FRANK KOPRA - 48-330

MARKETING SALES RELEASE

FILE 465/475 PRB

DATE August 25, 1972

465 and 475 Oscilloscopes

Tektronix, Inc. is about to introduce two of the most significant new products we've been able to present to our customers in several years. The 465 and 475 should enable us to maintain for several years the very dominant position we've enjoyed in the portable oscilloscope market. As you're all well aware, a leadership position in an attractive marketplace is maintained only by consistently (and aggressively) offering the customer the best value for his dollar. The 465 and 475 represent the state-of-the-art in PRICE/PERFORMANCE for the major usage areas of portable oscilloscopes.

As with our existing portables, many non-field service customers will also find these instruments the best value. This will be especially true of manufacturing areas and will apply perhaps more than ever to R & D labs as well. (Let's not overlook anybody.) Here are some of the reasons we feel both instruments have pushed the benchmark for value well above either their predecessors or their competitors.

Although most of the discussion here will involve technical characteristics, one of the most important "specs" these instruments have to offer is the significant reduction in price.

The 465 is $1725
The 475 is $2500

It's probably well worth remembering those numbers as you go through the specs, because you'll find in almost all cases that the specs are improved as well. The 475 offers 200 MHz and 2 mV/div sensitivity and the 465 offers 100 MHz and 5 mV/div. Both instruments provide full bandwidth at maximum sensitivity. They're light (approx. 23 pounds) and they have full 8 cm x 10 cm display areas. The 465 sweep speed is 5 nsec/div and the 475 goes to 1 nsec/div, both using a X10 magnifier. One nsec/div should give the 475 particular advantage where the customer is after best time resolution. Both CRTs have 18 kV accelerating potential and produce bright displays.

TRIGGER VIEW - One of the major new functions added to the 465/475 is the ability to view the triggering signal at its proper time location on-screen. Trouble-shooting circuits and equipment is often more effectively accomplished when using external trigger sources. It is essential that the timing, amplitude and other characteristics of the external trigger waveforms are known. By simply pressing a front panel push button on the 465 or 475, any external waveform applied at the A trigger input is instantly displayed, thus eliminating resetting controls and disconnecting leads. This can be a real time saver and convenience when external trigger signals are frequently being used as timing references. The display of the external trigger signal will be time-related to the display of the vertical signal as in the 485. In the 465/475 you may also view the internal trigger signal but time relation between the two displays (signal and trigger) is not maintained.

HORIZONTAL - Time bases feature sweep rates appropriate for displaying full bandwidth signals on each instrument. Sweep accuracy is within 2% over the full 10 divisions of the CRT. The 475 time bases go to 1 ns/cm with the X10 Mag while the 465 time base sweep is 5 ns/cm with X10 Mag. This capability is of significant value for time resolution. Improved delay-time accuracy of 1% further extends fast, accurate time-difference measurements.

Horizontal modes for the 465/475 include both delayed and mixed sweep operation. Other features include a variable holdoff control to allow selection of the triggering point by varying the holdoff time between sweeps. This is most useful when viewing complex waveforms such as composite television signals or digital pulse trains.

LAYOUT & PACKAGING - The form factor of the 465/475 has undergone some improvements as well, both externally (shape) and on the front panel. The cabinets of the 465 and 475 have a lower profile than many portable instruments. They have a short carrying height (20.3 inches) which results from mounting the accessories in a pouch on top of the cabinet and shortening the carrying handle. Adding to the portability of these instruments is the light weight of only 23 pounds. The overall result is an instrument which is ready to go, ready to make measurements and easy-to-carry. These instruments are designed to withstand the vibration and mechanical shock associated with portable scopes and give accurate measurements under extreme environmental conditions.

The front panel format has the CRT placed in the center with the vertical controls to the left, horizontal controls to the right and display controls below. This front panel layout coupled with some of our recent innovations in "interior design" make a very serviceable package, with all the circuit boards facing out. There's relatively little conventional cable harnessing to get in the way.

ENGINEERING BENCH SCOPES - The 465 and 475 are much more than high-performing, battery-operated portable scopes. They will be very popular with the researcher and designer. Even in the laboratory environment where there is line power, users can encounter conducted EMI, ground loops and power fluctuations. When this happens, high-performance, battery-operated scopes are a quick and easy solution. With 200 MHz bandwidth at 2 mV/cm, sweep speeds to 1 ns/cm accurate to within 3%, delay time accuracies of 1% and a big, bright 8 x 10-cm CRT, the 475 is a top contender for a small amount of space on a researcher or designer's lab bench.

VERTICAL MODES - The 465 and 475 have five vertical modes in addition to XY. They include CH 1, ALT, ADD, CHOP (465 at 250-kHz rate, 475 at 1-MHz rate) and CH 2.

SENSITIVITY READOUT - The vertical deflection factor is indicated by a light behind the skirt of each VOLTS/DIV switch (lit only when a channel is being displayed). When a recommended probe is added to the input, the indicator light automatically changes to reflect the actual deflection factor referenced to the probe tip. This provides a real time savings when training new oscilloscope operators, and adds speed and confidence for the experienced operator. It also eliminates incorrect measurements caused by forgetting the probe attenuation factor or multiplying by 10 when we should have been dividing.

PROBES & GROUND REFERENCE BUTTON - The P6065 and P6075 probes were designed to provide full bandwidth operation for the 465 and 475 respectively. These probes feature a small, angled termination block at the front panel to minimize protrusion in front of the panel, and have a small probe tip for easy use in high-density circuits. An-

other feature is a ground button on the probe tip which allows disconnecting signals at the probe tip by just pressing a button. At the same time a ground reference trace is displayed on the CRT screen. (6' Probes standard)

TRIGGERING - A full range of triggering selection modes and performance is offered. In addition to full bandwidth triggering and the normal selection modes we're used to, you can now select CH 1, CH 2 or NORM (composite) for both time base A and time base B independently.

High-Frequency Triggering - A new switch, which combines the TEKTRONIX developed cam-actuated switch with the action of a lever switch, allows the switching action in the horizontal circuits to take place right on the circuit board. High-frequency operation is enhanced due to the reduction in signal losses which result from the cabling required to do the switching with normal panel-mounted switches. This allows high-frequency triggering capability through the entire bandpass of the 465 and 475.

"A" Trigger Holdoff - Holdoff provides a variable time (as much as two sweep lengths) between the end of "A" sweep and the next acceptable trigger and provides capability to trigger on complex digital words. B ENDS A - allows "A" sweep to be terminated and retriggered in the minimum time following the end of "B" sweep to optimize display brightness.

BATTERY, DC or AC OPERATION - Although battery operation is probably not even considered by most of our customers, it seems to have become a point of concern by some as a result of HP's efforts to "turn the tide" in any way possible. The 465/475 will provide battery operation and external DC operation as well as normal line operation. We expect to be announcing the full particulars on this within a month or two. If you have any customer discussions that hang up on this question in the meantime, give us a call for the most up-to-date information. We intend to supply both a free-standing battery supply and a strap-on battery pack. The free-standing supply will, of course, permit other instruments to be battery operated.

It's probably worthwhile to note here that battery operation doesn't come free in a scope. In order to optimize a scope for battery operation a fair number of design compromises need to happen to minimize power drain. These compromises cost money. With the 465/475 we have elected to provide the best cost/performance package to the vast majority of customers. We've elected not to burden everyone with the extra cost of battery operation. As a result, we expect our battery supplies will be a bit more expensive, but the total package cost will certainly be less. In addition, the non-battery user gets a much more equitable deal.

SERVICING - The circuit boards are easy to remove for service since they are located on the outside of the U-channel frame. External connections to the boards are made with quick-disconnect type connectors. The boards are designed to be self-contained; i.e., the switches, indicator lights, and variable controls associated with each board are mounted directly on the boards rather than on the chassis or on the front panel. Not only does this make the boards easier to remove, but it also reduces the number of interconnections necessary between the boards and subassemblies, resulting in improved reliability and performance.

OPTIONS -

EMI Option - If your applications require an instrument with limited electro-

magnetic interference *EMI), the Option 4 version of the 465 and 475 is available which meets the EMI requirements of MIL-I-6181D.

TV Sync Option - A TV sync separator circuit is added to the 465. This optional circuit (Option 5) permits stable internal triggering from displayed composite video or composite sync waveforms.

SALES PROGRAM

A rather important point to observe is a comparison of the 453A to the 475. A customer who would have purchased a 453A may now be willing to consider the 475 as the two instruments are really not that far apart in price. For the small difference in dollars, the customer gets a very large increase in performance. It's certainly to our overall advantage to offer customers this "trade-up".

We anticipate that quite a few customers with 453As or 454As presently on order will request that we convert their order to one of the new instruments. We're happy to do this - in fact, it's his privilege to do so. However, in order to treat all customers fairly, all conversions will be treated as new 465/475 orders as of the conversion date for purposes of determining shipping priorities. Unless we do this, conversion orders would all show an order entry date prior to announcement and the resultant shipping schedule could only anger our "new" customers.

DASH VERSIONS - The dash versions for the 465 and 475 (such as 453A-1, -2, etc.) will not be offered. They have been offered in the past when significant cost reductions could be realized. The 465 and 475 cost reductions would be relatively insignificant hence would not significantly affect the price.

DEMO PROGRAM -
We'll have right around 100 465s distributed, world-wide, prior to public announcement. In addition, the 465 is going well in Manufacturing and we have a sustained yield coming. The 475 is a bit behind and initial demos will be somewhat scarce. The first ones out, which will also be distributed prior to announcement, will be B-phase models. At this time (ten days prior to announcement), the prognosis looks good to begin sustained output at announcement. Demos in the field will be built up rapidly following that. The early 475 demos should, of course, be as fully utilized as possible. We don't plan to rat-hole any demos here, but if you get in a bind, give us a call and perhaps we can help locate one.

PUBLIC ANNOUNCEMENT - September 1, 1972

FIRST PUBLIC SHOWING - WESCON, Los Angeles, September 19-22, 1972

ADVERTISING SUPPORT -

Ads - ELECTRONIC PRODUCTS - October issue
ELECTRONICS - October 9th issue
EDN - October 15th issue
ELECTRONIC DESIGN - October 26th issue

Then from November through May we will run 14 ads, with an introductory theme at the beginning and then changing into portable family ads.

Editorial Coverage featuring 465/475 -

Front cover photo on EDN September 1 issue with feature story.
EDN September 15th issue - Portable Oscilloscope survey (dominent position).
EDN November issue will be on the electrical-mechanical communications.
EE 4th quarter - Portable selection and purchase justification.

News Release - has been sent to about 200 publications, domestic and international.

Mailings - Post card mailing in the last quarter of 1972.
A direct mailer to Materials Handling Industry in the last quarter.

465/475 Brochure - A 6-page full color brochure will be mailed by August 31st to each field engineer. This brochure will be used to fill inquiries from Ads and trade shows.

UN-PPRB 8-page booklet by Jim Johnson is being mailed to each field engineer. This booklet points out the many features of the 465 and 475, the engineering innovations found inside the box and battery operation with the 1105 or 1106. There is also a chart comparing the 465 and 475 with our 453A, 454A, and HP's 1707A and 1710A (1700B information will follow).

Answers to the questions you and your customers may have are in process of trying to be anticipated. Jim Johnson will be getting this information to you within several weeks. He will be the primary address to field your 465 and 475 questions.

ENGINEERING PERSPECTIVE -
A history and description of the innovations and tradeoffs involved in designing the 465/475 is being written and will be mailed to all field engineers in about three weeks.

AVAILABILITY -

It appears that our initial PAL quotes will be 7 weeks for the 465 and 10 weeks for the 475. The 453A is presently 7 weeks and this pretty much dictates the 465. We'd prefer that it didn't look even more attractive to the fellow who already has a 453A on order. Ten weeks for the 475 should have enough of a safety factor built into it that we can avoid any missed commitments and other frustrations. The 465/475 will appear on the PAL of September 5.

Bob Johnson
Lew Loebe

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