howard Vollum, Byron Broms, Chuck Nolan, George Edens and Will Marsh were among the many employees who discussed the feasibility of a camera.



THE Type 350, a new 35-mm oscilloscope camera-lens combination, is demonstrated here by Maurie Merrick, Camera Development project leader.

During 1959, a run of 50 C-11 cameras was produced and sold. The design was initiated by Chuck's Special Products department. Then Maurie was hired as Camera Development project leader. He "pitched in and helped" complete the design and production of these cameras. Based on the valuable camera manufacturing and marketing experience gained from the C-11 effort, the company then decided to direct full-scale effort toward the design of an even more versatile and complete camera line.

Many design approaches were considered between November '59 and January '60. Prototype models were built, their features studied and evaluation sessions held. By January Tek had agreed upon a design approach which would offer the most promising advantages.

On the basis of preliminary drawings, Gale Morris of Industrial Design contributed styling sketches. Many hours of drawing-board time by Bob White, Denny Smith and Dwane Romine followed.

From the preliminary drawings, models were made in the Instrument Engineering Model Shop, under Slim Sorenson. Since most of the work involved precision machining, rather than sheet metal work, Dale Helbig's section of the Model Shop was elected. "Through the enthusiasm and skill of Dale, Harry Hendrickson, Max Messmer, Les Wold, Shorty Spencer and many others, we were able to build and evaluate models and to finally meet our deadline," Maurie said.

### C-12 Goes to IRE

After a final prototype was built and evaluated, a decision was made: Try to build a show model for the March 1960 IRE show in New York.

Remembering that hectic week before IRE makes several engineers shake their heads in wonderment, asking themselves, "How in the world did we do it?" Maurie remembers that they "practically didn't go home at all for weeks." But in spite of the last-minute rush a brand-spanking-new Tektronix product, the C-12 camera, made its debut at IRE.

Reactions from field engineers and customers were enthusiastic; the decision to manufacture C-12s followed. "We got the GO! GO! GO! signal," Maurie related. Formal engineering began that month.

By December 1960, preproduction was underway and the first 100 cameras were being made in Engineering from

production parts. Training of production people (in assembly, testing, etc.) was in full swing.

Since the assembly techniques required in camera production were considerably different from the skills which had been built up in Instrument Manufacturing, Precision Mechanical Assembly was set up by Fabrication & Molding. Armon McDowell of F & M was selected to head this group because of his extensive mechanical experience at Tek. The group was organized and trained by Armon in the special problems involved in high-precision mechanical work. PMA has the responsibility of assembling, inspecting, testing and packaging the cameras for finished goods inventory. They also repair and recondition cameras and shutters.

"There were many production problems to be worked out, and these people deserve a lot of credit for the work they are doing," comments Maurie. "Their efforts are certainly a big factor in the success of the camera program."

The seven men who work in Camera Development are termed "the greatest" by their project leader, Maurie. Jaime Navia, mechanical designer, is administrative assistant. Denny Smith and Sid Broughton are also mechanical designers. Len McCracken (draftsman), Duncan Bergeron (plastics engineer, expeditor) and Norm Hughes (photo technician) help keep things running smoothly.

"We're not in the camera business to drive any competitor out," Maurie points out. "Tektronix is interested in satisfying its customers—giving them a unit specifically designed for use with Tek scopes, a unit which can periodically be upgraded to keep up with scope advances."

Three types of scope cameras are being manufactured by Tektronix—the C-12, C-13 and C-19. All take Polaroid film and use Polaroid backs. No major changes have been made in the C-12 since it was introduced three years ago. Naturally, Maurie tells, there were "bugs" to be worked out, but those were minor. "Camera sales were encouraging right from the start," he said. "We are selling many times above the original estimate."

### Many Features Offered

The C-12 camera features light-tight construction; focusing to compensate for unavoidable variations in CRT positions; a swing-away hinge to pull the camera away from the CRT; precise, calibrated magnification lenses featuring inter-

changeability; accessible controls (no boxes to open or screws to remove); and, finally, an attractive style that complements Tektronix oscilloscopes. Patents are pending on several camera features.

Two other versions of the camera, both embodying all the features of the C-12, are being manufactured. The C-19 contains a special mirror system and a very fast lens for photographing fast-rise transients. The C-13 has a lift-up viewing door in place of the hood, for compactness and economy.

### The Latest: Type 350

In preproduction stages now is a unique new camera named the Type 350—a 35mm. automatic sequence camera and lens combination useable on the C-12, C-13 or C-19 front casting assembly.

The spring motor automatically actuates the shutter and advances the film each time the manual trigger is depressed. Or the camera, with a special power supply, can be triggered or sequenced electrically. Using a 35mm. 36-exposure roll of film, one winding of the spring motor will take 55 photographs.

The versatile Type 350 can be oriented so that the film runs vertically or horizontally, depending on the application. Provision can also be made for triggering from the scope trace or from an external source, and for a lamp to indicate when the shutter is open.

There has been continual demand for cameras with automatically sequenced moving film. The Type 350 Camera Attachment will be an entry and a "feeler" in this market.

Most component parts of the camera are manufactured at Tektronix. Lenses, shutters and Polaroid backs are purchased outside the company. Die castings are built by a Portland firm, under Tek supervision.

Tek departments which contribute to camera construction include Plastics, Screw Machine Shop, Paint, Sheet Metal Fabrication, Welding, Electrochemical and Panelcraft. Supporting groups—Manuals, Printing, Advertising, Field Information and Photography—also aid camera operations.

"Every day we see significant advances in the electronics field," Maurie remarked. "These advances are reflected in scopes now on the drawing boards and in planning stages at Tektronix. In turn, the camera program is constantly being advanced to keep pace with the needs of the users of these new scopes."

