



PRODUCT TRAINING
2001 Course Catalog



CUSTOMER SUPPORT DIVISION OF UNIVERSAL INSTRUMENTS

Automation in Electronic Assembly

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4797 HSP Level 1 training is available. Check Universal's Web site at www.uic.com after January 1, 2001 for a course description, or contact a Product Training Center for details.



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Through hole courses available only at customer site

TRAINING IS AVAILABLE AT YOUR SITE FOR THE 3788B DUAL TABLE POSITIONING SYSTEM; 6132B DUAL TABLE POSITIONING SYSTEM (OPERATION/PROGRAMMING/TROUBLESHOOTING); 6287B/6687B SH VCD AXIAL INSERTER; 6292B/6298B DH VCD AXIAL INSERTER; 6293B/6299B DH JUMPER WIRE INSERTER; 6360A RADIAL III SEQUENCER/INSERTER; AND DYNAPERT UCSM-G, V12000, AND VCD-G. SEE COURSE DESCRIPTIONS FOR DETAILS.

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UNIVERSAL PRODUCT TRAINING CENTER LOCATIONS

INSIDE BACK COVER

Universal Instrument's product training philosophy is based on two core concepts: performance-based instruction and skills-based objectives.

- **Performance-based instruction** means you work in a hands-on environment during training. Rather than spending most of your time attending a classroom lecture, you concentrate on working on machines. In addition, we give you practice time so you can hone your new skills.
- **Skills-based objectives** ensure you practice necessary and useful skills. We realize the time you spend in training is valuable time away from your manufacturing responsibilities, and we want to make your training time as productive as possible. By providing you with skills to improve your ability to diagnose and maintain equipment, our skills-based objectives help you make the greatest positive impact on meeting machine uptime and mean-time-to-repair targets.

The two core training concepts provide you with new skills and evaluate the results of your training by having you perform those skills. To make this possible, all instruction at Universal's Product Training Centers is designed around four fundamental elements — objectives, content, activities, and evaluation.

- **Objectives** define the outcome of your training. They identify what you will do to achieve success and what instruction is necessary to accomplish a given task. All Universal training courses are based on objectives.
- **Content** is the material presented during instruction. Training course content is developed by drawing on the expertise of a variety of subject matter experts (field engineers, customers, manufacturing technicians and builders, design engineers, and product team personnel), and is coordinated by a full-time Instructional Design and Development Team.
- **Activities** lead to the integration of knowing and doing. Our training courses require hands-on activities that enable you to demonstrate your newly acquired skills.
- **Evaluation** determines the effectiveness of our training. This evaluation follows the completion of your training and takes two forms: (1) surveys distributed to you and your manager to identify the impact of our training, and (2) performance evaluations that require you to demonstrate the skills you have learned.

LEVELS OF TRAINING

Based on your requests and needs, Universal offers Level 1 and Level 2 training on most products.

- A **Level 1** course is an introduction to the machine. Level 1 courses pertain either to machine operation and preventive maintenance or machine operation and programming. A Level 1 programming course teaches you how to create and edit programs; a Level 1 maintenance course teaches you how to perform daily, weekly, and monthly preventive maintenance tasks as defined in your machine's maintenance manual. For new equipment installations, Level 1 classes should be taken no earlier than two weeks prior to the installation of your Universal equipment, but no later than three months after the equipment installation.
- **Level 2** classes build on the knowledge, skill, and equipment experience of the trainee. Level 2 programming courses address advanced topics for the seasoned programmer. Level 2 maintenance courses cover advanced topics relating to mechanical or electrical maintenance and troubleshooting. Level 2 maintenance courses integrate the ability to read and interpret diagnostic readouts, electrical or mechanical schematics, or prints with advanced maintenance skills. This provides you with the skills to perform maintenance and troubleshooting at an advanced level. Since Level 2 classes build on trainees' knowledge, skill, and machine experience, enrollment in a Level 2 class should occur no earlier than after six months of daily experience on the specified Universal equipment.

TYPES OF TRAINING

Universal offers regularly scheduled courses and customer-tailored courses.

- **Regularly scheduled courses** – Most Universal training courses consist of machine-specific introductory units (Level 1) composed of operation and preventive maintenance or operation and programming. Many machines also have one or more Level 2 courses. Each Product Training Center distributes a schedule of courses offered, and descriptions of all courses are found in the course description portion of this catalog.
- **Customer-tailored courses** – Any course can be customized to meet your specific needs. Examples of customer-tailored courses include a course conducted solely for your company at a Product Training Center or at your facility, combinations of courses, training to address problems or situations unique to your company, or training on equipment not listed in this catalog.

To discuss customer-tailored courses, please contact a Universal Product Training Center (telephone numbers are listed on the inside back cover of this catalog). After working with you to identify your needs, Universal will give you a detailed quote.

SCHEDULING COURSES

Course scheduling is based on forecasted demand, so the frequency of offerings varies from region to region. Schedules are available from your regional sales office, sales engineer, or any Universal Product Training Center.

If a course is canceled due to insufficient demand, confirmed students will be notified prior to the starting date. The class will be rescheduled or your tuition will be refunded.

Scheduling of customer-tailored courses is handled by the manager of each Product Training Center.

TRAINING FACILITIES

Universal operates Product Training Centers in the United States (California, Illinois, and New York), Singapore, Germany (Bad Vilbel), England (Redhill, Surrey), Mexico (Ciudad Juarez and Guadalajara [opening in 2001]), and China (Shenzhen). Each location is staffed by professional trainers and equipped with the latest versions of Universal's equipment. Training centers enable you to practice your newly learned skills in a quiet environment, away from the activity and distraction of the manufacturing floor. Most importantly, our training facilities are located around the world to minimize your travel costs related to training.

TRAINING STAFF

Product Training maintains a full-time Instructional Design and Development staff, as well as full-time staffs of professional instructors at each regional Product Training Center. The instructor staff is drawn from various disciplines including manufacturing, engineering, field engineering, and education. If, for some reason, your instructor cannot answer a specific question, he or she will find a specialist with the information you need before you complete your training.

Universal recognizes the need to provide training in native languages, and has staffed its Product Training Centers accordingly. Additionally, translation services are available (at no extra charge) at the Product Training Centers in New York and England.

DAILY SCHEDULE

Course hours vary from location to location, so consult your course schedule or call a Product Training Center for information. If you would like a copy of Universal's most recent course schedule, contact a Product Training Center using the telephone numbers listed on the inside back cover of this catalog.

COURSE MATERIALS

Note-taking and training materials are provided as part of your training course.

WHAT TO WEAR

Courses are conducted on an informal basis, and you should expect to become fully involved in all course tasks and activities. Therefore, dress casually and be prepared for the regional weather conditions at the Product Training Center you will be visiting.

REGISTRATION INFORMATION

You can enroll in a course by calling the appropriate Product Training Center to reserve a seat in the required course(s). Class size is limited, so it is important to register as far in advance as possible. If the course you request is full, we will make every effort to enroll you in the next available course.

TRAINING CREDITS

Two training credits are included with the purchase of most Universal machines. The value of one training credit is US\$1,000. These credits expire one year after the date of machine shipment if not used.

TUITION COSTS

Tuition cost for most Level 1 courses is one training credit or US\$1,000 per training seat. Tuition cost for most Level 2 courses is two training credits or US\$2,000 per training seat. Tuition cost for customized and on-site training is quoted by a Product Training Center manager.

PAYMENT OF FEES

If tuition is required, payment is due before you attend the course. Make checks or purchase orders payable to Universal Instruments. For your convenience, major credit cards are also accepted. Course prices are subject to change.

CANCELLATIONS

Before a program begins, Universal incurs substantial costs in reserving your seat in a course. Therefore, if you cancel your registration less than two weeks before the starting date of your course, you will forfeit 20% of the course fee. If you cancel within one week of the course, you will forfeit 50% of the course fee. If you cancel on the starting day of the course, you will forfeit the full course fee.

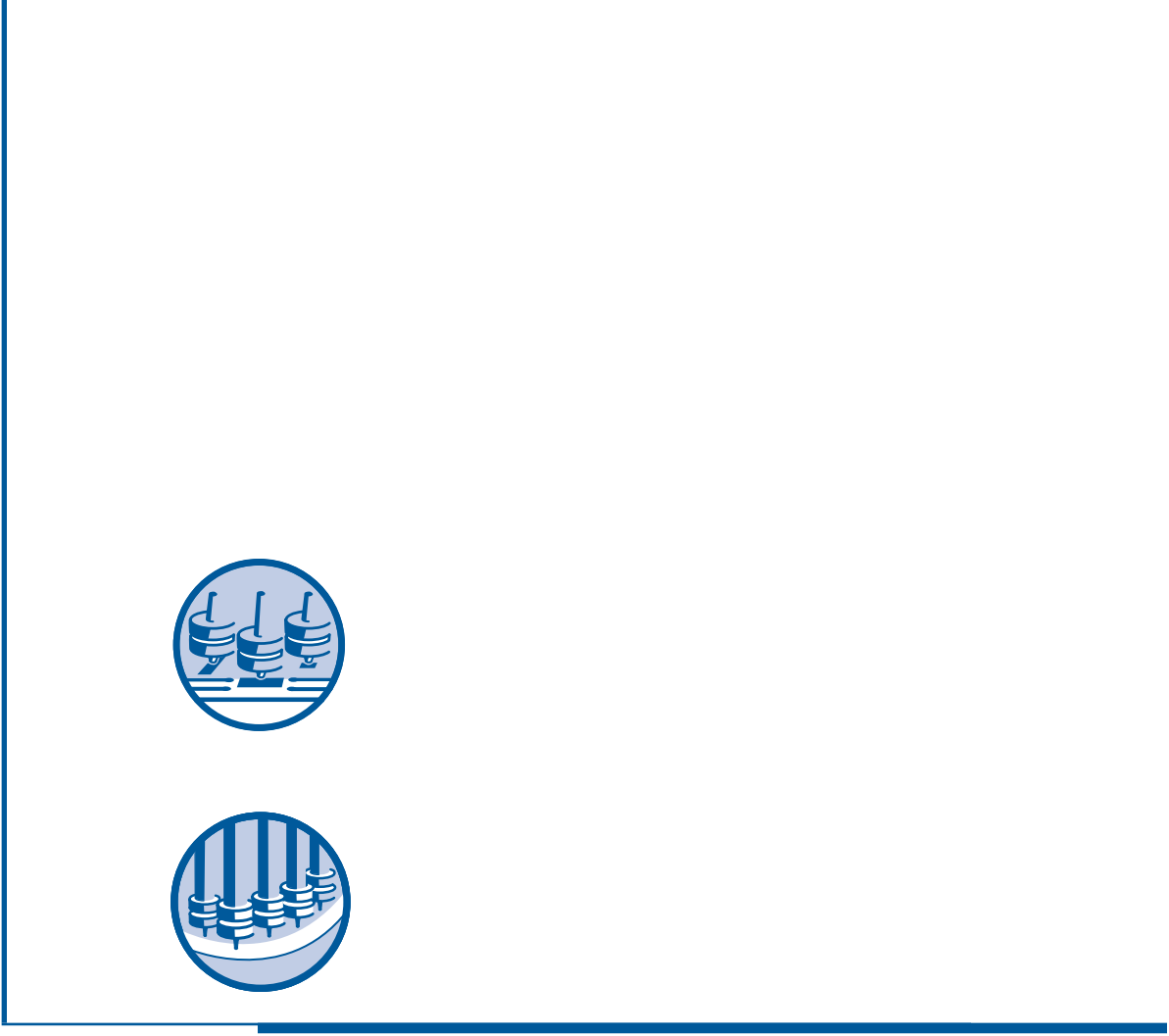
If you cannot attend the class you have registered for and want to send a substitute in your place, this is permissible as long as the substitute meets the prerequisites of the course(s). Product Training Center management must approve each substitute. There is no additional fee for a substitute.

RELATED TRAINING PRODUCTS

Universal offers three performance support products you might find helpful: Tech Advisor technical support product, Product Trainer computer-assisted training tool, and Train-the-Trainer courses. Information on these products is included in this catalog for your convenience. See the Table of Contents.

GUARANTEE

Universal guarantees you will be satisfied with your training, or we will refund your tuition.





WHAT SHOULD SURFACE MOUNT EQUIPMENT OPERATORS KNOW?

Those operating surface mount equipment must understand and follow basic safety and ESD practices. In addition, they must be able to identify machine functions and assemblies; load programs; identify, adjust, load, and mount feeders; recover from errors; and run product. In addition, operators must know how to find and use machine operation documentation and on-line tools. Some operators must also be able to perform basic, daily preventive maintenance tasks.

WHEN TO TAKE THIS COURSE?

Some courses have prerequisites that must be met before you can take that course.

- If there is a checkmark (✓) in the Prerequisite (PR) column, there are prerequisites that must be met before you can take that course. The prerequisites can be found in the course description on the page indicated in the Page column.
- The minimum daily machine experience requirement, indicated in the Minimum Experience column, must also be met before you can take that course.

RECOMMENDED TRAINING COURSES FOR GSM PLATFORM OPERATORS

Machine Code	Course	Page	PR	Minimum Experience	Comments
PRODUCT TRAINER: INTRODUCTION TO SURFACE MOUNT ASSEMBLY FOR OPERATORS	PT	76		NO EXPERIENCE	PRIOR TO WORKING WITH MACHINE PART NUMBER 48888301
PRODUCT TRAINER: GSM PLATFORM – OPERATION	PT	76		NO EXPERIENCE	PRIOR TO WORKING WITH MACHINE SHIPS WITH ALL GSM PLATFORM MACHINES PART NUMBER 47798401

Platform

4675A GSM OFA2 PLATFORM	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
4676A GSM2 CONNECTOR PLATFORM	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
4681A GSM1 PLATFORM	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
4685A GSM1 PLATFORM FOR FLEXIBLE ASSEMBLY	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
4688A GSM2 PLATFORM	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
4689A GSM OFA PLATFORM	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
4699A GSM2 PLATFORM FOR FLEXIBLE ASSEMBLY	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
4716A GDM PLATFORM	GDM-O	27		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
5681A GSMx™ PLATFORM	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
5685A GSMx PLATFORM (ADVANCED SEMICONDUCTOR ASSEMBLY APPLICATIONS)	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
5781A GSMxs™ PLATFORM	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
5785A GSMxs PLATFORM (ADVANCED SEMICONDUCTOR ASSEMBLY APPLICATIONS)	GSM-O	14		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION

Feeder

4559A PLATFORM TRAY FEEDER (PTF)	PTF-O	15	✓	NO EXPERIENCE	TAUGHT AS NEEDED UPON MACHINE INSTALLATION
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RECOMMENDED TRAINING COURSES FOR HSP OPERATORS

PRODUCT TRAINER: INTRODUCTION TO SURFACE MOUNT ASSEMBLY FOR OPERATORS	PT	76		NO EXPERIENCE	PRIOR TO WORKING WITH MACHINE PART NUMBER 48888301
4790/4791/4792 HSP	HP90-O	37		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
4795/4796 HSP	HP95-O	40		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	PT	76		NO EXPERIENCE	SHIPS WITH 4796 SERIES MACHINES PART NUMBER 48096701
4797 HSP	HP97-O	NA		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION CHECK UNIVERSAL'S WEB SITE AFTER JANUARY 1, 2001 FOR A COURSE DESCRIPTION (WWW.UIC.COM)



WHAT SHOULD SURFACE MOUNT EQUIPMENT PROGRAMMERS KNOW?

Those programming surface mount equipment must understand and follow basic safety and ESD practices. In addition, they must be able to perform machine operation tasks to run a product; create and edit products; define and edit feeder and component databases; and know how to find and use machine programming documentation and on-line tools.

WHEN TO TAKE THIS COURSE?

Some courses have prerequisites that must be met before you can take that course.

- If there is a checkmark (✓) in the Prerequisite (PR) column, there are prerequisites that must be met before you can take that course. The prerequisites can be found in the course description on the page indicated in the Page column.
- The minimum daily machine experience requirement, indicated in the Minimum Experience column, must also be met before you can take that course.

RECOMMENDED TRAINING COURSES FOR GSM PLATFORM PROGRAMMERS

Machine Code	Course	Page	PR	Minimum Experience	Comments
INTRODUCTION TO SURFACE MOUNT ASSEMBLY	ISMA	13		PRIOR TO WORKING WITH MACHINE	AVAILABLE BY REQUEST
INTRODUCTION TO SURFACE MOUNT PROCESSES	PR1	13		PRIOR TO WORKING WITH MACHINE	AVAILABLE BY REQUEST

Platform

4675A GSM OFA2 PLATFORM	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
4676A GSM2 CONNECTOR PLATFORM	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
4681A GSM1 PLATFORM	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
	GSM-APP	30	✓	6 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	FJ-OLB	31	✓	3 TO 6 MONTHS	
4685A GSM1 PLATFORM FOR FLEXIBLE ASSEMBLY	GSM-P	23	✓	NO EXPERIENCE TO 3 MONTHS	
	GSM-APP	30	✓	6 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
4688A GSM2 PLATFORM	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
	GSM-APP	30	✓	6 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	FJ-OLB	31	✓	3 TO 6 MONTHS	
4689A GSM OFA PLATFORM	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
	GSM-APP	30	✓	6 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
4699A GSM2 PLATFORM FOR FLEXIBLE ASSEMBLY	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
	GSM-APP	30	✓	6 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
4716A GDM PLATFORM	GDM1	27		NO EXPERIENCE TO 3 MONTHS	ALSO SEE 4681A GSM1 PLATFORM AND GSM PLATFORM HEAD OPTIONS TRAINING MODULES
5681A GSMx PLATFORM	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
	GSM-APP	30	✓	6 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
5685A GSMx PLATFORM (ADVANCED SEMICONDUCTOR ASSEMBLY APPLICATIONS)	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
	GSM-APP	30	✓	6 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
5781A GSMxs PLATFORM	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
	GSM-APP	30	✓	6 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
5785A GSMxs PLATFORM (ADVANCED SEMICONDUCTOR ASSEMBLY APPLICATIONS)	GSM-P	23		NO EXPERIENCE TO 3 MONTHS	
	GSM-APP	30	✓	6 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	

Level 1 head options training modules

DISPENSE HEADS (POSITIVE DISPLACEMENT PUMP AND ARCHIMEDES VALVE)	DIH-P	24	✓	TAKEN AS PART OF GSM-P	
FLEXJET HEAD	FJ-P	24	✓	TAKEN AS PART OF GSM-P	
HIGH FORCE HEAD	HF-P	25	✓	TAKEN AS PART OF GSM-P	
UFP 300+ HEAD	UFP-P	25	✓	TAKEN AS PART OF GSM-P	

Level 1 feeder options training module

4559A PLATFORM TRAY FEEDER (PTF)	PTF-P	26	✓	TAKEN AS PART OF GSM-P	
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RECOMMENDED TRAINING COURSES FOR HSP PROGRAMMERS

Machine	Course Code	Page	PR	Minimum Experience	Comments
INTRODUCTION TO SURFACE MOUNT ASSEMBLY	ISMA	13		PRIOR TO WORKING WITH MACHINE	AVAILABLE BY REQUEST
INTRODUCTION TO SURFACE MOUNT PROCESSES	PR1	13		PRIOR TO WORKING WITH MACHINE	AVAILABLE BY REQUEST
4790/4791/4792 HSP	HP90-P	38		NO EXPERIENCE TO 3 MONTHS	
4795/4796 HSP	HP95-P	42		NO EXPERIENCE TO 3 MONTHS	
	HP95UPS-P	42		NO EXPERIENCE TO 3 MONTHS	
	HP95-DIF	40	✓	NO EXPERIENCE TO 3 MONTHS	
4797 HSP	HP97-P	NA		NO EXPERIENCE TO 3 MONTHS	CHECK UNIVERSAL'S WEB SITE AFTER JANUARY 1, 2001 FOR A COURSE DESCRIPTION (WWW.UIC.COM)



WHAT SHOULD SURFACE MOUNT EQUIPMENT MAINTENANCE TECHNICIANS KNOW?

Those maintaining surface mount equipment must be able to identify the basic sequence of events for machine operation, be able to set up and run the machine, know how to perform operation error recovery tasks, and be able to identify the functions of the machine's electrical subsystems. They must also know how to find and use machine maintenance documents and on-line tools, as well as perform regular machine preventive maintenance procedures. In addition, advanced technicians should be able to read and interpret diagnostic readouts and electrical or mechanical schematics to troubleshoot equipment.

WHEN TO TAKE THIS COURSE?

Some courses have prerequisites that must be met before you can take that course.

- If there is a checkmark (✓) in the Prerequisite (PR) column, there are prerequisites that must be met before you can take that course. The prerequisites can be found in the course description on the page indicated in the Page column.
- The minimum daily machine experience requirement, indicated in the Minimum Experience column, must also be met before you can take that course.

RECOMMENDED TRAINING COURSES FOR GSM PLATFORM MAINTENANCE TECHNICIANS

Machine	Course Code	Page	PR	Minimum Experience	Comments
INTRODUCTION TO SURFACE MOUNT ASSEMBLY	ISMA	13		PRIOR TO WORKING WITH MACHINE	AVAILABLE BY REQUEST
INTRODUCTION TO SURFACE MOUNT PROCESSES	PR1	13		PRIOR TO WORKING WITH MACHINE	AVAILABLE BY REQUEST
Platform					
4675A GSM OFA2 PLATFORM	GSM2-OM *	17		NO EXPERIENCE TO 3 MONTHS	
	GSM-L2	28	✓	2 TO 3 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	
4676A GSM2 CONNECTOR PLATFORM	GSM2-OM *	17		NO EXPERIENCE TO 3 MONTHS	
	GSM-L2	28	✓	2 TO 3 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	
4681A GSM1 PLATFORM	GSM1-OM *	16		NO EXPERIENCE TO 3 MONTHS	ALSO SEE GSM PLATFORM HEAD AND FEEDER OPTIONS TRAINING MODULES
	GSM-L2	28	✓	2 TO 3 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	
4685A GSM1 PLATFORM FOR FLEXIBLE ASSEMBLY	GSM1-OM *	16		NO EXPERIENCE TO 3 MONTHS	
	GSM-L2	28	✓	2 TO 3 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	
4688A GSM2 PLATFORM	GSM2-OM *	17		NO EXPERIENCE TO 3 MONTHS	ALSO SEE GSM PLATFORM HEAD AND FEEDER OPTIONS TRAINING MODULES
	GSM-L2	28	✓	2 TO 3 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	
4689A GSM OFA PLATFORM	GSM1-OM *	16		NO EXPERIENCE TO 3 MONTHS	
	GSM-L2	28	✓	2 TO 3 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	
4699A GSM2 PLATFORM FOR FLEXIBLE ASSEMBLY	GSM2-OM *	17		NO EXPERIENCE TO 3 MONTHS	APPLICATION-SPECIFIC TRAINING IS PROVIDED SEPARATELY BY PRODUCT TEAM PERSONNEL
	GSM-L2	28	✓	2 TO 3 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	
4716A GDM PLATFORM	GDM1	27		NO EXPERIENCE TO 3 MONTHS	ALSO SEE 4681A GSM1 PLATFORM AND GSM PLATFORM HEAD OPTIONS TRAINING MODULES
5681A GSMx™ PLATFORM	GSM1-OM * (DELIVERED WITH GSMx PLATFORM/GSMxs PLATFORM CUSTOMER TRAINING ADDENDUM)	16		NO EXPERIENCE TO 3 MONTHS	ALSO SEE GSM PLATFORM HEAD AND FEEDER OPTIONS TRAINING MODULES
	GSM-L2	28	✓	2 TO 3 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	
5685A GSMx PLATFORM (ADVANCED SEMICONDUCTOR ASSEMBLY APPLICATIONS)	GSM1-OM * (DELIVERED WITH GSMx PLATFORM/GSMxs PLATFORM CUSTOMER TRAINING ADDENDUM)	16		NO EXPERIENCE TO 3 MONTHS	ALSO SEE GSM PLATFORM HEAD AND FEEDER OPTIONS TRAINING MODULES
	GSM-L2	28	✓	2 TO 3 MONTHS	APPLICATION-SPECIFIC TRAINING IS PROVIDED SEPARATELY BY PRODUCT TEAM PERSONNEL
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	

*See heads option modules and feeders option modules taken with GSM1-OM or GSM2-OM course on the next page



GSM Platform, continued

Machine	Course Code	Page	PR	Minimum Experience	Comments
5781A GSMxs™ PLATFORM	GSM1-OM * (DELIVERED WITH GSMx PLATFORM/GSMxs PLATFORM CUSTOMER TRAINING ADDENDUM)	16		NO EXPERIENCE TO 3 MONTHS	ALSO SEE GSM PLATFORM HEAD AND FEEDER OPTIONS TRAINING MODULES
	GSM-L2	28	✓	2 TO 3 MONTHS	
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	
5785A GSMxs PLATFORM (ADVANCED SEMICONDUCTOR ASSEMBLY APPLICATIONS)	GSM1-OM * (DELIVERED WITH GSMx PLATFORM/GSMxs PLATFORM CUSTOMER TRAINING ADDENDUM)	16		NO EXPERIENCE TO 3 MONTHS	ALSO SEE GSM PLATFORM HEAD AND FEEDER OPTIONS TRAINING MODULES
	GSM-L2	28	✓	2 TO 3 MONTHS	APPLICATION-SPECIFIC TRAINING IS PROVIDED SEPARATELY BY PRODUCT TEAM PERSONNEL
	GSM-TP	32	✓	3 TO 6 MONTHS	
	GSM-I	29	✓	2 TO 3 MONTHS	

* See heads option modules and feeders option modules taken with GSM1-OM or GSM2-OM below

Level 1 heads option modules taken with GSM1-OM or GSM2-OM (select one)

ARCHIMEDES VALVE DISPENSE HEAD	AD-OM	18	✓	NO EXPERIENCE TO 3 MONTHS
FLEXJET® HEAD	FJ-OM	18	✓	NO EXPERIENCE TO 3 MONTHS
FLEX/HIGH FORCE HEAD	FX/HF-OM	19	✓	NO EXPERIENCE TO 3 MONTHS
POSITIVE DISPLACEMENT PUMP DISPENSE HEAD	PD-OM	19	✓	NO EXPERIENCE TO 3 MONTHS
UFP300+ HEAD	UFP-OM	20	✓	NO EXPERIENCE TO 3 MONTHS

Level 1 feeders option modules taken with GSM1-OM or GSM2-OM (select one)

4556A STACKABLE MATRIX TRAY FEEDER (SMTF)	SMTF-OM	21	✓	NO EXPERIENCE TO 3 MONTHS
4559A PLATFORM TRAY FEEDER (PTF)	PTF-OM	21	✓	NO EXPERIENCE TO 3 MONTHS
4686A COMPONENT SHUTTLE	SH-OM	22	✓	NO EXPERIENCE TO 3 MONTHS
4695A PNEUMATIC TAPE FEEDER	TF-OM	22	✓	NO EXPERIENCE TO 3 MONTHS
4697A MULTI-PITCH TAPE FEEDER (MPTF)	MPTF-OM	22	✓	NO EXPERIENCE TO 3 MONTHS

Advanced heads maintenance modules

ARCHIMEDES VALVE DISPENSE HEAD	AD-M	33	✓	3 TO 6 MONTHS
FLEXJET® HEAD	FJ-M	33	✓	3 TO 6 MONTHS
FLEX/HIGH FORCE HEAD	FX/HF-M	34	✓	3 TO 6 MONTHS
POSITIVE DISPLACEMENT PUMP DISPENSE HEAD	PD-M	35	✓	3 TO 6 MONTHS
UFP300+ HEAD	UFP-M	35	✓	3 TO 6 MONTHS

Advanced feeders maintenance modules

4556A STACKABLE MATRIX TRAY FEEDER (SMTF)	SMTF-M	36	✓	3 TO 6 MONTHS
4559A PLATFORM TRAY FEEDER (PTF)	PTF-M	36	✓	3 TO 6 MONTHS

RECOMMENDED TRAINING COURSES FOR HSP MAINTENANCE TECHNICIANS

INTRODUCTION TO SURFACE MOUNT ASSEMBLY	ISMA	13		PRIOR TO WORKING WITH MACHINE	AVAILABLE BY REQUEST
INTRODUCTION TO SURFACE MOUNT PROCESSES	PR1	13		PRIOR TO WORKING WITH MACHINE	AVAILABLE BY REQUEST
4790/4791/4792 HSP	HP90-OM	37		NO EXPERIENCE TO 3 MONTHS	
	HP90-L2	39	✓	6 MONTHS	
4795/4796 HSP	HP95-OM	41		NO EXPERIENCE TO 3 MONTHS	
	HP95-DIF	40	✓	NO EXPERIENCE TO 3 MONTHS	
	HP95-L2	43	✓	6 MONTHS	
4797 HSP	HP97-OM	NA		NO EXPERIENCE TO 3 MONTHS	CHECK UNIVERSAL'S WEB SITE AFTER JANUARY 1, 2001 FOR A COURSE DESCRIPTION (WWW.UIC.COM)
	HP97-P	NA		NO EXPERIENCE TO 3 MONTHS	



ISMA: INTRODUCTION TO SURFACE MOUNT ASSEMBLY

Course level:	Level 1
Relevant product codes:	4675A GSM OFA2 Platform, 4676A GSM2 Connector Platform, 4681A GSM1 Platform, 4683A GSM OFS Platform, 4684A GSM SMT/TAB Bonder Platform, 4685A GSM1 Platform for Flexible Assembly, 4688A GSM2 Platform, 4689A GSM OFA Platform, 4699A GSM2 Platform for Flexible Assembly, 4716A GDM Platform, 5681A/5685A GSMx Platform, and 5781A/5785A GSMxs Platform
Course length:	4 hours
Overview:	This course provides operators, programmers, and maintenance technicians with an introduction to the terminology, concepts, and general information regarding surface mount machine operation and programming. Completion of this course prior to training on any Universal surface mount equipment will enhance the effectiveness of that training.
Who should take this course?	Anyone attending other courses on Universal's surface mount placement equipment, anyone who desires an understanding of the common terms and concepts associated with surface mount placement equipment, or anyone who is just getting started in surface mount assembly should take this course.
During this course you will:	<ul style="list-style-type: none">• Review a typical surface mount assembly line and its variations• Identify the acronyms, lead shape, pitch, and size/type of surface mount components (either chip or integrated circuit package)• Identify and define packaging options for components; for example, tape, stick tube, tray, etc.• Identify and define multicircuit panels, rotated images, reference points, and offsets• Identify the shapes of, differences between, and uses of global and local fiducials
Course availability:	<i>This course is available by request only. Please contact a Product Training Center for details.</i>

PR1: INTRODUCTION TO SURFACE MOUNT PROCESSES

Course level:	Level 1
Relevant product codes:	4675A GSM OFA2 Platform, 4676A GSM2 Connector Platform, 4681A GSM1 Platform, 4683A GSM OFS Platform, 4684A GSM SMT/TAB Bonder Platform, 4685A GSM1 Platform for Flexible Assembly, 4688A GSM2 Platform, 4689A GSM OFA Platform, 4699A GSM2 Platform for Flexible Assembly, 4716A GDM Platform, 5681A/5685A GSMx Platform, and 5781A/5785A GSMxs Platform
Course length:	1 day
Overview:	This course provides a comprehensive understanding of the processes and terminology used in the manufacture of printed circuit board assemblies using surface mount technology. The course includes a brief overview of printed circuit board manufacturing, but focuses on the terminology, materials, and processes involved with each step of the surface mount assembly process. Completion of this course prior to training on any Universal surface mount assembly equipment will enhance the effectiveness of that training.
Who should take this course?	Anyone who has had exposure to specific steps of the surface mount assembly process and wishes to understand how the entire assembly process works, or anyone who would like a refresher course for current surface mount processes should take this course.
During this course you will:	<ul style="list-style-type: none">• Identify the acronyms, lead shape, pitch, and size/type of surface mount components (either chip or integrated circuit package)• Identify surface mount assemblies and processes• Identify the key parameters in selecting and printing solder paste• Identify the key parameters in selecting and dispensing adhesives• Identify the key concepts in oven profiling
Course availability:	<i>This course is available by request only. Please contact a Product Training Center for details.</i>



GSM-O: 4681A/4688A GSM PLATFORM: OPERATION

Course level:	Level 1
Relevant product codes:	4675A GSM OFA2 Platform, 4676A GSM2 Connector Platform, 4681A GSM1 Platform, 4685A GSM1 Platform for Flexible Assembly, 4688A GSM2 Platform, 4689A GSM OFA Platform, and 4699A GSM2 Platform for Flexible Assembly
Software level:	UPS 4.x
Course length:	1-2 days; a full class of six students with previous PCB assembly machine operation experience can complete this course in one day, a full class of six students with no machine experience can complete this course in two days
Overview:	This course provides the knowledge and hands-on skills necessary to operate Universal's GSM1 Platform and/or GSM2 Platform using the latest UPS software. If this course is taught on-site at your factory, it focuses on the level of software currently loaded on your machine.
Who should take this course?	This course is designed for machine operators and others who need GSM Platform operation knowledge and skills. Appropriate tasks from this course have been included in Universal's GSM Platform maintenance courses (GSM1-OM and GSM2-OM) for your convenience.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to identify your company's surface mount components by package and lead types
During this course you will:	<ul style="list-style-type: none">• Review safety rules and ESD practices• Review the GSM Platform theory of operation• Locate on-line help related to operation• Perform normal GSM Platform operation tasks to set up and run a new product:<ul style="list-style-type: none">- Power on/off the machine- Take a (floppy disk) product and prepare it for production- Load a product- Load and arrange feeders and verify component orientation- Adjust the height of a matrix tray platform feeder (optional)- Check nozzle configuration for a new product (optional)- Zero the machine- Run a product in dry cycle and step modes- Run and stop production, and stop for an emergency- Shut down UPS• Perform GSM Platform error recovery tasks:<ul style="list-style-type: none">- Recover from fiducial failures- Perform feeder error recovery tasks- Recover from board handling errors- Run a segment repair product
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>
Note:	Some of the training provided in this course is also available as a self-paced, CD-ROM based instructional software program, known as Product Trainer. Please see the Product Trainer product description in this catalog for details.

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

PTF-O: 4559A PLATFORM TRAY FEEDER: OPERATION

Module level:	Level 1
Relevant product code:	4559A Platform Tray Feeder
Software level:	UPS 3.x
Module length:	2.5 hours (if you have already taken course GSM-O or have equivalent experience)
Overview:	This module provides the knowledge and skills necessary to operate Universal's Platform Tray Feeder (PTF) using the latest PTF and GSM Platform software. PTF-O does not include many of the basic operation skills contained in the GSM Platform operation course (GSM-O).
Who should take this module?	This module is designed for GSM Platform operators who need to operate the PTF option.
Prerequisite:	<ul style="list-style-type: none">• You should be able to perform all GSM-O course tasks that apply to your job
During this module you will:	<ul style="list-style-type: none">• Operate the PTF• Operate dual PTFs on the same GSM Platform (optional)• Recover from operation-related errors
Module availability:	<i>This module is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>





GSM1-OM: 4681A GSM1 PLATFORM: OPERATION AND MAINTENANCE

Course level: Level 1
Relevant product codes: 4681A GSM1 Platform, 4685A GSM1 Platform for Flexible Assembly, 4689A GSM OFA Platform, 4716A GDM Platform, 5681A/5685A GSMx Platform, and 5781A/5785A GSMxs Platform

Software level: UPS 4.x

Course length: 5 days (2.5 days for GSM1-OM plus 2.5 days for head and feeder operation and maintenance modules you select)

Overview: This course provides the knowledge and skills necessary to operate and perform preventive maintenance on Universal's single-beam (GSM1) Platform products. The base machine training is followed by a head training module and a feeder training module, which complete the full, one-week training course. For example, a one-week schedule that reads "GSM1/FJ/PTF-OM" includes operation and maintenance training for the GSM1 Platform (base machine), the FlexJet Head (FJ), and the Platform Tray Feeder (PTF).

Training options other than those listed on a current course schedule must be clearly requested when you enroll for a course. Training for a nonscheduled option may be substituted for one or more of the scheduled options if equipment and resources permit. Please contact a Product Training Center for a course schedule or information on the availability of optional training modules.

Who should take this course? This course is designed for technicians responsible for preventive maintenance and checking setups on a Universal GSM1 Platform.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to identify your company's surface mount components by package and lead types

During this course you will:

- Identify the basic sequence of events for GSM Platform operation
- Working as a group, set up the GSM Platform to run a new product
- Working as a group, perform GSM Platform operation error recovery tasks
- Identify the contents of and use the various GSM Platform support tools/documents
- Identify the functions of the GSM Platform electrical subsystems
- Use the discrete I/O feature to check machine inputs and outputs
- Perform GSM1 Platform, GSMx Platform, or GSMxs Platform (base machine) preventive maintenance procedures

Note that head- and feeder-related training tasks are listed in separate module descriptions.

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
8AM-12PM	SAFETY, DEMO, SEQ. OF EVENTS, USER INTERFACE, GSM PLATFORM OPERATION	GSM PLATFORM OPERATION (CONT.), DOCUMENTATION AND SUPPORT	GSM PLATFORM PREVENTIVE MAINTENANCE	(HEAD AND/OR FEEDER TRAINING)	(HEAD AND/OR FEEDER TRAINING)
1PM-4PM	GSM PLATFORM OPERATION	MACHINE SYSTEMS, DIAGNOSTICS AND DISCRETE I/O	(HEAD AND/OR FEEDER TRAINING)	(HEAD AND/OR FEEDER TRAINING)	(HEAD AND/OR FEEDER TRAINING)

Suggested additional courses:

- GSM-L2: All GSM Platforms: Electrical Maintenance and Troubleshooting
- GSM-I: All GSM Platforms: Installation and Calibration
- GSM-TP: All GSM Platforms: Troubleshooting Products on the Production Floor
- Advanced GSM Platform head maintenance modules

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.



GSM2-OM: 4688A GSM2 PLATFORM: OPERATION AND MAINTENANCE

Course level: Level 1
Relevant product codes: 4676A GSM2 Connector Platform and 4688A GSM2 Platform
Software level: UPS 4.x
Course length: 5 days (2.5 days for GSM2-OM plus 2.5 days for head and feeder operation and maintenance modules you select)

Overview: This course provides the knowledge and skills necessary to operate and perform preventive maintenance on Universal's dual-beam (GSM2) Platform products. The base machine training is followed by a head training module and a feeder training module, which complete the full, one-week training course. For example, a one-week schedule that reads "GSM2/FJ/PTF-OM" includes operation and maintenance training for the GSM2 Platform (base machine), the FlexJet Head (FJ), and the Platform Tray Feeder (PTF).

Training options other than those listed on a current course schedule must be clearly requested when you enroll for a course. Training for a nonscheduled option may be substituted for one or more of the scheduled options if equipment and resources permit. Please contact a Product Training Center for a course schedule or information on the availability of optional training modules.

Who should take this course? This course is designed for technicians responsible for preventive maintenance and checking setups on a Universal GSM2 Platform.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to identify your company's surface mount components by package and lead types

During this course you will:

- Identify the basic sequence of events for GSM Platform operation
- Working as a group, set up the GSM Platform to run a new product
- Working as a group, perform GSM Platform operation error recovery tasks
- Identify the functions of the GSM Platform electrical subsystems
- Identify the contents of and use the various GSM Platform support tools/documents
- Use the discrete I/O feature to check machine inputs and outputs
- Perform GSM2 Platform preventive maintenance procedures

Note that head- and feeder-related training tasks are listed in separate module descriptions.

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
8AM-12PM	SAFETY, DEMO, SEQ. OF EVENTS, USER INTERFACE, GSM PLATFORM OPERATION	GSM PLATFORM OPERATION (CONT.), DOCUMENTATION AND SUPPORT	GSM PLATFORM PREVENTIVE MAINTENANCE	(HEAD AND/OR FEEDER TRAINING)	(HEAD AND/OR FEEDER TRAINING)
1PM-4PM	GSM PLATFORM OPERATION	MACHINE SYSTEMS, DIAGNOSTICS AND DISCRETE I/O	(HEAD AND/OR FEEDER TRAINING)	(HEAD AND/OR FEEDER TRAINING)	(HEAD AND/OR FEEDER TRAINING)

Suggested additional courses:

- GSM-L2: All GSM Platforms: Electrical Maintenance and Troubleshooting
- GSM-I: All GSM Platforms: Installation and Calibration
- GSM-TP: All GSM Platforms: Troubleshooting Products on the Production Floor
- Advanced GSM Platform head maintenance modules



HEADS MODULES FOR GSM1-OM AND GSM2-OM COURSES

AD-OM: ARCHIMEDES VALVE DISPENSE HEAD: OPERATION AND MAINTENANCE

Module level:	Level 1
Relevant product codes:	4681A GSM1 Platform, 4688A GSM2 Platform, and 4716A GDM Platform
Software level:	UPS 4.x Module length: 1 day
Overview:	This module provides the knowledge and skills necessary to install, operate, and maintain the Archimedes Valve Dispense Head. This module does not cover basic GSM Platform operation and maintenance tasks.
Who should take this module?	Maintenance technicians who need to work on the Archimedes Valve Dispense Head, including installing and setting up the head, as well as operating and performing preventive maintenance on the head should take this module.
Prerequisite:	<ul style="list-style-type: none">• You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job
During this module you will:	<ul style="list-style-type: none">• Describe the theory of operation• Install the head and perform setups• Perform operation tasks• Change pump setups to get good quality dots• Carry out preventive maintenance tasks
Module availability:	<i>This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.</i>
Suggested additional modules:	<ul style="list-style-type: none">• AD-M: Archimedes Valve Dispense Head: Maintenance• DiH-P: Dispense Heads (Positive Displacement Pump and Archimedes Valve): Programming

FJ-OM: FLEXJET HEAD: OPERATION AND MAINTENANCE

Module level:	Level 1
Relevant product codes:	4681A GSM1 Platform and 4688A GSM2 Platform
Software level:	UPS 4.x Module length: 1.5 days
Overview:	This module provides the knowledge and skills unique to operating and performing warranty period maintenance tasks on Universal's FlexJet Head. This module does not include many of the basic maintenance and operation tasks contained in the GSM1-OM and GSM2-OM courses.
Who should take this module?	This module is designed for GSM Platform technicians responsible for maintaining the FlexJet Head.
Prerequisite:	<ul style="list-style-type: none">• You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job
During this module you will:	<ul style="list-style-type: none">• Perform all FlexJet Head operation tasks• Describe the theory of operation of the FlexJet Head and nozzle changer• Perform all FlexJet Head preventive maintenance tasks, including comprehensive head maintenance• Configure FlexJet Head options on the GSM Platform (optional)• Perform calibration placement enhancement on a FlexJet Head (optional)
Module availability:	<i>This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.</i>
Suggested additional modules:	<ul style="list-style-type: none">• FJ-M: FlexJet Head: Maintenance• FJ-P: FlexJet Head: Programming

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

HEADS MODULES FOR GSM1-OM AND GSM2-OM COURSES



FX/HF-OM: FLEX/HIGH FORCE HEAD: OPERATION AND MAINTENANCE

Module level: Level 1

Relevant product codes: 4681A GSM1 Platform and 4688A GSM2 Platform

Software level: UPS 4.x **Module length:** 1 day

Overview: This module provides the knowledge and skills unique to operating and performing warranty period maintenance tasks on Universal's four-spindle Flex Head (includes C4/High Force Head) and nozzle changer. This module does not include basic GSM Platform maintenance and operation tasks.

Who should take this module? This module is designed for GSM Platform technicians responsible for maintaining the Flex Head or High Force Head.

Prerequisite:

- You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job

During this module you will:

- Describe the head and nozzle changer parts, function, and theory of operation
- Perform all preventive maintenance tasks on the head and nozzle changer

- Replace a head nozzle adapter
- Install the head and configure the machine

Module availability: *This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.*

Suggested additional modules:

- FX/HF-M: Flex/High Force Head: Maintenance
- HF-P: High Force Head: Programming

PD-OM: POSITIVE DISPLACEMENT PUMP DISPENSE HEAD: OPERATION AND MAINTENANCE

Module level: Level 1

Relevant product codes: 4681A GSM1 Platform, 4688A GSM2 Platform, and 4716A GDM Platform

Software level: UPS 3.x **Module length:** 1 day

Overview: This module provides the knowledge and skills unique to operating and performing warranty period maintenance tasks on the Positive Displacement Pump Dispense Head. This module does not cover basic GSM Platform operation and maintenance tasks.

Who should take this module? Maintenance technicians who work on the Positive Displacement Pump Dispense Head should take this module.

Prerequisite:

- You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job

During this module you will:

- Describe the head's theory of operation
- Install the head and perform setups on the head
- Perform operation tasks
- Change pump setups to get good quality dots
- Carry out preventive maintenance tasks

Module availability: *This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.*

Suggested additional modules:

- PD-M: Positive Displacement Pump Dispense Head: Maintenance
- DiH-P: Dispense Heads (Positive Displacement Pump and Archimedes Valve): Programming



HEADS MODULES FOR GSM1-OM AND GSM2-OM COURSES

UFP-OM: UFP300+ HEAD: OPERATION AND MAINTENANCE

Module level: Level 1

Relevant product codes: 4681A GSM1 Platform

Software level: UPS 1.4.x-3.2.x **Module length:** 1 day

Overview: This module provides the knowledge and skills unique to maintaining and operating Universal's Ultrafine Pitch (UFP300+) Head. This module does not include basic GSM Platform maintenance and operation tasks.

Who should take this module? This module is designed for GSM Platform technicians responsible for maintaining the UFP300+ Head option on a GSM Platform.

Prerequisite:

- You should be able to perform all GSM1-OM course tasks that apply to your job

During this module you will

- Perform UFP300+ Head preventive maintenance tasks

Module availability: *This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.*

Suggested additional modules:

- UFP-M: UFP300+ Head: Maintenance
- UFP-P: UFP300+ Head: Programming

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.



SMTF-OM: 4556A STACKABLE MATRIX TRAY FEEDER: OPERATION AND MAINTENANCE

Module level:	Level 1
Relevant product code:	4556A Stackable Matrix Tray Feeder
Software level:	pre-UPS 3.0 Module length: 2 hours
Overview:	This module provides the knowledge and skills necessary to operate, install, and perform preventive maintenance on Universal's Stackable Matrix Tray Feeder (SMTF) using the latest GSM Platform software. This module does not cover basic GSM Platform maintenance tasks.
Who should take this module?	This module is designed for SMTF maintenance technicians who need to operate, set up, and maintain Universal's SMTF.
Prerequisite:	<ul style="list-style-type: none">• You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job
During this module you will:	<ul style="list-style-type: none">• Install the SMTF on the GSM Platform• Perform SMTF operation and error recovery tasks• Perform preventive maintenance tasks on the SMTF
Module availability:	<i>This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.</i>
Suggested additional module:	<ul style="list-style-type: none">• SMTF-M: 4556A Stackable Matrix Tray Feeder: Maintenance

PTF-OM: 4559A PLATFORM TRAY FEEDER: OPERATION AND MAINTENANCE

Module level:	Level 1
Relevant product code:	4559A Platform Tray Feeder
Software level:	UPS 3.x Module length: 1 day
Overview:	This module provides the knowledge and skills necessary to operate and perform setups and warranty period maintenance tasks on Universal's Platform Tray Feeder (PTF) using the latest PTF and GSM Platform software. This module does not include many of the basic maintenance tasks contained in the GSM1-OM or GSM2-OM classes.
Who should take this module?	This module is designed for PTF maintenance technicians who need to operate, set up, and maintain Universal's PTF.
Prerequisite:	<ul style="list-style-type: none">• You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job
During this module you will:	<ul style="list-style-type: none">• Configure specific PTF options (optional)• Perform PTF operation and error recovery tasks• Perform dual PTF operation (optional)• Perform preventive maintenance tasks on the PTF• Use PTF setup software to verify the axes• Use PTF diagnostics to verify I/O functions
Module availability:	<i>This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.</i>
Suggested additional modules:	<ul style="list-style-type: none">• PTF-M: 4559A Platform Tray Feeder: Maintenance• PTF-P: 4559A Platform Tray Feeder: Programming



FEEDERS MODULES FOR GSM1-OM AND GSM2-OM COURSES

SH-OM: 4686A COMPONENT SHUTTLE: OPERATION AND MAINTENANCE

Module level:	Level 1
Relevant product code:	4686A Component Shuttle
Software level:	pre-UPS 3.0 Module length: 3 hours
Overview:	This module provides the knowledge and skills necessary to operate and perform warranty period maintenance tasks on Universal's Component Shuttle. This module does not cover basic GSM Platform operation and maintenance tasks.
Who should take this module?	Maintenance technicians who need to work on the Component Shuttle should take this module.
Prerequisite:	<ul style="list-style-type: none">• You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job
During this module you will:	<ul style="list-style-type: none">• Operate the shuttle• Perform all regularly required maintenance tasks
Module availability:	<i>This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.</i>

TF-OM: 4695A PNEUMATIC TAPE FEEDER: OPERATION AND MAINTENANCE

Module level:	Level 1
Relevant product code:	4695A Pneumatic Tape Feeder
Module length:	2 hours
Overview:	This module provides the knowledge and skills necessary to install, operate, and maintain Universal's Pneumatic Tape Feeder.
Who should take this module?	Maintenance technicians who need to work on the Pneumatic Tape Feeder should take this module.
Prerequisite:	<ul style="list-style-type: none">• You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job
During this module you will:	<ul style="list-style-type: none">• Install the feeder on a GSM Platform• Operate the feeder• Perform all regularly required maintenance tasks• Perform selected corrective maintenance tasks
Module availability:	<i>This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.</i>

MPTF-OM: 4697A MULTI-PITCH TAPE FEEDER: OPERATION AND MAINTENANCE

Module level:	Level 1
Relevant product code:	4697A Multi-Pitch Tape Feeder
Software level:	UPS 3.x Module length: 2-4 hours
Overview:	This module provides the knowledge and skills necessary to install, operate, and perform warranty period maintenance tasks on Universal's Multi-Pitch Tape Feeder (8mm, 12mm, 16mm-88mm). This new feeder is expected to replace the standard tape feeder over time because each feeder can handle a range of pitches per component.
Who should take this module?	Maintenance technicians who need to work on the Multi-Pitch Tape Feeder should take this module.
Prerequisite:	<ul style="list-style-type: none">• You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job
During this module you will:	<ul style="list-style-type: none">• Install the feeder on a GSM Platform• Operate the feeder• Perform all regularly required maintenance tasks• Perform selected corrective maintenance tasks
Module availability:	<i>This module is taught as part of GSM1-OM or GSM2-OM training at your request. Please contact a Product Training Center for details.</i>

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

GSM-P: 4681A/4688A GSM PLATFORM: PROGRAMMING



Course level: Level 1

Relevant product codes: 4675A GSM OFA2 Platform, 4676A GSM2 Connector Platform, 4681A GSM1 Platform, 4685A GSM1 Platform for Flexible Assembly, 4688A GSM2 Platform, 4689A GSM OFA Platform, 4699A GSM2 Platform for Flexible Assembly, 5681A/5685A GSMx Platform, and 5781A/5785A GSMxs Platform

Software level: UPS 4.x (Application-specific needs may exist for GSMx Platform and GSMxs Platform customers who purchase various configuration options.)

Course length: 5 days

Overview: GSM-P provides the knowledge, skills, and hands-on experience necessary to program products on Universal's GSM1 Platform, GSM2 Platform, GSMx Platform, and GSMxs Platform machines using the most current Universal Platform Software. The default heads discussed during training are the Flex Head and the FlexJet Head. Options training may include any, but not all, of the following programming options depending on time and length of that particular option's module: Dispense Head (Positive Displacement Pump or Archimedes Valve), High Force Head, or the Ultra Fine Pitch Head; as well as feeder programming options for the Platform Tray Feeder, Stackable Matrix Tray Feeder, or Random Access Matrix Tray Feeder.

Who should take this course? GSM-P is designed for GSM Platform programmers and anyone else who needs to create products on GSM Platforms. If you require more specific programming training for the 4685A GSM1 Platform for Flexible Assembly or 4716 GDM Platform, please contact a Product Training Center.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to identify your own surface mount components by package and lead types

During this course you will:

- Perform machine operation tasks necessary to run a product
- Create and edit products, including CAD data products
- Define and edit feeder and component databases
- Work with Enhanced Product Setup

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
8AM-12PM	OPERATING	PROGRAMMING	PROGRAMMING	PROGRAMMING	EXIT TEST
1PM-4PM	PROGRAMMING	PROGRAMMING	PROGRAMMING	PROGRAMMING	OPTIONS

Suggested additional courses:

- GSM-APP: All GSM Platforms: Advanced Programming for Programmers
- GSM-TP: All GSM Platforms: Troubleshooting Products on the Production Floor
- FJ-OLB: FlexJet/Flex Head: Optimization and Line Balancing



HEADS MODULES FOR GSM-P COURSE

DIH-P: DISPENSE HEADS (POSITIVE DISPLACEMENT PUMP AND ARCHIMEDES VALVE): PROGRAMMING

Module level: Level 1

Relevant product codes: 4681A GSM1 Platform, 4688A GSM2 Platform, and 4716A GDM Platform

Software level: UPS 4.x **Module length:** 2 hours

Overview: This module provides the knowledge and skills necessary to operate and program GSM Platform-based dispense heads. During this training, both the Positive Displacement Pump Dispense Head and the Archimedes Valve Dispense Head are addressed.

Who should take this module? This module is designed for machine programmers responsible for programming a GDM Platform or GSM Platform with a dispense head option. This module is appropriate for a programmer who has already completed the GSM-P course and now requires additional programming training for the dispense head option or GDM Platform.

Prerequisite:

- You should be able to perform all GSM-P course tasks that apply to your job; refer to the GSM-P course description for details

During this module you will:

- Create a product file that contains dispense patterns for components
- Test and troubleshoot the created product on a GSM Platform or GDM Platform

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*

FJ-P: FLEXJET HEAD: PROGRAMMING

Module level: Level 1

Relevant product codes: 4681A GSM1 Platform and 4688A GSM2 Platform

Software level: UPS 4.x **Module length:** 4 hours

Overview: This module provides the knowledge and skills unique to programming Universal's seven-spindle FlexJet Head using UPS 4.0 software. It builds on the skills and knowledge taught in course GSM-P. FJ-P does not teach the basic programming skills common to the GSM Platform because you are expected to be proficient in GSM Platform programming before taking this course.

Who should take this module? This module is designed for GSM Platform programmers who need to create products using the FlexJet Head.

Prerequisite:

- You should be able to perform all GSM-P course tasks that apply to your job; refer to the GSM-P course description for details

During this module you will:

- Describe FlexJet Head design features and how they affect programming
- Configure a GSM Platform to use a FlexJet Head
- Create a product that uses a FlexJet Head
- Modify an existing Flex Head product to use a FlexJet Head (optional)
- Optimize using the Throughput Optimization Aid

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*

Suggested additional course:

- FJ-OLB: FlexJet Head/Flex Head: Optimization and Line Balancing

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

HEADS MODULES FOR GSM-P COURSE



HF-P: HIGH FORCE HEAD: PROGRAMMING

Module level: Level 1

Relevant product codes: 4681A GSM1 Platform, 4685A GSM1 Platform for Flexible Assembly, and 4688A GSM2 Platform

Software level: UPS 4.x **Module length:** 2 hours

Overview: This module provides the knowledge and skills unique to programming Universal's High Force Head using the latest UPS software. The High Force Head can accommodate the pick and place of C4 and odd form type components.

Who should take this module? This module is designed for machine programmers responsible for creating products for the High Force Head on a GSM Platform. This module is appropriate for a programmer who has already completed the GSM-P course and now requires additional programming training for the High Force Head head option.

Prerequisite:

- You should be able to perform all GSM-P course tasks that apply to your job; refer to the GSM-P course description for details

During this module you will:

- Create and manually optimize a product that contains High Force Head placements
- Test the created product on a GSM Platform with the High Force Head option

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*

UFP-P: UFP300+ HEAD: PROGRAMMING

Module level: Level 1

Relevant product code: 4681A GSM1 Platform

Software level: UPS 1.4.x-3.2.x **Module length:** 2 hours

Overview: This module provides the knowledge and skills unique to programming Universal's Ultra Fine Pitch Head (UFP300+) using the latest UPS software. This head can only be mounted on a GSM1 Platform.

Who should take this module? This module is designed for machine programmers responsible for creating products for the UFP300+ Head on a GSM1 Platform. This module is appropriate for a programmer who has already completed the GSM-P course and now requires additional programming training for the UFP300+ Head option.

Prerequisite:

- You should be able to perform all GSM-P course tasks that apply to your job; refer to the GSM-P course description for details

During this module you will:

- Create and manually optimize a product that contains UFP300+ Head placements
- Test the created product on a GSM Platform with the UFP300+ Head option

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*



FEEDER MODULE FOR GSM-P COURSE

PTF-P: 4559A PLATFORM TRAY FEEDER: PROGRAMMING

Module level: Level 1

Relevant product code: 4559A Platform Tray Feeder

Software level: UPS 3.x

Module length: 2-4 hours if you have already completed course GSM-P; note that PTF-P does not include many of the basic programming skills contained in the GSM Platform programming course.

Overview: This module provides the knowledge and skills necessary to program Universal's Platform Tray Feeder (PTF) using the latest PTF and GSM Platform software. Students who need to operate the PTF as a major part of their job should take PTF-O in addition to this module.

Who should take this module? This module is designed for GSM Platform programmers who need to program the PTF option.

Prerequisite:

- You should be able to perform all GSM-P course tasks that apply to your job; refer to the GSM-P course description for details

During this course you will:

- Configure the PTF
- Create/modify a product to use parts from the PTF
- Run and test a GSM Platform product that uses the PTF
- Program dual PTFs (optional)

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.



GDM-O: 4716A GDM PLATFORM: OPERATION

Course level:	Level 1
Relevant product code:	4716A GDM Platform
Software level:	pre-UPS 3.0
Course length:	1-1.5 days; if students do not need training on process issues associated with using adhesive, the course can be taught in one day
Overview:	This course provides the knowledge and skills necessary to operate the GDM Platform and the Dispense Head (either Positive Displacement Pump Head or Archimedes Valve Head).
Who should take this course?	This course is designed for anyone who needs to operate the GDM Platform and its associated Dispense Head. If you have the Dispense Head option on your GSM Platform, you should not take this course because it does not provide training specific to the GSM Platform. Instead, you should request training on the Dispense Head in addition to GSM Platform training.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to identify your company's surface mount components by package and lead types
During this course you will:	<ul style="list-style-type: none">• Describe the GDM Platform theory of operation• Operate the GDM Platform• Perform Dispense Head operation tasks• Recover from operation-related errors• Change process variables to improve dispense quality
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>

GDM1: 4716A GDM PLATFORM: OPERATION, PROGRAMMING, AND MAINTENANCE

Course level:	Level 1
Relevant product code:	4716 GDM Platform
Software level:	UPS 3.0
Course length:	4.5 days
Overview:	This course provides the knowledge and skills necessary to operate, program, and maintain the GDM Platform using the latest UPS software. Students individually and in small groups perform hands-on tasks. This course covers both Universal's Positive Displacement Pump Dispense Head and Archimedes Valve Dispense Head.
Who should take this course?	This course is designed for anyone responsible for programming and/or maintaining the GDM Platform. If you have the Dispense Head option on a GSM Platform, you should not take this course because it does not provide training specific to the GSM Platform. Instead, you should request training on the Dispense Head in addition to GSM Platform training.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to identify your company's surface mount components by package and lead type
During this course you will:	<ul style="list-style-type: none">• Describe how the GDM Platform and Dispense Head function• Configure the GDM Platform and Dispense Head• Perform GDM Platform operation tasks• Create and run a product that contains dispense patterns for components• Create a product with CAD data (optional)• Check/adjust normal setups on the Dispense Head• Adjust setups in response to different processes• Remove, disassemble, and clean a pump assembly• Perform preventive maintenance tasks on the GDM Platform and Dispense Head
Course availability:	<i>This course is available by request only. Please contact a Product Training Center for details.</i>
Suggested additional courses:	<ul style="list-style-type: none">• AD-M: Archimedes Valve Dispense Head: Maintenance• PD-M: Positive Displacement Pump Dispense Head: Maintenance• DiH-P: Dispense Heads (Positive Displacement Pump or Archimedes Valve): Programming• GSM-L2: All GSM Platforms: Electrical Maintenance and Troubleshooting



GSM-L2: ALL GSM PLATFORMS: ELECTRICAL MAINTENANCE AND TROUBLESHOOTING

Course level: Level 2

Relevant product codes: 4675A GSM OFA2 Platform, 4676A GSM2 Connector Platform, 4681A GSM1 Platform, 4683A GSM OFS Platform, 4685A GSM1 Platform for Flexible Assembly, 4688A GSM2 Platform, 4689A GSM OFA Platform, 4699A GSM2 Platform for Flexible Assembly, 4716A GDM Platform, 5681A/5685A GSMx Platform, and 5781A/5785A GSMxs Platform

Course length: 4 days

Overview: This course provides the knowledge and skills necessary to troubleshoot the base electrical subsystems common across many of Universal's GSM Platform products.

Who should take this course? This course is designed for maintenance technicians who require advanced electrical troubleshooting expertise on GSM Platform products. It should be considered a requirement for anyone who needs to electrically troubleshoot a GSM Platform.

Prerequisites:

- You should have basic training on electrical components and circuits, electrical safety, and electrical troubleshooting techniques, including how to measure resistance and AC/DC voltage with a meter
- You should be able to perform all GSM1-OM/GSM2-OM and GSM-P course tasks that apply to your job; refer to the GSM1-OM/GSM2-OM and GSM-P course descriptions for details
- You should have two to three months experience working on the GSM Platform before taking this course

During this course you will:

- Identify the sights and sounds of normal GSM Platform operation
- Read GSM Platform electrical schematics
- Troubleshoot power distribution circuits
- Troubleshoot E-stop and interlock (safety) circuits
- Use LOGICOMM
- Troubleshoot the VME chassis
- Troubleshoot I/O circuits
- Follow all applicable safety rules when working on or near the machine
- Troubleshoot axes circuits

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4
8AM-12PM	INTRODUCTION, SIGHTS AND SOUNDS, READING ELECTRICAL SCHEMATICS	TROUBLESHOOTING POWER DISTRIBUTION	USING LOGICOMM, TROUBLESHOOTING THE VME	TROUBLESHOOTING AXES
1PM-4PM	TROUBLESHOOTING POWER DISTRIBUTION	TROUBLESHOOTING E-STOP AND INTERLOCK	TROUBLESHOOTING I/O CIRCUITS	EXIT TEST

Suggested additional courses:

- GSM-TP: All GSM Platforms: Troubleshooting Products on the Production Floor
- Advanced GSM Platform head maintenance modules

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

GSM-I: ALL GSM PLATFORMS: INSTALLATION AND CALIBRATION



Course level: Level 2

Relevant product codes: 4675A GSM OFA2 Platform, 4676A GSM2 Connector Platform, 4681A GSM1 Platform, 4685A GSM1 Platform for Flexible Assembly, 4688A GSM2 Platform, 4689A GSM OFA Platform, 4699A GSM2 Platform for Flexible Assembly, 5681A/5685A GSMx Platform, and 5781A/5785A GSMxs Platform

Course length: 2 days

Overview: This course provides the knowledge and skills necessary to install, calibrate, and trim* GSM Platform products to manufacturing specifications (*using the Calibration Placement Enhancement Kit).

Who should take this course? This course is designed for maintenance technicians who must install, calibrate, and trim Universal's GSM Platform products. *Note that you must purchase the kits noted in the Prerequisites section to be able to perform the related training tasks at your factory.*

Prerequisites:

- You should be able to perform all GSM1-OM/GSM2-OM and GSM-P course tasks that apply to your job; refer to the GSM1-OM/GSM2-OM and GSM-P course descriptions for details
- Material requirements for on-site course delivery and on-site performance of tasks:
 - for installation:*
 1. Precision Leveling Kit (Platform Installation Kit), part number 46139601 or later revision
 2. Platform Roller Kit, part number 46719001 or later revision
 - for calibration:*
 1. Standard Calibration Kit, part number 45235205 or later revision
 2. NCC8 Calibration Kit (NCC8 Calibration Accessory Kit), part number 46722101 or later revision
 - for trimming:*
 1. Calibration Placement Enhancement Kit, part number 47383801 or later revision

During this course you will:

- Install a GSM Platform using the installation toolkit
- Calibrate a GSM Platform using the calibration kit
- Trim a GSM Platform using the Calibration Placement Enhancement Kit
- Check operation of the GSM Platform

Course availability: *This course is available by request only. Please contact a Product Training Center for details.*

Suggested additional courses:

- GSM-L2: All GSM Platforms: Electrical Maintenance and Troubleshooting
- Advanced GSM Platform head maintenance modules



GSM-APP: ALL GSM PLATFORMS: ADVANCED PROGRAMMING FOR PROGRAMMERS

- Course level:** Level 2
- Relevant product codes:** 4681A GSM1 Platform, 4685A GSM1 Platform for Flexible Assembly, 4688A GSM2 Platform, 4689A GSM OFA Platform, 4699A GSM2 Platform for Flexible Assembly, 5681A/5685A GSMx Platform, and 5781A/5785A GSMxs Platform
- Software level:** UPS 4.x (Application-specific needs may exist for GSMx Platform or GSMxs Platform customers who purchase various configuration options.)
- Course length:** 4 days
- Overview:** GSM-APP provides the advanced knowledge, skills, hands-on experience, and application-specific experience necessary to program and troubleshoot complex parts and concepts on GSM Platform machines.
- Who should take this course?** Programmers and process engineers responsible for programming the GSM Platform should take this course. *Since this course targets specific applications, you are encouraged to bring specific components and products that can be used in class as examples from which to learn.*
- Prerequisites:**
- You should have successfully completed course GSM-P
 - Before taking this course you should have at least six months experience programming the GSM Platform after attending course GSM-P
- During this course you will:**
- Use available tools such as Enhanced Product Setup and advanced vision diagnostics to troubleshoot specific, complex parts and applications
 - Learn the basics of odd form assembly programming
 - Learn best practices for manually optimizing a GSM Platform Flex/High Force Head product and working with machine configurations
 - Program a wide variety of complex components using the spectrum of component categories available on the GSM Platform
 - Have the opportunity to share ideas and concepts with other members in your field

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4
8AM-12PM	PROGRAMMING KNOWLEDGE REVIEW	TROUBLESHOOTING PRODUCT APPLICATIONS	TROUBLESHOOTING PRODUCT APPLICATIONS	LINE BALANCING AND PLATFORM OPTIMIZATION
1PM-4PM	TROUBLESHOOTING PRODUCT APPLICATIONS		LINE BALANCING AND PLATFORM OPTIMIZATION	OPTIONAL ACTIVITIES

Suggested additional courses:

- GSM-TP: All GSM Platforms: Troubleshooting Products on the Production Floor
- FJ-OLB: FlexJet/Flex Head: Optimization and Line Balancing

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

FJ-OLB: FLEXJET HEAD/FLEX HEAD: OPTIMIZATION AND LINE BALANCING



Course level: Level 2

Relevant product codes: 4681A GSM1 Platform and 4688A GSM2 Platform

Software level: UPS 4.x **Course length:** 3 days

Overview: This course provides the knowledge and skills specific to optimization and line balancing for Universal's seven-spindle FlexJet Head. It is designed to build on the skills and knowledge taught in Universal's GSM Platform programming class, GSM-P. FJ-OLB does not teach the basic programming skills common to the GSM Platform since you are expected to be proficient in GSM Platform programming prior to taking this course. Line balancing exercises include Flex Head, Platform Tray Feeder, and other machine options.

Who should take this course? This course is designed for GSM Platform programmers who need to optimize FlexJet Head products to maximize machine throughput. The course is also designed for GSM Platform programmers who need to balance a product over a machine line that includes GSM Platform machines and generic surface mount equipment.

Prerequisites:

- You should be able to perform all GSM-P course tasks that apply to your job; refer to the GSM-P course description for details
- You should have three to six months experience working on the GSM Platform before taking this course

During this course you will:

- Use the FlexJet automatic optimizer to optimize a product that includes a Platform Tray Feeder
- Use the automatic line balancer to split and balance a product across three machines
- Manually optimize and balance products using procedures generated by Universal's Application Engineering Group (optional)

Course availability: *This course is available by request only. Please contact a Product Training Center for details.*

Suggested additional courses:

- GSM-APP: All GSM Platforms: Advanced Programming for Programmers
- GSM-TP: All GSM Platforms: Troubleshooting Products on the Production Floor



GSM-TP: ALL GSM PLATFORMS: TROUBLESHOOTING PRODUCTS ON THE PRODUCTION FLOOR

Course level: Level 2

Relevant product codes: 4681A GSM1 Platform, 4685A GSM1 Platform for Flexible Assembly, 4688A GSM2 Platform, 4689A GSM OFA Platform, 4699A GSM2 Platform for Flexible Assembly, 5681A/5685A GSMx Platform, and 5781A/5785A GSMxs Platform

Software level: UPS 4.x (Application-specific needs may exist for GSMx Platform and GSMxs Platform customers who purchase various configuration options.)

Course length: 4 days

Overview: GSM-TP provides production floor technicians and programmers with the hands-on skills necessary to troubleshoot products in a production environment where GSM Platform machines are used. GSM-TP is not intended to teach product creation, product importing, or optimization tasks and techniques, but focuses on the key aspects of troubleshooting products on the GSM Platform. However, the first half day of the course is devoted to a review of product creation concepts, since an understanding of these concepts is required for proficiency at troubleshooting products with errors.

Who should take this course? GSM Platform production technicians, programmers, operators, and those who set up GSM Platform machines should take this course. Also, anyone who has taken GSM-P or GSM-APP and requires more hands-on application at the machine would benefit from this course.

Prerequisites:

- You should have three to six months experience working on the GSM Platform before taking this course
- You must have completed at least one of the following courses to enroll in GSM-TP:
 - GSM1-OM: 4681A GSM1 Platform: Operation and Maintenance
 - GSM2-OM: 4688A GSM2 Platform: Operation and Maintenance
 - GSM-P: 4681A/4688A GSM Platform: Programming
 - GSM-APP: All GSM Platforms: Advanced Programming for Programmers

During this course you will:

- Review product creation concepts
- Troubleshoot programming errors related to boards, fiducials, feeders, and components
- Complete all machine-related troubleshooting activities

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4
8AM-12PM	REVIEW PRODUCT CREATION CONCEPTS, CREATE A SIMPLE PRODUCT WITH THE INSTRUCTOR	TROUBLESHOOTING BOARDS	TROUBLESHOOTING FEEDERS	TROUBLESHOOTING COMPONENTS, TROUBLESHOOTING PRODUCTS
1PM-4PM	TROUBLESHOOTING BOARDS	TROUBLESHOOTING FIDUCIALS	TROUBLESHOOTING COMPONENTS	EXIT TEST

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

ADVANCED HEADS MAINTENANCE MODULES



AD-M: ARCHIMEDES VALVE DISPENSE HEAD: MAINTENANCE

Module level:	Level 2
Relevant product codes:	4681A GSM1 Platform, 4688A GSM2 Platform, and 4716A GDM Platform
Software level:	UPS 3.x
Module length:	1 or 2 days depending on previous experience; if you have already taken course GDM1 or AD-OM, register for the one-day version of AD-M; if you have not taken course GDM1 or AD-OM, register for the two-day version of AD-M
Overview:	This module provides the knowledge and skills necessary to install, operate, program, maintain, and troubleshoot the Archimedes Valve Dispense Head.
Who should take this module?	Maintenance technicians who need to troubleshoot problems with the Archimedes Valve Dispense Head should take this module.
Prerequisite:	<ul style="list-style-type: none">• You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job
During this module you will:	<ul style="list-style-type: none">• Describe the head's theory of operation• Install the head and perform setups• Perform operation tasks• Modify a product to dispense with the head• Alter valve setups to get good quality dots• Carry out preventive maintenance tasks• Troubleshoot head performance
Module availability:	<i>This module is available by request only. Please contact a Product Training Center for details.</i>

FJ-M(07): FLEXJET HEAD MAINTENANCE (07 HEAD), FJ-M(09): FLEXJET HEAD MAINTENANCE (09 HEAD)

Module level:	Level 2
Relevant product codes:	4681A GSM1 Platform, 4688A GSM2 Platform, and 4716A GDM Platform
Software level:	UPS 4.x
Module length:	3 days
Overview:	This module provides the knowledge and skills necessary to install, operate, maintain, and troubleshoot the FlexJet Head.
Who should take this module?	Maintenance technicians who need to troubleshoot problems with the FlexJet Head should take this module.
Prerequisites:	<ul style="list-style-type: none">• You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job• You should have access to a Universal Calibration Placement Enhancement (CPE) kit
During this module you will:	<ul style="list-style-type: none">• Describe the theory of operation of the FlexJet Head and nozzle changer• Install the FlexJet Head and configure head-specific options on the GSM Platform• Perform operation tasks• Carry out setups and preventive maintenance tasks• Carry out selected corrective maintenance tasks• Troubleshoot head performance• Calibrate the GSM Platform with a FlexJet Head
Module availability:	<i>This module is scheduled regularly. Please consult a current course schedule or contact a Product Training Center for details.</i>



ADVANCED HEADS MAINTENANCE MODULES

FX/HF-M: FLEX/HIGH FORCE HEAD: MAINTENANCE

Module level: Level 2

Relevant product codes: 4681A GSM1 Platform and 4688A GSM2 Platform

Software level: UPS 3.x **Module length:** 2 days

Overview: This module provides the knowledge and skills necessary for maintaining Universal's four-spindle Flex Head (includes C4/High Force Head) and nozzle changer. This module does not include basic GSM Platform maintenance and operation tasks. Contact a Product Training center for a detailed list of tasks; you may choose only those tasks you wish to receive training on.

Who should take this module? This module is designed for GSM Platform technicians responsible for advanced maintenance on the Flex/High Force Head.

Prerequisites:

- You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job
- You should have access to a Universal calibration kit

During this module you will:

- Describe the head parts and their functions and describe the head's theory of operation
- Install the head and configure head-specific options on the GSM Platform
- Perform selected tasks from the following list: spindle replacement, spindle alignment/verification, theta alignment/verification, Z-motor replacement, Z-encoder replacement, manifold assembly replacement, clutch replacement, clutch wire rope replacement, linear slide replacement, and theta encoder replacement
- Perform electrical and mechanical troubleshooting
- Calibrate the GSM Platform with a Flex/High Force Head

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

ADVANCED HEADS MAINTENANCE MODULES



PD-M: POSITIVE DISPLACEMENT PUMP DISPENSE HEAD: MAINTENANCE

Module level: Level 2

Relevant product codes: 4681A GSM1 Platform, 4688A GSM2 Platform, and 4716A GDM Platform

Software level: UPS 3.x

Module length: 1 or 2 days, depending on your previous experience; if you have taken course GDM1 or PD-OM you should register for the one-day version of PD-M; if you have not taken course GDM1 or PD-OM you should register for the two-day version of PD-M

Overview: This module provides the knowledge and skills necessary to install, operate, program, maintain, and troubleshoot the Positive Displacement Pump Dispense Head.

Who should take this module? Maintenance technicians who need to troubleshoot the Positive Displacement Pump Dispense Head should take this module.

Prerequisite:

- You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job

During this module you will:

- Describe the head's theory of operation
- Install the head and perform setups
- Perform operation tasks
- Modify a product to dispense with the head
- Alter pump/valve setups to get good quality dots
- Carry out preventive maintenance tasks
- Troubleshoot head performance

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*

UFP-M: UFP300+ HEAD: MAINTENANCE

Module level: Level 2

Relevant product codes: 4681A GSM1 Platform and 4688A GSM2 Platform

Software level: UPS 1.4.x-3.2.x **Module length:** 1 day

Overview: This module provides the knowledge and skills necessary for maintaining Universal's Ultrafine Pitch (UFP300+) Head. This module does not include basic GSM Platform maintenance and operation tasks.

Who should take this module? Maintenance technicians who need to troubleshoot the UFP300+ Head should take this module.

Prerequisites:

- You should be able to perform all GSM1-M course tasks that apply to your job
- You should have access to a Universal calibration kit

During this module you will:

- Describe the head's theory of operation
- Install the head and configure the software
- Perform all preventive maintenance tasks
- Perform selected corrective maintenance tasks
- Troubleshoot the head

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*



ADVANCED FEEDERS MAINTENANCE MODULES

SMTF-M: 4556A STACKABLE MATRIX TRAY FEEDER: MAINTENANCE

Course level: Level 2

Relevant product code: 4556A Stackable Matrix Tray Feeder

Software level: pre-UPS 3.0 **Module length:** 4-6 hours

Overview: This module provides the knowledge and skills necessary to install, operate, maintain, and troubleshoot Universal's Stackable Matrix Tray Feeder (SMTF).

Who should take this module? Maintenance technicians who need to work on the SMTF should take this module.

Prerequisite: • You should be able to perform all GSM1-OM or GSM2-OM course tasks that apply to your job

During this module you will:

- Install the feeder on a GSM Platform
- Load and reload the feeder in manual and automatic modes
- Perform all regularly required maintenance tasks
- Describe the feeder's sequence of events
- Use LOGICOMM to test assemblies and assembly inputs
- Perform selected tests and adjustments
- Load carriage axis motion parameters

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*

PTF-M: 4559A PLATFORM TRAY FEEDER: MAINTENANCE

Module level: Level 2

Relevant product code: 4559A Platform Tray Feeder

Software level: UPS 3.x **Module length:** 2 days

Overview: This module combines advanced maintenance and electrical troubleshooting tasks to provide you with the skills and knowledge to troubleshoot Platform Tray Feeder (PTF) problems.

Who should take this module? Maintenance personnel who need to troubleshoot the PTF should take this module.

Prerequisites:

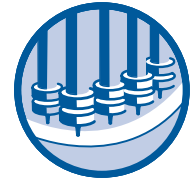
- You should be able to perform all PTF-OM module tasks that apply to your job; refer to the PTF-OM module description for details
- You should have two to three months experience working on the PTF before taking this module

During this module you will:

- Describe the PTF theory of operation
- Use PTF setup and diagnostic software to verify axes and I/O
- Set up and verify all axes home pulses
- Describe and troubleshoot the PTF power distribution
- Describe and troubleshoot the safety and elevator brake circuitry
- Describe and troubleshoot PTF axis controls and serial communication

Module availability: *This module is available by request only. Please contact a Product Training Center for details.*

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.



HP90-O: 4790/4791/4792 HSP: OPERATION

Course level:	Level 1
Relevant product codes:	4790 HSP, 4791 HSP, and 4792 HSP
Course length:	1.5 days
Overview:	This course provides the skills needed to operate the 4790, 4791, or 4792 HSP machines. Emphasis is placed on the skills required to prepare, set up, and safely run the machine in a production environment. You are given ample hands-on time with the machine to practice the skills identified by the course objectives.
Who should take this course?	Anyone who will be operating the machine during production should take this course. The typical title of an attendee is machine operator.
Prerequisites:	<ul style="list-style-type: none">• Ability to identify surface mount components by name• Ability to identify by width and pitch the type of component packaging• Proficiency with basic hand tools, such as screwdrivers and Allen wrenches
During this course you will:	<ul style="list-style-type: none">• Identify machine functions and assemblies• Load programs• Set up the board transfer section• Identify, adjust, load, and mount feeders• Recover from component missing, feeder mis-set, E-stop, and fiducial errors• Run sample boards• Perform daily preventive maintenance tasks
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>

HP90-OM: 4790/4791/4792 HSP: OPERATION AND MAINTENANCE

Course level:	Level 1
Relevant product codes:	4790 HSP, 4791 HSP, and 4792 HSP
Course length:	5 days
Overview:	This course is designed for individuals responsible for operating or maintaining the 4790, 4791, or 4792 HSP machines. Emphasis is placed on the skills required to set up, maintain, troubleshoot, and safely run the machine for production, maintenance, or programming purposes.
Who should take this course?	Operators, maintenance technicians, and programmers who will be operating the machine, performing preventive maintenance, or troubleshooting the machine should take this course. This course should be considered a prerequisite for course HP90-P unless you have experience operating the machine. This course is oriented toward hands-on experience with the machine at the operation and maintenance levels.
Prerequisites:	<ul style="list-style-type: none">• Ability to identify surface mount components by name• Ability to identify by width and pitch the type of component packaging• Proficiency with basic hand tools• An understanding of electrical schematics• An understanding of pneumatic diagrams
During this course you will:	<ul style="list-style-type: none">• Identify machine safety features• Operate the machine• Recover from component missing, feeder mis-set, E-stop, and fiducial errors• Describe and demonstrate the turret functions• Set up the transfer section• Identify, adjust, load, and mount feeders• Replace a head rotor assembly• Replace cutter blades• Trace pneumatic flow on a diagram and locate assemblies at the machine• Trace electrical signal flow on a block diagram and locate assemblies at the machine• Use input diagnostics• Adjust photo-amplifier sensitivity• Perform machine calibrations not requiring optional fixtures• Interpret machine-generated data for troubleshooting• Perform preventive maintenance tasks
Course availability:	<i>This course is available by request only. Please contact a Product Training Center for details.</i>
Suggested additional courses:	<ul style="list-style-type: none">• HP90-L2: 4790/4791/4792 HSP: Advanced Maintenance and Calibration• HP90-P: 4790/4791/4792 HSP: Programming



HP90-P: 4790/4791/4792 HSP: PROGRAMMING

Course level: Level 1

Relevant product codes: 4790 HSP, 4791 HSP, and 4792 HSP

Course length: 5 days

Overview: This course is designed for individuals responsible for programming the 4790, 4791, or 4792 HSP machines. Emphasis is placed on the skills required for identifying/defining components in the component library and for writing pattern programs. Multiple personal computer setups at the Product Training Center allow you ample hands-on time.

Who should take this course? Anyone programming the machine for production or maintenance purposes should take this course. This course is oriented toward hands-on experience with the machine at the programming level.

Prerequisites:

- Ability to identify surface mount components by name
- Ability to identify by width and pitch the type of component packaging
- Ability to use a computer and navigate in a Windows®-based environment
- Knowledge of the purpose of fiducials
- Knowledge of how to safely set up and operate the machine for production

These prerequisite skills can be acquired by taking course HP90-OM (4790/4791/4792 HSP: Operation and Maintenance).

During this course you will:

- Define at least one of each of the following types of components in the component library: square, cylindrical, leaded, flat packaged, and deformed
- Write a pattern program considering the following features: optimization, fiducials, bad board reject, multiple rotated offsets, and alternate feeder functions

Course availability: *This course is available by request only. Please contact a Product Training Center for details.*

Suggested additional course: HP90-OM: 4790/4791/4792 HSP: Operation and Maintenance

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

HP90-L2: 4790/4791/4792 HSP: ADVANCED MAINTENANCE AND CALIBRATION



Course level: Level 2

Relevant product codes: 4790 HSP, 4791 HSP, and 4792 HSP

Course length: 6 days

Overview: This course is designed for individuals responsible for maintaining the 4790, 4791, or 4792 HSP machines. Emphasis is placed on the skills required to maintain these machines after the warranty period, where optional jigs and fixtures are required to return the machine to original specifications. Most of the tasks covered in this course are not needed on a routine basis, and the training is provided “just in case” for anyone wanting more independence.

Who should take this course? Maintenance technicians and engineers monitoring the performance of these machines and having responsibility for ensuring the machines are running at maximum efficiency should take this course.

Prerequisites:

- Completion of a 4790/91/92 Level I operation and maintenance class
- Ability to operate a storage oscilloscope
- You should have at least six months experience performing routine and corrective maintenance on the 4790, 4791, or 4792 before taking this course
- Ability to set up and operate the machine for production
- Material requirements: The following jigs will be used in the class and must be purchased to perform the skills taught in the class:
 - 44560101 nozzle height and X/Y table chute block
 - JG-0029 PEC recognition calibration template
 - JG-0038 component recognition calibration jig set

During this course you will:

- Review all turret functions
- Set up the MZ/CZ axes
- Check heads and set head height
- Trace electrical signal flow through machine diagrams
- Use input and output diagnostics
- Adjust analog servo drivers
- Set up and calibrate all theta drivers
- Adjust frontlighting and backlighting
- Calibrate the recognition camera
- Set and calibrate the PEC camera
- Set level axis offsets
- Check and adjust solenoid linkages
- Interpret management data
- Check and adjust component missing sensor

Course availability: *This course is available by request only. Please contact a Product Training Center for details.*

Suggested additional course:

- HP90-P: 4790/4791/4792 HSP: Programming



HP95-DIF: 4790 HSP SERIES AND 4795/4796 HSP SERIES DIFFERENCES

Course level:	Level 1						
Relevant product codes:	4795 HSP and 4796 HSP						
Course length:	1 day						
Overview:	This course presents the operation and programming differences between the 4790/4791/4792 HSP and 4795/4796 HSP machines. The maintenance differences can be learned by attending the final four days of an in-progress HP95-OM course, 4795/4796 HSP: Operation and Maintenance.						
Who should take this course?	Experienced 4790/4791/4792 HSP technicians and programmers who have attended the 4790/4791/4792 HSP Level 1 course and are responsible for running production, maintaining, or programming the 4795/4796 HSP should take this course.						
Prerequisites:	<ul style="list-style-type: none">• You should have successfully completed a 4790/4791/4792 HSP Level I course• You should have at least three months experience working on the 4790/4791/4792 HSP before taking this course						
During this course you will:	<ul style="list-style-type: none">• Identify machine safety features• Operate the machine• Interpret machine-generated data for troubleshooting• Describe the programming differences between the 4790/4791/4792 and 4795/4796 HSPs• Use UCT-52						
Typical course schedule:	<table border="1"><thead><tr><th colspan="2">DAY 1</th></tr></thead><tbody><tr><td>8AM-12PM</td><td>OPERATION, COMPONENT LIBRARY</td></tr><tr><td>1PM-4PM</td><td>PROGRAMMING</td></tr></tbody></table>	DAY 1		8AM-12PM	OPERATION, COMPONENT LIBRARY	1PM-4PM	PROGRAMMING
DAY 1							
8AM-12PM	OPERATION, COMPONENT LIBRARY						
1PM-4PM	PROGRAMMING						
Suggested additional course:	<ul style="list-style-type: none">• HP95-OM: 4795/4796 HSP: Operation and Maintenance						

HP95-O: 4795/4796 HSP: OPERATION

Course level:	Level 1
Relevant product codes:	4795 HSP and 4796 HSP
Course length:	1.5 days
Overview:	This course provides the skills needed to operate the 4795 and 4796 HSP machines. Emphasis is placed on the skills required to prepare, set up, and safely run the machine in a production environment. You are given ample hands-on time with the machine to practice the skills identified by the course objectives.
Who should take this course?	Anyone who will be operating the machine during production should take this course. The title of a typical attendee is machine operator. This course is oriented toward hands-on experience with the machine at the operation level.
Prerequisites:	<ul style="list-style-type: none">• Ability to identify surface mount components by name• Ability to identify by width and pitch the type of component packaging• Proficiency with basic hand tools such as screwdrivers and Allen wrenches
During this course you will:	<ul style="list-style-type: none">• Identify machine functions and assemblies• Load programs• Set up the board transfer section• Identify, adjust, load, and mount feeders• Recover from component missing, feeder mis-set, E-stop, and fiducial errors• Run sample boards• Perform daily preventive maintenance tasks
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>
Note:	The training provided in this course is also available as a self-paced, CD-ROM based instructional software program, known as Product Trainer. Please see the Product Trainer product description in this catalog for details.

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

HP95-OM: 4795/4796 HSP: OPERATION AND MAINTENANCE

Course level: Level 1

Relevant product codes: 4795 HSP and 4796 HSP

Course length: 5 days

Overview: This course is designed for individuals responsible for operating or maintaining the 4795 and 4796 HSP. Emphasis is placed on the skills required to set up, maintain, troubleshoot, and safely run the machine for production, maintenance, or programming purposes.

Who should take this course? Operators, maintenance technicians, and programmers who will be operating the machine, performing preventive maintenance, or troubleshooting the machine should take this course. This course should be considered a prerequisite for course HP95-P unless you have experience operating the machine. This course is oriented toward hands-on experience with the machine at the operation and maintenance levels.

Prerequisites:

- Ability to identify surface mount components by name
- Ability to identify by width and pitch the type of component packaging
- Proficiency with basic hand tools
- Knowledge of electrical schematics
- Knowledge of pneumatic diagrams

During this course you will:

- Identify machine safety features
- Operate the machine
- Recover from component missing, feeder mis-set, E-stop, and fiducial errors
- Describe and demonstrate the turret functions
- Set up the transfer section
- Identify, adjust, load, and mount feeders
- Replace nozzle miniature stroke bearing
- Replace cutter blades
- Trace pneumatic flow on a diagram and locate assemblies at the machine
- Trace electrical signal flow on a block diagram and locate assemblies at the machine
- Use input diagnostics
- Adjust frontlighting and backlighting
- Teach photo-amp sensitivity
- Perform machine calibrations not requiring optional fixtures
- Interpret machine-generated data for troubleshooting
- Perform preventive maintenance tasks

Suggested additional courses:

- HP95-L2: 4795/4796 HSP: Advanced Maintenance and Calibration
- HP95-P: 4795/4796 HSP: Programming (UCT-52)
- HP95UPS-P: 4795/4796 HSP: Programming (UPS)



HP95-P: 4795/4796 HSP: PROGRAMMING (UCT-52)

Course level: Level 1

Relevant product codes: 4795 HSP and 4796 HSP

Software level: UCT-52 **Course length:** 5 days

Overview: This course is designed for individuals responsible for programming the 4795 and 4796 HSP using UCT-52. Emphasis is placed on the skills required for identifying/defining components in the component library and for writing pattern programs. Multiple personal computer setups at the Product Training Center allow ample hands-on time.

Who should take this course? Anyone who will be programming the machine, either for production purposes or for maintenance reasons should take this course. This course is oriented toward hands-on experience with the machine at the programming level.

Prerequisites:

- Ability to identify surface mount components by name
- Ability to identify by width and pitch the type of component packaging
- Ability to use a computer and navigate in a Windows®-based environment
- Knowledge of the purpose of fiducials
- Knowledge of how to safely set up and operate the machine for production

These prerequisite skills can be acquired by taking course HP95-OM (4795/4796 HSP: Operation and Maintenance).

During this course you will:

- Define at least one of each of the following types of components in the component library: square, cylindrical, leaded, flat packaged, and deformed
- Write a pattern program utilizing the following features: optimization, fiducials, bad board reject, multiple rotated offsets, unit programs, and alternate feeder functions

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
8AM-12PM	COMPONENT LIBRARY	COMPONENT LIBRARY	COMPONENT LIBRARY	PATTERN PROGRAMMING	PATTERN PROGRAMMING
1PM-4PM	COMPONENT LIBRARY	COMPONENT LIBRARY	PATTERN PROGRAMMING	PATTERN PROGRAMMING	

Suggested additional course:

- HP95-OM: 4795/4796 HSP: Operation and Maintenance

HP95UPS-P: 4795/4796 HSP: PROGRAMMING (UPS)

Course level: Level 1

Relevant product codes: 4795 HSP and 4796 HSP

Software level: HSP UPS 1.1.1 **Course length:** 5 days

Overview: This course is designed for individuals responsible for programming the 4795 and 4796 HSP using HSP-UPS. Emphasis is placed on the skills required for identifying/defining components in the component database and for creating a product. Multiple personal computer setups at the Product Training Center allow for ample hands-on time.

Who should take this course? Anyone who will be programming the machine, either for production purposes or for maintenance reasons should take this course. This course is oriented toward hands-on experience with the machine at the programming level.

Prerequisites:

- Ability to identify surface mount components by name
- Ability to identify by width and pitch the type of component packaging
- Ability to use a computer and navigate in a Windows®-based environment
- Knowledge of the purpose of fiducials
- Knowledge of how to safely set up and operate the machine for production

These prerequisite skills can be acquired by taking course HP95-OM (4795/4796 HSP: Operation and Maintenance).

During this course you will:

- Define at least one of each of the following types of components in the component database: square, cylindrical, leaded, flat packaged, and deformed
- Create a product utilizing the following features: optimization, fiducials, bad board reject, multiple rotated offsets, unit programs, and alternate feeder functions
- Perform CAD translation

Suggested additional course:

- HP95-OM: 4795/4796 HSP: Operation and Maintenance

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

HP95-L2: 4795/4796 HSP: ADVANCED MAINTENANCE AND CALIBRATION



Course level: Level 2

Relevant product codes: 4795 HSP and 4796 HSP

Course length: 6 days

Overview: This course is designed for individuals responsible for maintaining the 4795 and 4796 HSP machines. Emphasis is placed on the skills required to maintain these machines after the warranty period, where optional jigs and fixtures are required to return the machine to original specifications. Most of the tasks covered in this course are not needed on a routine basis and the training is provided “just in case” for anyone wanting more independence.

Who should take this course? Maintenance technicians and engineers monitoring the performance of these machines and having responsibility for ensuring the machines are running at maximum efficiency should take this course.

Prerequisites:

- Completion of a 4795/96 Level I operation and maintenance class
- Ability to operate a storage oscilloscope
- Ability to set up and operate the machine in production
- You should have at least six months experience performing routine and corrective maintenance on the 4695/4796 before taking this course
- Material requirements: The following jigs will be used in the class and must be purchased to perform the skills taught in the class:
 - JG-0045 component recognition calibration jig set
 - JG-0046 master head
 - JG-0047 master nozzle
 - JG-0048 line sensor positioning jig
 - JG-0050 nozzle level jig (2 required)
 - JG-0051 PHS 19 level jig
 - JG-0052 nozzle storage positioning jig
 - JG-0055 nozzle height and X/Y table chute block
 - JG-0063 PEC recognition calibration template
 - JG-0089 top block jig
 - 46578901 spanner wrench for head cable assembly

During this course you will:

- Review all turret functions
- Set up the MZ/CZ axes
- Replace heads and head drive assemblies
- Set head height
- Trace electrical signal flow through machine diagrams
- Disassemble head communication assemblies
- Use input and output diagnostics
- Adjust analog servo drivers
- Adjust position of recognition cameras
- Calibrate the recognition cameras
- Position and calibrate the PEC camera
- Replace line sensor assembly
- Check and adjust solenoid linkages
- Position nozzle level detection sensors
- Adjust nozzle storage and selection plates
- Perform master head offset teach
- Set X/Y table offsets

Suggested additional courses:

- HP95-P: 4795/4796 HSP: Programming (UCT-52)
- HP95UPS-P: 4795/4796 HSP: Programming (UPS)



4555B RANDOM ACCESS MATRIX TRAY FEEDER: OPERATION

Course code: RAMTF-O provides you with the knowledge and skills necessary to operate Universal's 4555B RAMTF-O Random Access Matrix Tray Feeder (RAMTF). *Note that RAMTF-O does not include most of the basic operation skills taught in course GSM-O.*

4555B RANDOM ACCESS MATRIX TRAY FEEDER: OPERATION AND MAINTENANCE

Course code: RAMTF-OM provides you with the knowledge and skills necessary to operate and perform setups and preventive maintenance on Universal's 4555B Random Access Matrix Tray Feeder (RAMTF) using the latest RAMTF and GSM Platform software. *Note that RAMTF-OM does not include most of the basic maintenance skills taught in course GSM1-OM or GSM2-OM.*

This course is designed for GSM Platform maintenance technicians who need to operate, set up, and maintain Universal's RAMTF. In this course you will describe the operation of RAMTF motors and sensors, perform operation and error recovery tasks, set up and verify RAMTF assemblies, and perform RAMTF preventive maintenance tasks.

4555B RANDOM ACCESS MATRIX TRAY FEEDER: PROGRAMMING

Course code: RAMTF-P provides you with the knowledge and skills necessary to program Universal's 4555B RAMTF-P Random Access Matrix Tray Feeder (RAMTF) using the latest RAMTF and GSM Platform software. You will perform hands-on programming tasks.

This course is designed for GSM Platform programmers who also need to program the RAMTF option. This course should be considered a requirement for anyone allowed to create or alter RAMTF products on the GSM Platform. In this course you will perform the feeder teach procedure for the RAMTF (from the GSM Platform), modify a product to use the RAMTF, and run and test a GSM Platform product that uses a RAMTF.

4683A GSM OFS PLATFORM: MAINTENANCE

Course code: OFS1-M provides you with the knowledge and skills necessary to perform maintenance and check setups on Universal's 4683A GSM OFS Platform. Some basic operation and programming are included in the course.

This course is designed for machine technicians responsible for maintaining and checking setups on the GSM OFS Platform. Technicians who alter products on this machine should also take course OFS1-P.

4683A GSM OFS PLATFORM: PROGRAMMING

Course code: OFS1-P provides you with the knowledge and skills necessary to create programs using the latest UPS software applicable to the 4683A GSM OFS Platform. Operation skills have been included in this course so you can test your products using the GSM OFS Platform.

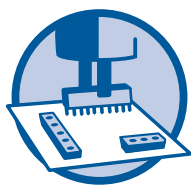
This course is designed for GSM OFS Platform programmers; however, this course should be considered a requirement for any person allowed to alter a product for use on this machine.

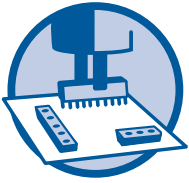
4785/4786 HSP: OPERATION, PROGRAMMING, AND MAINTENANCE

Course code: HP85 is designed for individuals responsible for operating, programming, and maintaining the 4785 and 4786 HSP machines. Emphasis is placed on the skills required to set up, maintain, troubleshoot, and operate the machine, as well as to identify and define components and write pattern programs.

After completing this course, you will be able to define components; write pattern programs; identify machine assemblies; load programs; recover from component, fiducial, and feeder errors; and perform basic preventive and corrective maintenance tasks.

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.





NOTE FOR THOSE USING GSM PLATFORMS FOR ODD FORM ASSEMBLY

Anyone using a GSM Platform-based machine for odd form assembly should see the Surface Mount Recommended Courses/Module Matrix and Surface Mount Course Descriptions for training options since the courses below are for the Polaris™ Assembly Cell, which is not a GSM Platform-based machine.

WHAT SHOULD ODD FORM ASSEMBLY EQUIPMENT OPERATORS KNOW?

Those operating odd form assembly equipment must understand and follow basic safety and ESD practices. In addition, they must be able to identify machine functions and assemblies; load programs; identify, adjust, load, and mount feeders; recover from errors; and run product. In addition, operators must know how to find and use machine operation documentation and on-line tools. Some operators must also be able to perform basic, daily preventive maintenance tasks.

WHEN TO TAKE THIS COURSE?

Some courses have prerequisites that must be met before you can take that course.

- If there is a checkmark (✓) in the Prerequisite (PR) column, there are prerequisites that must be met before you can take that course. The prerequisites can be found in the course description on the page indicated in the Page column.
- The minimum daily machine experience requirement, indicated in the Minimum Experience column, must also be met before you can take that course.

RECOMMENDED TRAINING COURSES FOR POLARIS ASSEMBLY CELL OPERATORS

Machine Code	Course	Page	PR	Minimum Experience	Comments
7512A POLARIS ASSEMBLY CELL	POL-O	NA		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION CHECK UNIVERSAL'S WEB SITE AFTER JANUARY 1, 2001 FOR A COURSE DESCRIPTION (WWW.UIC.COM)

WHAT SHOULD ODD FORM ASSEMBLY EQUIPMENT PROGRAMMERS KNOW?

Those programming odd form assembly equipment must understand and follow basic safety and ESD practices. In addition, they must be able to perform machine operation tasks to run a product; create and edit products; define and edit feeder and component databases; and know how to find and use machine programming documentation and on-line tools.

RECOMMENDED TRAINING COURSES FOR POLARIS ASSEMBLY CELL PROGRAMMERS

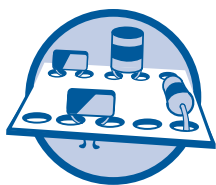
7512A POLARIS ASSEMBLY CELL	POL-OP	NA		NO EXPERIENCE	CHECK UNIVERSAL'S WEB SITE AFTER JANUARY 1, 2001 FOR A COURSE DESCRIPTION (WWW.UIC.COM)
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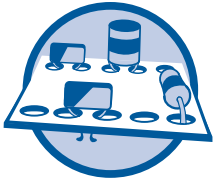
WHAT SHOULD ODD FORM ASSEMBLY EQUIPMENT MAINTENANCE TECHNICIANS KNOW?

Those maintaining odd form assembly equipment must be able to identify the basic sequence of events for machine operation, be able to set up and run the machine, know how to perform operation error recovery tasks, and be able to identify the functions of the machine's electrical subsystems. They must also know how to find and use machine maintenance documents and on-line tools, as well as perform regular machine preventive maintenance procedures. In addition, advanced technicians should be able to integrate advanced maintenance skills with the ability to read and interpret diagnostic readouts or electrical or mechanical schematics or prints to troubleshoot equipment.

RECOMMENDED TRAINING COURSES FOR POLARIS ASSEMBLY CELL MAINTENANCE TECHNICIANS

7512A POLARIS ASSEMBLY CELL	POL-OM	NA		NO EXPERIENCE	CHECK UNIVERSAL'S WEB SITE AFTER JANUARY 1, 2001 FOR A COURSE DESCRIPTION (WWW.UIC.COM)
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WHAT SHOULD THROUGH HOLE EQUIPMENT OPERATORS KNOW?

Those operating through hole equipment must understand and follow basic safety and ESD practices. In addition, they must be able to identify machine functions and assemblies; load programs; identify, adjust, load, and mount dispense heads; recover from errors; run product; and perform basic, daily preventive maintenance tasks.

WHEN TO TAKE THIS COURSE?

Some courses have prerequisites that must be met before you can take that course.

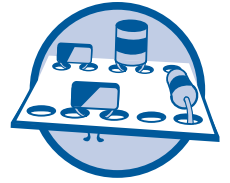
- If there is a checkmark (✓) in the Prerequisite (PR) column, there are prerequisites that must be met before you can take that course. The prerequisites can be found in the course description on the page indicated in the Page column.
- The minimum daily machine experience requirement, indicated in the Minimum Experience column, must also be met before you can take that course.

RECOMMENDED TRAINING COURSES

Machine Code	Course	Page	PR	Minimum Experience	Comments
2596B/2596C AXIAL SEQUENCER	SEQ-O	52		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	SDHV8-O	52		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
2800 SERIES EXPANDED RANGE VERIFIER	ERV	68	✓	3 TO 6 MONTHS	OPERATION, PROGRAMMING, AND MAINTENANCE
	ERVIM8	69	✓	3 TO 6 MONTHS	OPERATION, PROGRAMMING, AND MAINTENANCE
3785B SINGLE TABLE INTERCONNECT INSERTER AND 6132B SINGLE TABLE POSITIONING SYSTEM	STPS	71		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION OPERATION, PROGRAMMING, AND MAINTENANCE
3788B DUAL TABLE POSITIONING SYSTEM AND 3789B DUAL TABLE INTERCONNECT INSERTER	DTPS	71		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION OPERATION, PROGRAMMING, AND MAINTENANCE
6241B/C/D, 6242E, AND 6248D VCD-SEQUENCER/INSERTER	VS-O	54		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	VS1	55		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	PT	76		NO EXPERIENCE	AVAILABLE FOR 6241D/6248D/6242E PART NUMBER 46674301
6241F VCD/SEQUENCER 8 AXIAL SEQUENCER/INSERTER	VS8-O	56		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	PT	76		NO EXPERIENCE	SHIPS WITH MACHINE PART NUMBER 47940301
6287B/6687B SH VCD AXIAL INSERTER	SV1	71		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
6292B/6298B DH VCD AXIAL INSERTER	SDHV1	71		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
6292C/6298C VCD DH 8 AXIAL INSERTER	SDHV8-O	52		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	PT	76		NO EXPERIENCE	SHIPS WITH MACHINE PART NUMBER 47685201
6293B/6299B DH JUMPER WIRE INSERTER	JW1	71		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
6293C/6299C JW DH 8 JUMPER WIRE INSERTER	JW8-O	57		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	PT	76		NO EXPERIENCE	SHIPS WITH MACHINE PART NUMBER 47798301
6360B/C/D/E, 6368D, 6369E RADIAL SEQUENCER/INSERTER	RL5-O	59		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	RL5-OPM	60		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	PT	76		NO EXPERIENCE	AVAILABLE FOR 6360B/C/D/E PART NUMBER 46563801
6380A/6388A/6389A RADIAL 8 SEQUENCER/INSERTER	RL8-O	61		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	PT	76		NO EXPERIENCE	SHIPS WITH MACHINE PART NUMBER 47674501
6683C JW SH 8 JUMPER WIRE INSERTER AND 6687C SH VCD 8 AXIAL INSERTER	SV8-O	63		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
6772A MULTI-MODULE DIP INSERTER	MM-O	65		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION
	MM1	65		NO EXPERIENCE	TAUGHT UPON MACHINE INSTALLATION

WHAT SHOULD THROUGH HOLE EQUIPMENT PROGRAMMERS KNOW?

Those programming through hole equipment must understand and follow basic safety and ESD practices. In addition, they must be able to operate the machine, perform product changeover, recover from machine interrupts and errors, and program the machine.



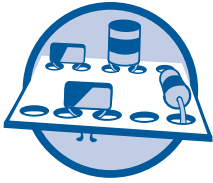
WHEN TO TAKE THIS COURSE?

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RECOMMENDED TRAINING COURSES

Machine Code	Course	Page	PR	Minimum Experience	Comments
2596B/2596C AXIAL SEQUENCER	SDHV8-OP	53		NO EXPERIENCE	
	SV1	71		NO EXPERIENCE	
	ERV	68	✓	3 TO 6 MONTHS	
2800 SERIES EXPANDED RANGE VERIFIER	ERV	68	✓	3 TO 6 MONTHS	OPERATION, PROGRAMMING, AND MAINTENANCE
	ERVIM8	69	✓	3 TO 6 MONTHS	
3785B SINGLE TABLE INTERCONNECT INSERTER AND 6132B SINGLE TABLE POSITIONING SYSTEM	STPS	71		NO EXPERIENCE	OPERATION, PROGRAMMING, AND MAINTENANCE
3788B DUAL TABLE POSITIONING SYSTEM AND 3789B DUAL TABLE INTERCONNECT INSERTER	DTPS	71		NO EXPERIENCE	OPERATION, PROGRAMMING, AND MAINTENANCE
6241B/C/D, 6242E, AND 6248D VCD-SEQUENCER/INSERTER	VS1	55		NO EXPERIENCE	THE ERV OPTION IS NOT AVAILABLE FOR THE 6242E
	ERV	68	✓	3 TO 6 MONTHS	
	PP12	66	✓	3 TO 6 MONTHS	
	PPU25	67	✓	3 TO 6 MONTHS	
6241F VCD/SEQUENCER 8 AXIAL SEQUENCER/INSERTER	VS8-OP	56		NO EXPERIENCE	
	ERVIM8	69	✓	3 TO 6 MONTHS	
6287B/6687B SH VCD AXIAL INSERTER	SV1	71		NO EXPERIENCE	
	ERV	68	✓	3 TO 6 MONTHS	
	PP12	66	✓	3 TO 6 MONTHS	
	PPU25	67	✓	3 TO 6 MONTHS	
6292B/6298B DH VCD AXIAL INSERTER	SDHV1	71		NO EXPERIENCE	
	PP12	66	✓	3 TO 6 MONTHS	
	PPU25	67	✓	3 TO 6 MONTHS	
6292C/6298C VCD DH 8 AXIAL INSERTER	SDHV8-OP	53		NO EXPERIENCE	
6293B/6299B DH JUMPER WIRE INSERTER	JW1	71		NO EXPERIENCE	
	PP12	66	✓	3 TO 6 MONTHS	
	PPU25	67	✓	3 TO 6 MONTHS	
6293C/6299C JW DH 8 JUMPER WIRE INSERTER	JW8-OP	58		NO EXPERIENCE	
6360B/C/D/E, 6368D, 6369E RADIAL SEQUENCER/INSERTER	RL5-OPM	60		NO EXPERIENCE	
	ERV	68	✓	3 TO 6 MONTHS	
	PP12	66	✓	3 TO 6 MONTHS	
	PPU25	67	✓	3 TO 6 MONTHS	
6380A/6388A/6389A RADIAL 8 SEQUENCER/INSERTER	RL8-OP	62		NO EXPERIENCE	
	ERVIM8	69	✓	3 TO 6 MONTHS	
6683C JW SH 8 JUMPER WIRE INSERTER AND 6687C SH VCD 8 AXIAL INSERTER	SV8-OP	63		NO EXPERIENCE	
6772A MULTI-MODULE DIP INSERTER	MM1	65		NO EXPERIENCE	
	PP12	66	✓	3 TO 6 MONTHS	
	PPU25	67	✓	3 TO 6 MONTHS	



WHAT SHOULD THROUGH HOLE EQUIPMENT MAINTENANCE TECHNICIANS KNOW?

Those maintaining through hole equipment must be able to identify the basic sequence of events for machine operation, be able to set up and run the machine, and know how to perform operation error recovery tasks. They must also know how to find and use machine maintenance documents and tools, as well as perform regular machine preventive maintenance procedures. In addition, advanced technicians should be able to read and interpret diagnostic readouts and electrical or mechanical schematics to troubleshoot equipment.

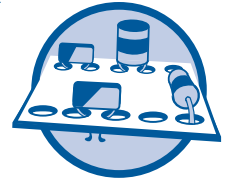
WHEN TO TAKE THIS COURSE?

Some courses have prerequisites that must be met before you can take that course.

- If there is a checkmark (✓) in the Prerequisite (PR) column, there are prerequisites that must be met before you can take that course. The prerequisites can be found in the course description on the page indicated in the Page column.
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RECOMMENDED TRAINING COURSES

Machine Code	Course	Page	PR	Minimum Experience	Comments
2596B/2596C AXIAL SEQUENCER	SDHV8-OM	53		NO EXPERIENCE	
	SV1	71		NO EXPERIENCE	
	SV2	71	✓	3 TO 6 MONTHS	
	ERV	68	✓	3 TO 6 MONTHS	
2800 SERIES EXPANDED RANGE VERIFIER	ERV	68	✓	3 TO 6 MONTHS	OPERATION, PROGRAMMING, AND MAINTENANCE
	ERVIM8	69	✓	3 TO 6 MONTHS	
3785B SINGLE TABLE INTERCONNECT INSERTER AND 6132B SINGLE TABLE POSITIONING SYSTEM	STPS	71		NO EXPERIENCE	OPERATION, PROGRAMMING, AND MAINTENANCE
3785C SINGLE TABLE INTERCONNECT INSERTER AND 6132C SINGLE TABLE POSITIONING SYSTEM	IPS8-OM	54		NO EXPERIENCE	
3788B DUAL TABLE POSITIONING SYSTEM AND 3789B DUAL TABLE INTERCONNECT INSERTER	DTPS	71		NO EXPERIENCE	OPERATION, PROGRAMMING, AND MAINTENANCE
6241B/C/D, 6242E, AND 6248D VCD-SEQUENCER/INSERTER	VS1	55		NO EXPERIENCE	THE ERV OPTION IS NOT AVAILABLE FOR THE 6242E
	VS2	55	✓	3 TO 6 MONTHS	
	IMCTT	51	✓	3 TO 6 MONTHS	
	BHIMC	70	✓	3 TO 6 MONTHS	
	ERV	68	✓	3 TO 6 MONTHS	
6241F VCD/SEQUENCER 8 AXIAL SEQUENCER/INSERTER	VS8-OM	57		NO EXPERIENCE	
	IM8-L2	51	✓	3 TO 6 MONTHS	
	ERVIM8	69	✓	3 TO 6 MONTHS	
6287B/6687B SH VCD AXIAL INSERTER	SV1	71		NO EXPERIENCE	
	SV2	71	✓	3 TO 6 MONTHS	
	IMCTT	51	✓	3 TO 6 MONTHS	
	ERV	68	✓	3 TO 6 MONTHS	
6292B/6298B DH VCD AXIAL INSERTER	SDHV1	71		NO EXPERIENCE	
	SDHV2	71	✓	3 TO 6 MONTHS	
	IMCTT	51	✓	3 TO 6 MONTHS	
	BHIMC	70	✓	3 TO 6 MONTHS	
6292C/6298C VCD DH 8 AXIAL INSERTER	SDHV8-OM	53		NO EXPERIENCE	
	IM8-L2	51	✓	3 TO 6 MONTHS	
6293B/6299B DH JUMPER WIRE INSERTER	JW1	71		NO EXPERIENCE	
	JW2	71	✓	3 TO 6 MONTHS	
	IMCTT	51	✓	3 TO 6 MONTHS	
	BHIMC	70	✓	3 TO 6 MONTHS	
6293C/6299C JW DH 8 JUMPER WIRE INSERTER	JW8-OM	58		NO EXPERIENCE	
	IM8-L2	51	✓	3 TO 6 MONTHS	
6360B/C/D/E, 6368D, 6369E RADIAL SEQUENCER/INSERTER	RL5-OPM	60		NO EXPERIENCE	
	RL5-L2	61	✓	3 TO 6 MONTHS	
	IMCTT	51	✓	3 TO 6 MONTHS	
	BHIMC	70	✓	3 TO 6 MONTHS	
	ERV	68	✓	3 TO 6 MONTHS	
6380A/6388A/6389A RADIAL 8 SEQUENCER/INSERTER	RL8-OM	62		NO EXPERIENCE	
	IM8-L2	51	✓	3 TO 6 MONTHS	
	ERVIM8	69	✓	3 TO 6 MONTHS	
6683C JW SH 8 JUMPER WIRE INSERTER AND 6687C SH VCD 8 AXIAL INSERTER	SV8-OM	64		NO EXPERIENCE	
6772A MULTI-MODULE DIP INSERTER	MM1	65		NO EXPERIENCE	
	MM2	66	✓	3 TO 6 MONTHS	
	IMCTT	51	✓	3 TO 6 MONTHS	



IMCTT: INSERTION MACHINE CONTROL THEORY AND TROUBLESHOOTING

Course level: Level 2

Relevant product codes: All pre-Generation 8 insertion machines

Software level: UICS® **Course length:** 3 days

Overview: IMCTT provides prerequisite skills required for advanced (Level 2) maintenance courses for all Universal through hole equipment, but you need take the course only once since it addresses skills and knowledge common to all insertion machines.

Who should take this course? Mechanical and electrical technicians working on Universal through hole machines should take this course.

Prerequisites:

- Completion of any Level 1 through hole machine course or equivalent experience
- Experience with operation, programming, and preventive maintenance of any through hole machine
- Ability to use hand tools and digital voltmeters
- Ability to read electrical and pneumatic diagrams

During this course you will:

- Perform basic pattern program manipulations using the Universal Control Terminal
- Troubleshoot serial communication problems of the machine control system
- Troubleshoot machine I/O
- Use machine diagnostics
- Perform electrical setups common to all through hole machines
- Trace circuitry and check functionality of CE-marked E-stop/interlock system
- Troubleshoot a machine pneumatic problem
- Align the rotary table

Typical course schedule:

	DAY 1	DAY 2	DAY 3
8AM-12PM	UCT APPLICATIONS	TROUBLESHOOT I/O PROBLEMS	ELECTRICAL ADJUSTMENTS, TROUBLESHOOT PNEUMATIC PROBLEMS
1PM-4PM	TROUBLESHOOT SERIAL COMMUNICATION PROBLEMS	USE MACHINE DIAGNOSTICS	ALIGN ROTARY TABLE

IM8-L2: ALL GENERATION 8 MACHINES: CONTROL THEORY AND TROUBLESHOOTING

Course level: Level 2

Relevant product codes: 6241F VCD/Sequencer 8 Axial Sequencer/Inserter, 6292C/6298C VCD DH 8 Axial Inserter, 6293C/6299C JW DH 8 Jumper Wire Inserter, and 6380A/6388A/6389A Radial 8 Sequencer/Inserter

Software level: IM-USOS **Course length:** 4 days

Overview: IM8-L2 addresses machine control theory for all Universal Generation 8 through hole machines. During the course you will also practice troubleshooting the electrical system common among this series of machines.

Who should take this course? Technicians who maintain any of Universal's Generation 8 machines should take this course.

Prerequisites:

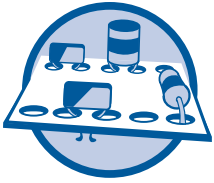
- Ability to perform Level 1 machine course objectives for any Generation 8 machine
- Experience with operation, programming, and preventive maintenance of any Generation 8 machine
- Ability to use a computer and navigate in a Windows®-based environment
- Ability to use hand tools and digital voltmeters

During this course you will:

- Troubleshoot power distribution circuits
- Troubleshoot the E-stop and interlock circuits
- Troubleshoot the VME chassis
- Troubleshoot axis problems
- Use insertion machine diagnostics to troubleshoot Generation 8 machines
- Troubleshoot UPS

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4
8AM-12PM	OVERVIEW, SIGHTS AND SOUNDS	POWER DISTRIBUTION	VME CHASSIS	IM DIAGNOSTICS
1PM-4PM	READING SCHEMATICS	E-STOP AND INTERLOCK	TROUBLESHOOTING AXIS PROBLEMS	UPS, EXIT TEST



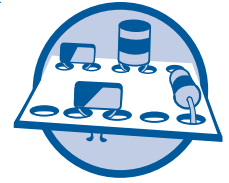
SEQ-O: 2596B/C AXIAL SEQUENCER: OPERATION

Course level:	Level 1
Relevant product codes:	2596B/2596C Axial Sequencer
Course length:	4 hours
Overview:	This course provides you with the skills required to operate Universal's 2596B/C Axial Sequencer. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives.
Who should take this course?	Anyone who must operate the machine for production should take this course. Typical titles of trainees attending this course are operators and maintenance technicians. This course is oriented toward hands-on experience with the machine at the operation level.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to recognize and read machine indicator lights and sensors
During this course you will:	<ul style="list-style-type: none">• Perform product changeover• Operate the machines• Recover from machine interrupts
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>
Suggested additional courses:	<ul style="list-style-type: none">• ERV: Expanded Range Verifier• IMCTT: Insertion Machine Control Theory and Troubleshooting• PP12: Pattern Programming• PPU25: Pattern Program Utility

SDHV8-O: 2596B/C AXIAL SEQUENCER AND 6292C/6298C VCD DH 8 AXIAL INSERTER: OPERATION

Course level:	Level 1
Relevant product codes:	2596B/2596C Axial Sequencer and 6292C/6298C VCD DH 8 Axial Inserter
Software level:	IM-UPS
Course length:	1.5 days
Overview:	This course provides the skills required to operate Universal's 2596B/C Axial Sequencer and 6292C/6298C VCD DH 8 Axial Inserter. Extensive hands-on time with the machines ensures you have ample opportunity to practice the skills identified by the course objectives.
Who should take this course?	This course is designed for machine operators and others who need axial machine operation knowledge and skills.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to recognize and read machine indicator lights and sensors
During this course you will:	<ul style="list-style-type: none">• Review the theory of automatic insertion• Perform normal machine operation tasks to set up and run a new board• Perform machine error recovery tasks• Perform basic operation troubleshooting
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>
Suggested additional courses:	<ul style="list-style-type: none">• SDHV8-OP: 2596B/C Axial Sequencer and 6292C/6298C VCD DH 8 Axial Inserter: Operation and Programming• SDHV8-OM: 2596B/C Axial Sequencer and 6292C/6298C VCD DH 8 Axial Inserter: Operation and Maintenance• ERV: Expanded Range Verifier• IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting
Note:	The training provided in this course is also available as a self-paced, CD-ROM based instructional software program, known as Product Trainer. Please see the Product Trainer product description in this catalog for details.

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.



SDHV8-OP: 2596B/C AXIAL SEQUENCER AND 6292C/6298C VCD DH 8 AXIAL INSERTER: OPERATION AND PROGRAMMING

- Course level:** Level 1
- Relevant product codes:** 2596B/2596C Axial Sequencer, 2800 Series Expanded Range Verifier, and 6292C/6298C VCD DH 8 Axial Inserter
- Software level:** IM-UPS **Course length:** 5 days
- Overview:** This course is designed for individuals who need to operate and program Universal's 2596B/C Axial Sequencer and 6292C/6298C VCD DH 8 Axial Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives. Board handling training is not part of this course, but can be arranged separately.
- Who should take this course?** Anyone who must operate the machine for production, maintenance, or troubleshooting, and anyone who must create/edit products should take this course. Typical titles of trainees attending this course include operators, programmers, and maintenance technicians.
- Prerequisites:**
- Ability to use a computer and navigate in a Windows®-based environment
 - Ability to recognize and read machine indicator lights and sensors
- During this course you will:**
- Perform product changeover
 - Operate the machines
 - Recover from machine interrupts
 - Program the machines

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
8AM-12PM	COURSE OVERVIEW AND SEQUENCER OPERATION	VCD DH 8 OPERATION	VCD DH 8 PROGRAMMING	VCD DH 8 PROGRAMMING	VCD DH 8 PROGRAMMING
1PM-4PM	SEQUENCER PROGRAMMING	VCD DH 8 OPERATION	VCD DH 8 PROGRAMMING	VCD DH 8 PROGRAMMING	VCD DH 8 PROGRAMMING

- Suggested additional courses:**
- SDHV8-OM: 2596B/C Sequencer and 6292C/6298C VCD DH 8 Axial Inserter: Operation and Maintenance
 - IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting
 - ERV: Expanded Range Verifier

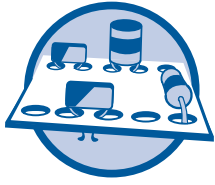
SDHV8-OM: 2596B/C AXIAL SEQUENCER AND 6292C/6298C VCD DH 8 AXIAL INSERTER: OPERATION AND MAINTENANCE

- Course level:** Level 1
- Relevant product codes:** 2596B/2596C Axial Sequencer, 2800 Series Expanded Range Verifier, and 6292C/6298C VCD DH 8 Axial Inserter
- Software level:** IM-UPS **Course length:** 5 days
- Overview:** This course is designed for individuals who need to operate and maintain Universal's 2596B/C Axial Sequencer and 6292C/6298C VCD DH 8 Axial Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives. Board handling training is not part of this course, but can be arranged separately.
- Who should take this course?** Anyone who must operate the machines and perform mechanical or electrical adjustments to the machines should take this course. The adjustments covered by the course material are ones that are usually performed during the first three to six months after machine installation. A typical title of trainees attending this course is maintenance technician. This course is oriented toward hands-on experience with the machine at the maintenance level.
- Prerequisites:**
- Ability to use a computer and navigate in a Windows®-based environment
 - Ability to recognize and read machine indicator lights and sensors
 - Ability to use hand tools, calipers, and feeler gauges
- During this course you will:**
- Practice operator tasks
 - Perform daily, weekly, and monthly preventive maintenance of the machines
 - Perform standard mechanical and electrical adjustments required to maintain machine performance for three to six months after machine installation

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
8AM-12PM	VCD DH 8 OPERATION	VCD DH 8 MAINTENANCE	VCD DH 8 MAINTENANCE	VCD DH 8 MAINTENANCE	SEQUENCER OPERATION
1PM-4PM	VCD DH 8 OPERATION	VCD DH 8 MAINTENANCE	VCD DH 8 MAINTENANCE	VCD DH 8 MAINTENANCE	SEQUENCER MAINTENANCE

- Suggested additional courses:**
- SDHV8-OP: 2596B/C Axial Sequencer and 6292C/6298C VCD DH 8 Axial Inserter: Operation and Programming
 - IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting
 - ERV: Expanded Range Verifier



IPS8-OM: 3785C SINGLE TABLE INTERCONNECT INSERTER AND 6132C SINGLE TABLE POSITIONING SYSTEM: OPERATION AND MAINTENANCE

Course level: Level 1

Relevant product codes: 3785C Single Table Interconnect Inserter and 6132C Single Table Positioning System

Software level: IM-UPS **Course length:** 4.5 days

Overview: This course is designed primarily for those who need to maintain Universal's Generation 8 3785C Single Table Interconnect Inserter and 6132C Single Table Positioning System machines. This positioning system is used on machines built by Universal's Special Products Group. The types of machines that use this system are the 3785C Single Table Interconnect Inserter and Cambridge machines. The machine base is the same as that used to manufacture Universal's 6241C VCD-Sequencer/Inserter.

Extensive hands-on time with the machine will ensure that you have ample opportunity to practice the skills identified in the course objectives.

Who should take this course?

Anyone who must operate the machine and perform mechanical or electrical adjustments to the machine should take this course. The adjustments covered by the course material are ones that are usually performed during the first three to six months after machine installation. Typical titles of those attending this course include engineers and maintenance technicians. This course is oriented toward hands-on experiences.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to use hand tools and measuring instruments

During this course you will:

- Operate the machine
- Perform daily, weekly, and monthly preventive maintenance of the machine
- Perform standard mechanical and electrical adjustments required to maintain machine performance for three to six months after machine installation

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
8AM-12PM	OPERATION	CHECK AXES OPERATION, USE IM-UPS	PM AND SETUP HEAD	PM AND SETUP ANVIL	BEC SETUP, EXIT TEST
1PM-4PM	OPERATION	OVERVIEW IM DIAGNOSTICS	PM AND SETUP HEAD	XY POSITIONING SYSTEM	

VS-O: 6241B/C/D, 6242E, AND 6248D VCD-SEQUENCER/INSERTER: OPERATION

Course level: Level 1

Relevant product codes: 6241B/C/D VCD-Sequencer/Inserter, 6242E VCD-Sequencer/Inserter, and 6248D VCD-Sequencer/Inserter

Course length: 1 day

Overview: This course provides the skills required to operate Universal's 6241B/C/D, 6242E, and 6248D VCD-Sequencer/Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives.

Who should take this course? This course is designed for machine operators and others who need VCD-Sequencer machine operation knowledge and skills.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to recognize and read machine indicator lights and sensors

During this course you will:

- Review the theory of automatic insertion
- Perform normal machine operation tasks to set up and run a new board
- Perform machine error recovery tasks
- Perform basic operation troubleshooting

Course availability:

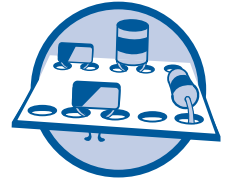
This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.

Note:

The training provided in this course is also available as a self-paced, CD-ROM based instructional software program, known as Product Trainer. Please see the Product Trainer product description in this catalog for details.

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

VS1: 6241B/C/D, 6242E, AND 6248D VCD-SEQUENCER/INSERTER: OPERATION, PROGRAMMING, AND MAINTENANCE



Course level: Level 1

Relevant product codes: 2800 Series Expanded Range Verifier, 6241B/C/D VCD-Sequencer/Inserter, 6242E VCD-Sequencer/Inserter, and 6248D VCD-Sequencer/Inserter

Software level: UICS **Course length:** 4 days

Overview: This course is designed for individuals who need to operate, program, and maintain a 6241B/C/D, 6242E, or 6248D VCD-Sequencer/Inserter.

Who should take this course? Operators, programmers, and maintenance technicians responsible for these machines should take this course.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to recognize and read machine indicator lights and sensors
- Ability to use hand tools, calipers, and feeler gauges

During this course you will:

- Operate and program the machine
- Perform preventive maintenance and typical adjustments encountered during the first three months of machine use

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4
8AM-12PM	OVERVIEW OF MACHINE ASSEMBLIES	CREATING A .PUT PROGRAM	PREVENTIVE MAINTENANCE	PREVENTIVE MAINTENANCE
1PM-4PM	MACHINE OPERATION, RECOVER FROM OPERATION INTERRUPTION	RUN AND EDIT A .PUT PROGRAM, SET PARAMETERS	PREVENTIVE MAINTENANCE	PREVENTIVE MAINTENANCE

Suggested additional courses:

- VS2: 6241B/C/D, 6242E, and 6248D VCD-Sequencer/Inserter: Advanced Maintenance and Troubleshooting
- BHIMC: Board Handling for Insertion Machines
- ERV: Expanded Range Verifier
- IMCTT: Insertion Machine Control Theory and Troubleshooting
- PP12: Pattern Programming
- PPU25: Pattern Program Utility

VS2: 6241B/C/D, 6242E, AND 6248D VCD-SEQUENCER/INSERTER: ADVANCED MAINTENANCE AND TROUBLESHOOTING

Course level: Level 2

Relevant product codes: 2800 Series Expanded Range Verifier, 6241B/C/D VCD-Sequencer/Inserter, 6242E VCD-Sequencer/Inserter, and 6248D VCD-Sequencer/Inserter

Software level: UICS **Course length:** 4 days

Overview: This course is designed for individuals who need to maintain, troubleshoot, and repair a 6241B/C/D, 6242E, or 6248D VCD-Sequencer/Inserter.

Who should take this course? Mechanical and electrical maintenance technicians responsible for these machines should take this course.

Prerequisites:

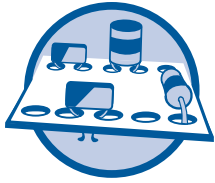
- Completion of course VS1 or equivalent
- Completion of course IMCTT
- Ability to use a digital voltmeter, dial indicators, and calipers
- Ability to use machine diagnostics to read inputs and activate outputs
- Experience with operation, programming, and preventive maintenance of the machine

During this course you will:

- Perform corrective maintenance and mechanical and electrical troubleshooting associated with all the major machine subassemblies including: dispensing heads, chain systems, Expanded Range Verifier, insertion head, centering assembly, cut and clinch assembly, servo systems, and interlock system

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4
8AM-12PM	DISPENSING HEAD ASSEMBLY	SEQUENCER CHAIN SYSTEM	INSERTION HEAD ASSEMBLY	CUT AND CLINCH ASSEMBLY
1PM-4PM	SEQUENCER CHAIN SYSTEM	VCD CHAIN SYSTEM	INSERTION HEAD ASSEMBLY	ELECTRICAL SUBSYSTEMS



VS8-O: 6241F VCD/SEQUENCER 8 AXIAL SEQUENCER/INSERTER: OPERATION

Course level:	Level 1
Relevant product code:	6241F VCD/Sequencer 8 Axial Sequencer/Inserter
Course length:	1 day
Overview:	This course provides the skills required to operate Universal's 6241F VCD/Sequencer 8 Axial Sequencer/Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives.
Who should take this course?	This course is designed for machine operators and others who need machine operation knowledge and skills.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to recognize and read machine indicator lights and sensors
During this course you will:	<ul style="list-style-type: none">• Review the theory of automatic insertion• Perform normal machine operation tasks to set up and run a new board• Perform machine error recovery tasks• Perform basic operation troubleshooting
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>
Suggested additional courses:	<ul style="list-style-type: none">• VS8-OP: 6241F VCD/Sequencer 8 Axial Sequencer/Inserter: Operation and Programming• VS8-OM: 6241F VCD/Sequencer 8 Axial Sequencer/Inserter: Operation and Maintenance• IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting• ERV: Expanded Range Verifier
Note:	The training provided in this course is also available as a self-paced, CD-ROM based instructional software program, known as Product Trainer. Please see the Product Trainer product description in this catalog for details.

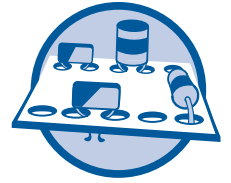
VS8-OP: 6241F VCD/SEQUENCER 8 AXIAL SEQUENCER/INSERTER: OPERATION AND PROGRAMMING

Course level:	Level 1
Relevant product code:	6241F VCD/Sequencer 8 Axial Sequencer/Inserter
Software level:	IM-UPS
Course length:	5 days
Overview:	This course is designed for individuals who need to operate and program Universal's 6241F VCD/Sequencer 8 Axial Sequencer/Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified in the course objectives. Board handling training is not part of this course, but can be arranged separately.
Who should take this course?	Anyone who must operate the machine for production, maintenance, or troubleshooting, and anyone who must create/edit products should take this course. Typical titles of trainees attending this course include operators, programmers, and maintenance technicians. This course is oriented toward hands-on experience with the machine at the operation level.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to recognize and read machine indicator lights and sensors
During this course you will:	<ul style="list-style-type: none">• Perform product changeover• Operate the machine• Recover from machine interrupts• Program the machine
Suggested additional courses:	<ul style="list-style-type: none">• VS8-OM: 6241F VCD/Sequencer 8 Axial Sequencer/Inserter: Operation and Maintenance• IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting• ERV: Expanded Range Verifier

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

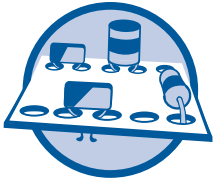
VS8-OM: 6241F VCD/SEQUENCER 8 AXIAL SEQUENCER/INSERTER: OPERATION AND MAINTENANCE

Course level:	Level 1
Relevant product code:	6241F VCD/Sequencer 8 Axial Sequencer/Inserter
Software level:	IM-UPS Course length: 4.5 days
Overview:	This course is designed for individuals who need to operate and maintain Universal's 6241F VCD/Sequencer 8 Axial Sequencer/Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives. Board handling training is not part of this course, but can be arranged separately.
Who should take this course?	Anyone who must operate the machine and perform mechanical or electrical adjustments to the machine should take this course. The adjustments covered by the course material are ones that are usually performed during the first three to six months after machine installation. Typical titles of trainees attending this course include engineers and maintenance technicians.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to recognize and read machine indicator lights and sensors• Ability to use hand tools, calipers, feeler gauges, and a digital multimeter
During this course you will:	<ul style="list-style-type: none">• Operate the machine and recover from machine interrupts• Perform daily, weekly, and monthly preventive maintenance• Perform standard mechanical and electrical adjustments required to maintain machine performance for 3-6 months after machine installation
Suggested additional courses:	<ul style="list-style-type: none">• VS8-OP: 6241F VCD/Sequencer 8 Axial Sequencer/Inserter: Operation and Programming• IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting• ERV: Expanded Range Verifier



JW8-O: 6293C/6299C JW DH 8 JUMPER WIRE INSERTER: OPERATION

Course level:	Level 1
Relevant product codes:	6293C/6299C JW DH 8 Jumper Wire Inserter
Software level:	IM-UPS Course length: 1 day
Overview:	This course provides the skills required to operate Universal's 6293C/6299C JW DH 8 Jumper Wire Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives.
Who should take this course?	This course is designed for machine operators and others who need machine operation knowledge and skills.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to recognize and read machine indicator lights and sensors
During this course you will:	<ul style="list-style-type: none">• Review the theory of automatic insertion• Perform normal machine operation tasks to set up and run a new board• Perform machine error recovery tasks• Perform basic operation troubleshooting
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>
Suggested additional courses:	<ul style="list-style-type: none">• JW8-OP: 6293C/6299C JW DH 8 Jumper Wire Inserter: Operation and Programming• JW8-OM: 6293C/6299C JW DH 8 Jumper Wire Inserter: Operation and Maintenance• IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting• BHIMC: Board Handling for Insertion Machines
Note:	The training provided in this course is also available as a self-paced, CD-ROM based instructional software program, known as Product Trainer. Please see the Product Trainer product description in this catalog for details.



JW8-OP: 6293C/6299C JW DH 8 JUMPER WIRE INSERTER: OPERATION AND PROGRAMMING

Course level:	Level 1
Relevant product codes:	6293C/6299C JW DH 8 Jumper Wire Inserter
Software level:	IM-UPS Course length: 4 days
Overview:	This course is designed for individuals who need to operate and program Universal's 6293C/6299C JW DH 8 Jumper Wire Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives. Board handling training is not part of this course, but can be arranged separately.
Who should take this course?	Anyone who must operate the machine for production, maintenance, or troubleshooting, and anyone who must create/edit products should take this course. Typical titles of trainees attending this course include operators, programmers, and maintenance technicians. This course is oriented toward hands-on experience with the machine at the operation level.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to recognize and read machine indicator lights and sensors
During this course you will:	<ul style="list-style-type: none">• Perform product changeover• Operate the machines• Recover from machine interrupts• Program the machines
Suggested additional courses:	<ul style="list-style-type: none">• JW8-OM: 6293C/6299C JW DH 8 Jumper Wire Inserter: Operation and Maintenance• IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting

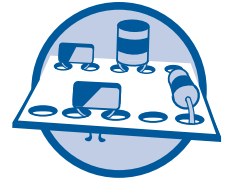
JW8-OM: 6293C/6299C JW DH 8 JUMPER WIRE INSERTER: OPERATION AND MAINTENANCE

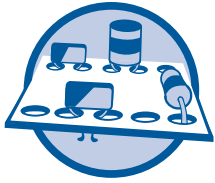
Course level:	Level 1
Relevant product codes:	6293C/6299C JW DH 8 Jumper Wire Inserter
Software level:	IM-UPS Course length: 4 days
Overview:	This course is designed for individuals who need to operate and maintain Universal's 6293C/6299C JW DH 8 Jumper Wire Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives. Board handling training is not part of this course, but can be arranged separately.
Who should take this course?	Anyone who must operate the machine and perform mechanical or electrical adjustments to the machine should take this course. The adjustments covered by the course material are ones that are usually performed during the first three to six months after machine installation. A typical title of trainees attending this course is maintenance technician. This course is oriented toward hands-on experience with the machine at the maintenance level.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to recognize and read machine indicator lights and sensors• Ability to use hand tools, calipers, and feeler gauges
During this course you will:	<ul style="list-style-type: none">• Practice operator tasks• Perform daily, weekly, and monthly preventive maintenance of the machines• Perform standard mechanical and electrical adjustments required to maintain machine performance for three to six months after machine installation
Suggested additional courses:	<ul style="list-style-type: none">• JW8-OP: 6293C/6299C JW DH 8 Jumper Wire Inserter: Operation and Programming• IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

RL5-O: 6360B/C/D/E, 6368D, AND 6369E RADIAL SEQUENCER/INSERTER: OPERATION

Course level:	Level 1
Relevant product codes:	6360B/C/D/E Radial Sequencer/Inserter, 6368D Radial Sequencer/Inserter, and 6369E Radial Sequencer/Inserter
Course length:	1 day
Overview:	This course provides the skills to operate Universal's 6360B/C/D/E, 6368D, and 6369E Radial Sequencer/Inserters. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives.
Who should take this course?	This course is designed for machine operators and others who need machine operation knowledge and skills.
Prerequisites:	<ul style="list-style-type: none">• Ability to use a computer and navigate in a Windows®-based environment• Ability to recognize and read machine indicator lights and sensors
During this course you will:	<ul style="list-style-type: none">• Review the theory of automatic insertion• Perform normal machine operation tasks to set up and run a new board• Perform machine error recovery tasks• Perform basic operation troubleshooting
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>
Suggested additional courses:	<ul style="list-style-type: none">• RL5-OPM: 6360B/C/D/E, 6368D, and 6369E Radial Sequencer/Inserter: Operation, Programming, and Maintenance• RL5-L2: 6360B/C/D/E, 6368D, and 6369E Radial Sequencer/Inserter: Advanced Maintenance and Troubleshooting• BHIMC: Board Handling for Insertion Machines• ERV: Expanded Range Verifier• IMCTT: Insertion Machine Control Theory and Troubleshooting• PP12: Pattern Programming• PPU25: Pattern Program Utility
Note:	The training provided in this course is also available as a self-paced, CD-ROM based instructional software program, known as Product Trainer. Please see the Product Trainer product description in this catalog for details.





**RL5-OPM: 6360B/C/D/E, 6368D, AND 6369E RADIAL SEQUENCER/INSERTER:
OPERATION, PROGRAMMING, AND MAINTENANCE**

Course level: Level 1

Relevant product codes: 2800 Series Expanded Range Verifier, 6360B/C/D/E Radial Sequencer/Inserter, 6368D Radial Sequencer/Inserter, and 6369E Radial Sequencer/Inserter

Course length: 4 days

Overview: This course provides the skills required to operate Universal's 6360B/C/D/E, 6368D, and 6369E Radial Sequencer/Inserters. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives.

Who should take this course? Anyone who must operate the machine for production, maintenance, troubleshooting, or verifying pattern programs; or anyone who plans to attend Level 2 training on the machine should take this course. Typical titles of trainees attending this course include operators, programmers, and maintenance technicians. This course is oriented toward hands-on experience with the machine at the operation level.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to recognize and read machine indicator lights and sensors
- Ability to use hand tools, calipers, and feeler gauges

During this course you will:

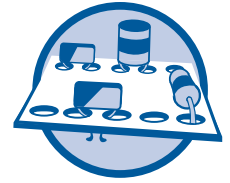
- Perform product changeover
- Operate the machine
- Recover from machine interrupts
- Program the machine
- Perform preventive maintenance and typical adjustments required during the first six months of machine use

Suggested additional courses:

- RL5-L2: 6360B/C/D/E, 6368D, and 6369E Radial Sequencer/Inserter: Advanced Maintenance and Troubleshooting
- IMCTT: Insertion Machine Control Theory and Troubleshooting
- BHIMC: Board Handling for Insertion Machines
- ERV: Expanded Range Verifier
- PP12: Pattern Programming
- PPU25: Pattern Program Utility

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

RL5-L2: 6360B/C/D/E, 6368D, AND 6369E RADIAL SEQUENCER/INSERTER: ADVANCED MAINTENANCE AND TROUBLESHOOTING



Course level: Level 2

Relevant product codes: 2800 Series Expanded Range Verifier, 6360B/C/D/E Radial Sequencer/Inserter, 6368D Radial Sequencer/Inserter, and 6369E Radial Sequencer/Inserter

Course length: 5 days

Overview: During this course you learn to perform mechanical and electrical corrective maintenance and troubleshooting of Universal's 6360B/C/D/E, 6368D, and 6369E Radial Sequencer/Inserter machines. This advanced course builds upon the skills gained in course RL5-OPM, and provides you with an opportunity to practice machine troubleshooting and corrective maintenance procedures.

Who should take this course? Anyone who must maintain the machine by troubleshooting mechanical and/or electrical problems, performing monthly/yearly preventive maintenance procedures, or performing corrective maintenance should take this course. A typical title of a trainee attending this course is maintenance technician.

Prerequisites:

- Completion of course RL5-OPM or equivalent
- Completion of course IMCTT or equivalent
- Ability to use a digital voltmeter, dial indicators, and calipers
- Ability to use machine diagnostics to read inputs and activate outputs
- Ability to operate, program, and perform preventive maintenance tasks for the machine

During this course you will:

- Use machine documentation or Tech Advisor to perform adjustments and maintenance tasks on major assemblies
- Adjust the electrical system unique to the machine

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
8AM-12PM	OVERVIEW, CHAIN SYSTEM	CUTTER STATION	INSERTION HEAD AND HEAD DRIVE	CUTTER HEAD	POSITIONING SYSTEM
1PM-4PM	DISPENSING HEAD	VERIFIER EMITTER/RECEIVER, PART DETECTOR, CHAIN UNLOADER	INSERTION HEAD AND HEAD DRIVE, CTA	CLINCH BASE	ELECTRICAL SYSTEM

Suggested additional courses:

- BHIMC: Board Handling for Insertion Machines
- ERV: Expanded Range Verifier
- PP12: Pattern Programming
- PPU25: Pattern Program Utility

RL8-O: 6380A/6388A/6389A RADIAL 8 SEQUENCER/INSERTER: OPERATION

Course level: Level 1

Relevant product codes: 6380A/6388A/6389A Radial 8 Sequencer/Inserter

Software level: IM-UPS **Course length:** 1 day

Overview: This course is designed for individuals who need to operate Universal's 6380A, 6388A, or 6389A Radial 8 Sequencer/Inserter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives.

Who should take this course? Anyone who must operate the machine should take this course.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to recognize and read machine indicator lights and sensors

During this course you will:

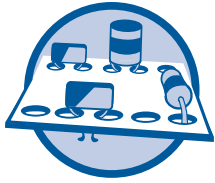
- Practice operator tasks

Course availability: *This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.*

Suggested additional courses:

- RL8-OP: 6380A/6388A/6389A Radial 8 Sequencer/Inserter: Operation and Programming
- RL8-OM: 6380A/6388A/6389A Radial 8 Sequencer/Inserter: Operation and Maintenance
- IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting
- ERV: Expanded Range Verifier

Note: The training provided in this course is also available as a self-paced, CD-ROM based instructional software program, known as Product Trainer. Please see the Product Trainer product description in this catalog for details.



RL8-OP: 6380A/6388A/6389A RADIAL 8 SEQUENCER/INSERTER: OPERATION AND PROGRAMMING

Course level: Level 1

Relevant product codes: 6380A/6388A/6389A Radial 8 Sequencer/Insertter

Software level: IM-UPS **Course length:** 5 days

Overview: This course is designed for individuals who need to operate and program Universal's 6380A, 6388A, or 6389A Radial 8 Sequencer/Insertter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives. Board handling training is not part of this course, but can be arranged separately.

Who should take this course? Anyone who must operate the machine for production, maintenance, or troubleshooting, and anyone who must create/edit products should take this course. Typical titles of trainees attending this course include operators, programmers, and maintenance technicians. This course is oriented toward hands-on experience with the machine at the operation level.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to recognize and read machine indicator lights and sensors

During this course you will:

- Perform product changeover
- Operate the machines
- Recover from machine interrupts
- Program the machines

Suggested additional courses:

- RL8-OM: 6380A/6368A/6389A Radial 8 Sequencer /Insertter: Operation and Maintenance
- IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting
- ERV: Expanded Range Verifier

RL8-OM: 6380A/6388A/6389A RADIAL 8 SEQUENCER/INSERTER: OPERATION AND MAINTENANCE

Course level: Level 1

Relevant product codes: 6380A/6388A/6389 Radial 8 Sequencer/Insertter

Software level: IM-UPS **Course length:** 5 days

Overview: This course is designed for individuals who need to operate and maintain Universal's 6380A, 6388A, or 6389A Radial 8 Sequencer/Insertter. Extensive hands-on time with the machine ensures you have ample opportunity to practice the skills identified by the course objectives. Board handling training is not part of this course, but can be arranged separately.

Who should take this course? Anyone who must operate the machines and perform mechanical or electrical adjustments to the machines should take this course. The adjustments covered by the course material are ones that are usually performed during the first three to six months after machine installation. A typical title of trainees attending this course is maintenance technician. This course is oriented toward hands-on experience with the machine at the maintenance level.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to recognize and read machine indicator lights and sensors
- Ability to use hand tools, calipers, and feeler gauges

During this course you will:

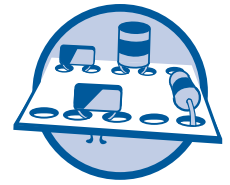
- Practice operator tasks
- Perform daily, weekly, and monthly preventive maintenance of the machines
- Perform standard mechanical and electrical adjustments required to maintain machine performance for three to six months after machine installation

Suggested additional courses:

- RL8-OP: 6380A/6368A/6389A Radial 8 Sequencer/Insertter: Operation and Programming
- IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting
- ERV: Expanded Range Verifier

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

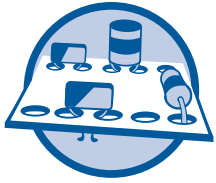
SV8-O: 6687C SH VCD 8 AXIAL INSERTER AND 2596B/C AXIAL SEQUENCER: OPERATION



Course level:	Level 1
Relevant product codes:	2596B/2596C Axial Sequencer, 6683C JW SH 8 Jumper Wire Inserter, and 6687C SH VCD 8 Axial Inserter
Software level:	UICS and IM-UPS Course length: 1.5 days
Overview:	This course is designed for individuals who need to operate Universal's 2596B/C Axial Sequencer and either the 6683C JW SH 8 Jumper Wire Inserter or 6687C SH VCD 8 Axial Inserter. Extensive hands-on time with the machines ensure you have ample opportunity to practice the skills identified by the course objectives.
Who should take this course?	Anyone who must operate these machines should take this course.
Prerequisites:	<ul style="list-style-type: none"> • Ability to use a computer and navigate in a Windows®-based environment • Ability to recognize and read machine indicator lights and sensors
During this course you will:	<ul style="list-style-type: none"> • Review the theory of automatic insertion • Perform machine operation tasks to set up and run a new board • Perform machine error recovery tasks • Perform basic operation troubleshooting
Course availability:	<i>This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.</i>

SV8-OP: 6683C JW SH 8 JUMPER WIRE INSERTER / 6687C SH VCD 8 AXIAL INSERTER AND 2596B/C AXIAL SEQUENCER: OPERATION AND PROGRAMMING

Course level:	Level 1																		
Relevant product codes:	2596B/2596C Axial Sequencer, 6683C JW SH 8 Jumper Wire Inserter, and 6687C SH VCD 8 Axial Inserter																		
Software level:	UICS and IM-UPS Course length: 5 days																		
Overview:	This course is designed for individuals who need to operate and program Universal's 2596B/C Axial Sequencer and either the 6683C JW SH 8 Jumper Wire Inserter or 6687C SH VCD 8 Axial Inserter. Extensive hands-on time with the machines ensure you have ample opportunity to practice the skills identified by the course objectives. Board handling training is not part of this course, but can be arranged separately.																		
Who should take this course?	Anyone who must operate these machines for production, maintenance, or troubleshooting, or anyone who must create/edit products should take this course. Typical titles of trainees attending this course include operators, programmers, and maintenance technicians.																		
Prerequisites:	<ul style="list-style-type: none"> • Ability to use a computer and navigate in a Windows®-based environment • Ability to recognize and read machine indicator lights and sensors 																		
During this course you will:	<ul style="list-style-type: none"> • Perform product changeover, operate the machines, recover from machine interrupts, and program the machines 																		
Typical course schedule:	<table border="1"> <thead> <tr> <th></th> <th>DAY 1</th> <th>DAY 2</th> <th>DAY 3</th> <th>DAY 4</th> <th>DAY 5</th> </tr> </thead> <tbody> <tr> <td>8AM-12PM</td> <td>COURSE OVERVIEW AND SEQ OPERATION</td> <td>VCD OPERATION</td> <td>VCD PROGRAMMING</td> <td>VCD PROGRAMMING</td> <td>VCD PROGRAMMING</td> </tr> <tr> <td>1PM-4PM</td> <td>SEQ PROGRAMMING</td> <td>VCD OPERATION</td> <td>VCD PROGRAMMING</td> <td>VCD PROGRAMMING</td> <td>VCD PROGRAMMING</td> </tr> </tbody> </table>		DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	8AM-12PM	COURSE OVERVIEW AND SEQ OPERATION	VCD OPERATION	VCD PROGRAMMING	VCD PROGRAMMING	VCD PROGRAMMING	1PM-4PM	SEQ PROGRAMMING	VCD OPERATION	VCD PROGRAMMING	VCD PROGRAMMING	VCD PROGRAMMING
	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5														
8AM-12PM	COURSE OVERVIEW AND SEQ OPERATION	VCD OPERATION	VCD PROGRAMMING	VCD PROGRAMMING	VCD PROGRAMMING														
1PM-4PM	SEQ PROGRAMMING	VCD OPERATION	VCD PROGRAMMING	VCD PROGRAMMING	VCD PROGRAMMING														
Suggested additional courses:	<ul style="list-style-type: none"> • 2596B/C Axial Sequencer and 6683C JW SH 8 Jumper Wire Inserter / 6687C SH VCD 8 Axial Inserter: Operation and Programming • IM8-L2: All Generation 8 Machines: Control Theory and Troubleshooting • ERV: Expanded Range Verifier 																		



SV8-OM: 6683C JW SH 8 JUMPER WIRE INSERTER / 6687C SH VCD 8 AXIAL INSERTER AND 2596B/C AXIAL SEQUENCER: OPERATION AND MAINTENANCE

Course level: Level 1

Relevant product codes: 2596B/2596C Axial Sequencer, 6683C JW SH 8 Jumper Wire Inserter, and 6687C SH VCD 8 Axial Inserter

Software level: UICS and IM-UPS **Course length:** 5 days

Overview: This course is designed for individuals who need to operate and maintain Universal's 2596B/C Axial Sequencer and either the 6683C JW SH 8 Jumper Wire Inserter or 6687C SH VCD 8 Axial Inserter. This course builds upon the skills gained in course SV8-OP. Extensive hands-on time with the machines ensure you have ample opportunity to practice the skills identified by the course objectives.

Who should take this course?

Anyone who must operate these machines and perform mechanical or electrical adjustments to the machines should take this course. The adjustments covered by the course material are ones that are usually performed during the first three to six months after machine installation. Typical titles of trainees attending this course include operators, engineers, and maintenance technicians. This course is oriented toward hands-on experiences.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to use hand tools and measuring instruments

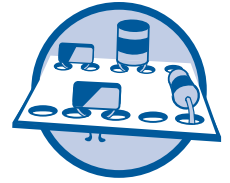
During this course you will:

- Perform product changeover
- Operate the machines
- Perform daily, weekly, and monthly preventive maintenance of the machines
- Perform standard mechanical and electrical adjustments required to maintain machine performance for three to six months after machine installation

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
8AM-12PM	COURSE OVERVIEW AND SEQ OPERATION	VCD OPERATION	OVERVIEW IM DIAGNOSTICS,	PM AND SET UP HEAD	X-Y POSITIONING SYSTEM,
1PM-4PM	VCD OPERATION	CHECK AXES OPERATION, USE IM-UPS	PM AND SET UP HEAD	PM AND SET UP CLINCH	BEC SETUP, EXIT TEST

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.



MM-O: 6772A MULTI-MODULE DIP INSERTER: OPERATION

Course level: Level 1

Relevant product code: 6772A Multi-Module DIP Inserter

Software level: UICS **Course length:** 1 day

Overview: This course is designed for individuals who need to operate Universal's 6772A Multi-Module DIP Inserter. Extensive hands-on time with the machine will ensure you have ample opportunity to practice the skills identified by the course objectives.

Who should take this course? Operators responsible for machine operation should take this course.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to recognize and read machine indicator lights and sensors

During this course you will:

- Review the theory of automatic insertion
- Perform normal machine operation tasks to set up and run a new board
- Perform machine error recovery tasks
- Perform basic operation troubleshooting

Course availability: *This course is available by request only. For course delivery upon machine installation, please contact your regional field service office.*

Suggested additional courses:

- PPU25: Pattern Program Utility
- MM2: 6772A Multi-Module DIP Inserter: Advanced Maintenance and Troubleshooting

MM1: 6772A MULTI-MODULE DIP INSERTER: OPERATION, PROGRAMMING, AND MAINTENANCE

Course level: Level 1

Relevant product code: 6772A Multi-Module DIP Inserter

Software level: UICS **Course length:** 4 days

Overview: This course is designed for individuals who need to operate, program, and maintain a 6772A Multi-Module DIP Inserter.

Who should take this course? Operators, programmers, and maintenance technicians responsible for the machine should take this course.

Prerequisites:

- Ability to use a computer and navigate in a Windows®-based environment
- Ability to recognize and read machine indicator lights and sensors
- Ability to use hand tools, calipers, and feeler gauges

During this course you will:

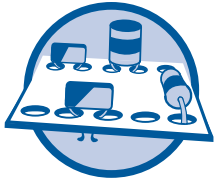
- Perform product changeover
- Operate the machine
- Recover from machine interrupts
- Program the machine
- Perform preventive maintenance and typical adjustments required during the first three months of machine use

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4
8AM-12PM	OVERVIEW OF MACHINE ASSEMBLIES	STRUCTURE OF A PATTERN PROGRAM, CREATING A .PUT PROGRAM	PREVENTIVE MAINTENANCE	PREVENTIVE MAINTENANCE
1PM-4PM	MACHINE OPERATION, RECOVER FROM OPERATION INTERRUPTION	RUN AND EDIT A .PUT PROGRAM, SET PARAMETERS	PREVENTIVE MAINTENANCE	PREVENTIVE MAINTENANCE

Suggested additional courses:

- IMCTT: Insertion Machine Control Theory and Troubleshooting
- PP12: Pattern Programming
- PPU25: Pattern Program Utility
- MM2: 6772A Multi-Module DIP Inserter: Advanced Maintenance and Troubleshooting



MM2: 6772A MULTI-MODULE DIP INSERTER: ADVANCED MAINTENANCE AND TROUBLESHOOTING

Course level: Level 2

Relevant product code: 6772A Multi-Module DIP Inserter

Software level: UICS **Course length:** 4 days

Overview: This course is designed for individuals who need to maintain, troubleshoot, and repair a 6772A Multi-Module DIP Inserter.

Who should take this course? Mechanical and electrical maintenance technicians responsible for the machine should take this course.

Prerequisites:

- Completion of course MM1 or equivalent
- Completion of course IMCTT
- Ability to use a digital voltmeter, dial indicators, and calipers
- Ability to use machine diagnostics to read inputs and activate outputs
- Experience with operation, programming, and preventive maintenance of the machine

During this course you will:

- Perform corrective maintenance and mechanical and electrical troubleshooting associated with all the major machine subassemblies including the carriage, magazine, spreader-pusher, slide, head, and cut and clinch

Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4
8AM-12PM	MECHANICAL SETUPS	MECHANICAL SETUPS	ELECTRICAL SETUPS	SOFTWARE SETUPS
1PM-4PM	MECHANICAL SETUPS	ELECTRICAL SETUPS	PNEUMATIC SETUPS	TROUBLESHOOTING PRACTICE

PP12: PATTERN PROGRAMMING

Course level: Level 1

Relevant product codes: All Universal through hole machines

Software level: UICS **Course length:** 3 days

Overview: Pattern Programming is designed for individuals whose major responsibility is to create UICS programs for Universal's through hole equipment. The course addresses common programming terms and concepts, as well as machine-specific considerations for Universal's DIP, radial, and axial sequencing/insertion equipment.

Who should take this course? Programmers who have to program the entire range of Universal through hole machines should take this course.

Prerequisites:

- Ability to use computer keyboards and disk drives
- Basic knowledge of printed circuit board layout and assembly
- Ability to operate and identify the function of each Universal machine for which you will create a working pattern program

During this course you will:

- Review the general through hole pattern programming process
- Identify the functions of data fields of .PUT and .MAG pattern programs for through hole machines
- Create and debug pattern programs for a variety of through hole equipment
- Use autoadjust to correct pattern programs

Typical course schedule:

	DAY 1	DAY 2	DAY 3
8AM-12PM	GENERAL PROGRAMMING CONCEPTS	VCD PROGRAMS	VCD SEQUENCER/ INSERTER PROGRAMS
1PM-4PM	USE UICS COMMANDS, SEQUENCER PROGRAMS	WRITE, LOAD, AND RUN MULTI-MODULE PROGRAMS	RADIAL PROGRAMS, USE SET VARIABLES AND BEC

Suggested additional course:

- PPU25: Pattern Program Utility

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

PPU25: PATTERN PROGRAM UTILITY

Course level: Level 2

Relevant product codes: All Universal through hole machines

Software level: UICS **Course length:** 4 days

Overview: Pattern Programming Utility (PPU) is designed for individuals who will use PPU either to translate CAD data into UICS pattern programs or to convert existing third-party (Dynapert, TDK, or Panasonic) through hole patterns into UICS patterns.

Who should take this course? Programmers responsible for using PPU should take this course.

Prerequisites:

- Ability to use computer keyboards, disk drives, and MS-DOS
- Basic knowledge of CAD concepts and printed circuit board layout and assembly
- Ability to use UICS commands to write and edit pattern programs
- Ability to operate and identify the function of each Universal machine for which you will translate CAD data into a working pattern program

Note that you should bring a diskette containing sample files of CAD data from your manufacturing site to be used for translation and editing during the course. Assembly drawings, a sample board, and a bill of materials are also helpful in accomplishing course objectives. If you are interested in converting third-party patterns into UICS patterns, please bring sample patterns from your manufacturing site.

During this course you will:

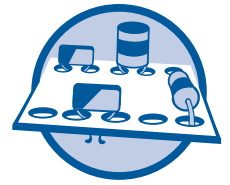
- Install PPU
- Create UICS pattern programs using PPU's CAD translator
- Convert third-party pattern programs into UICS pattern programs
- Edit UICS patterns created by CAD translation or through hole conversion
- Edit and debug UICS patterns using PPU editors

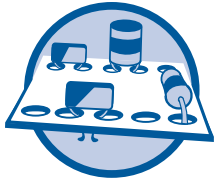
Typical course schedule:

	DAY 1	DAY 2	DAY 3	DAY 4
8AM-12PM	GENERIC PROGRAMMING PROCESS AND METHODS, ANALYZE CAD SAMPLES	CREATE CUSTOMER CAD TRANSLATION DEFINITION	TRANSLATE CAD DATA INTO UICS PATTERNS	EDIT TRANSLATED OR CONVERTED UICS PATTERN PROGRAMS
1PM-4PM	IDENTIFY MINIMUM HARDWARE AND SOFTWARE REQUIREMENTS, INSTALL PPU	PERFORM PPU TUTORIAL	CONVERT THROUGH HOLE THIRD-PARTY PATTERNS INTO UICS PATTERNS	DEBUG EDITED UICS PATTERNS ON A MACHINE

Suggested additional course:

- PP12: Pattern Programming





ERV: EXPANDED RANGE VERIFIER

Course level: Level 1

Relevant product codes: 2596B/2596C Axial Sequencer; 2800 Series Expanded Range Verifier; 6241B/C/D, and 6248D VCD Sequencer/Inserter; and 6360B/C/D/E, 6368D, and 6369E Radial Sequencer/Inserter

Software level: UICS **Course length:** 3 days

Overview: This course is designed for individuals who program and/or maintain Universal's radial and axial sequencer/inserters and axial sequencer machines. The course provides the opportunity to create an Expanded Range Verifier (ERV) program for commonly used electrical components. Extensive hands-on time with the ERV on a machine ensures you will learn the basics of operation, programming, and introductory troubleshooting.

Who should take this course? Programmers and maintenance technicians who wish to create ERV programs should take this course.

Prerequisites:

- Ability to use computer keyboards and access disk drives
- Ability to recognize and read machine indicator lights
- Ability to read and interpret numerical data
- Ability to identify the electrical characteristics of components
- Ability to use UICS commands to write and edit .PUT programs
- Ability to operate a through hole machine

During this course you will:

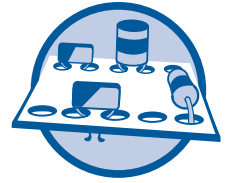
- Use ERV documentation to program the verifier
- Load and run ERV programs
- Load and run the performance check program
- Perform cable compensation
- Verify ERV circuit relay functions and use diagnostics to verify pushbutton/display operation

Typical course schedule:

	DAY 1	DAY 2	DAY 3
8AM-12PM	USE ERV DOCUMENTATION TO FIND PROGRAMMING DATA	WRITE, LOAD, AND RUN ERV PROGRAMS	WRITE, LOAD, AND RUN ERV PROGRAMS, PERFORMANCE CHECK
1PM-4PM	WRITE, LOAD, AND RUN ERV PROGRAMS	WRITE, LOAD, AND RUN ERV PROGRAMS	CABLE COMPENSATION, VERIFY RELAY FUNCTIONS, AND USE DIAGNOSTICS

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

ERVIM8: EXPANDED RANGE VERIFIER FOR GENERATION 8 MACHINES



Course level: Level 1

Relevant product codes: 6241F VCD/Sequencer 8 Axial Sequencer/Inserter; 2800 Series Expanded Range Verifier; and 6380A/6388A/6389A Radial 8 Sequencer/Inserter

Software level: IM-UPS **Course length:** 3 days

Overview: This course is designed for individuals who program and/or maintain Universal's 2800 Series Expanded Range Verifier (ERV) for Generation 8 machines. The course provides the opportunity to enter programming data for commonly used electrical components into component databases. During the course you will create and run a product on the machine with the ERV turned on. Extensive hands-on time with the ERV on a machine ensures you will learn the basics of operation, programming, and introductory troubleshooting.

Who should take this course? Programmers and maintenance technicians who wish to create ERV programs should take this course.

Prerequisites:

- Ability to recognize and read machine indicator lights
- Ability to read and interpret numerical data
- Ability to identify the electrical characteristics of components
- Ability to use a computer and navigate in a Windows®-based environment
- Completion of RL8-OP or VS8-OP (you must be able to operate and program a Radial 8 or VCD/Sequencer 8 machine)

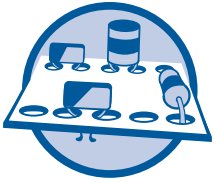
Note: Dual Head 8 machines do not have the Expanded Range Verifier option. This option is on the 2596C Sequencer, however; thus the ERV course is recommended.

During this course you will:

- Use ERV documentation to program the verifier
- Program components for Generation 8 machines
- Use the performance check program to verify ERV test specifications
- Perform cable compensation
- Troubleshoot the ERV

Typical course schedule:

	DAY 1	DAY 2	DAY 3
8AM-12PM	USE ERV DOCUMENTATION TO FIND PROGRAMMING DATA	PROGRAM COMPONENTS FOR GENERATION 8 MACHINES	PERFORM CABLE COMPENSATION
1PM-4PM	USE ERV DOCUMENTATION TO FIND PROGRAMMING DATA, PROGRAM COMPONENTS FOR GENERATION 8 MACHINES	PERFORMANCE CHECK PROGRAM TO VERIFY ERV TEST SPECIFICATIONS	TROUBLESHOOT ERV, EXIT TEST



BHIMC: BOARD HANDLING FOR INSERTION MACHINES (PRE-GENERATION 8 MACHINES)

Course level: Level 1

Relevant product codes: Pre-Generation 8 machines such as: 6241B/C/D VCD-Sequencer/Inserter, 6242E VCD-Sequencer/Inserter, 6248D VCD-Sequencer/Inserter, 6287B/6687B SH VCD Axial Inserter, 6292B/6298B VCD DH 8 Axial Inserter, 6293B/6299B DH Jumper Wire Inserter, 6360B/C/D/E Radial Sequencer/Inserter, 6368D Radial Sequencer/Inserter, 6369E Radial Sequencer/Inserter, and 6772A Multi-Module DIP Inserter

Software level: UICS

Course length: 2 days for single head board handling; 2 days for dual head board handling; 4 days if taken together

Overview: This course is designed for individuals who need to operate, program, and maintain a pre-Generation 8 single or dual head Universal through hole machine with a mounted board handling system. The training also incorporates the 5425 Magazine Loader-Unloader System (through hole elevators). You can arrange to take single head board handling system training, dual head board handling system training, or both.

Who should take this course? Maintenance technicians who need to work on Universal's board handling system should take this course.

Prerequisites:

- Ability to use computer keyboards and disk drives
- Basic knowledge of printed circuit board layout and assembly concepts
- Ability to read and interpret machine indicator lights
- Ability to use a digital voltmeter, feeler gauges, and calipers
- Experience with electrical and pneumatic components

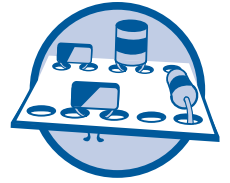
During this course you will:

- Operate and program the board handling system and elevators
- Perform all major machine setups and adjustments

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

3788B DUAL TABLE POSITIONING SYSTEM

Course code: DTPS teaches you how to operate, program, and troubleshoot Universal's 3788B Dual Table Positioning System, the system used on the 3789B Dual Table Interconnect Inserter and Cambridge machines. The machine base is the same as that used on Universal's 6292 DH VCD Axial Inserter. Basic maintenance training on the head tooling must be arranged separately with Universal's Special Products Group; training on the Cambridge placement head is conducted by Cambridge. Contact the Product Training Center in Binghamton or the Special Products Group for details.



6132B SINGLE TABLE POSITIONING SYSTEM

Course code: STPS teaches you how to operate, program, and troubleshoot Universal's 6132B Single Table Positioning System, the system used on the 3785B Single Table Interconnect Inserter and Cambridge machines. The machine base is the same as that used on Universal's 6241 VCD-Sequencer/Inserter. Basic maintenance training on the head tooling must be arranged separately with Universal's Special Products Group; training on the Cambridge placement head is conducted by Cambridge. Contact the Product Training Center in Binghamton or the Special Products Group for details.

2596B/C AXIAL SEQUENCER AND 6287B/6687B SH VCD AXIAL INSERTER: OPERATION, PROGRAMMING, AND MAINTENANCE

Course code: SV1 This course provides you with the skills required to operate Universal's 2596B/C Axial Sequencer and 6287B/6687B Single Head VCD Axial Inserter. During this course you will operate the machines, program the machines, and perform preventive maintenance and typical adjustments on the machines.

2596B/C AXIAL SEQUENCER AND 6287B/6687B SH VCD AXIAL INSERTER: ADVANCED MAINTENANCE AND TROUBLESHOOTING

Course code: SV2 SV2 teaches you how to perform mechanical and electrical corrective maintenance and troubleshooting of Universal's 2596B/C Axial Sequencer and 6287B/6687B Single Head VCD Axial Inserter. This advanced course builds upon the skills gained in course SV1, and gives you an opportunity to practice machine troubleshooting and corrective maintenance procedures.

2596B/C AXIAL SEQUENCER AND 6292B/6298B DH VCD AXIAL INSERTER: OPERATION, PROGRAMMING, AND MAINTENANCE

Course code: SDHV1 This course provides you with the skills required to operate Universal's 2596B/C Axial Sequencer and 6292B/6298B Dual Head VCD Inserter. During this course you will perform product changeover, operate the machines, recover from machine interrupts, program the machines, and perform preventive maintenance and typical adjustments on the machines.

2596B/C AXIAL SEQUENCER AND 6292B/6298B DH VCD AXIAL INSERTER: ADVANCED MAINTENANCE AND TROUBLESHOOTING

Course code: SDHV2 SDHV2 teaches you how to perform mechanical and electrical corrective maintenance and troubleshooting of Universal's 2596B/2596C Axial Sequencer and 6292B/6298B DH VCD Inserter. This advanced course builds upon the skills gained in course SDHV1, and gives you an opportunity to practice machine troubleshooting and corrective maintenance procedures.

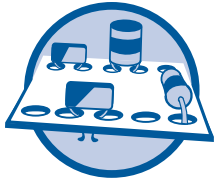
6293B/6299B DH JUMPER WIRE INSERTER: OPERATION, PROGRAMMING, AND MAINTENANCE

Course code: JW1 This course provides you with the skills required to operate Universal's 6293B/6299B Dual Head Jumper Wire Inserter. During this course you will perform product changeover, operate the machines, recover from machine interrupts, program the machines, and perform preventive maintenance and typical adjustments on the machines.

6293B/6299B DH JUMPER WIRE INSERTER: ADVANCED MAINTENANCE AND TROUBLESHOOTING

Course code: JW2 JW2 teaches you how to perform mechanical and electrical corrective maintenance and troubleshooting of Universal's 6293B/6299B Dual Head Jumper Wire Inserter. This advanced course builds upon the skills gained in course JW1, and gives you an opportunity to practice machine troubleshooting and corrective maintenance procedures.

IN NORTH AMERICA, THESE COURSES ARE AVAILABLE ONLY AT A CUSTOMER SITE.



6360A RADIAL III SEQUENCER/INSERTER: OPERATION, PROGRAMMING, AND MAINTENANCE

Course code:
RLA1

This course is designed for individuals who need to operate, program, and maintain Universal's 6360A Radial III Sequencer/Inserter. During this course you will perform product changeover, operate the machine, recover from machine interrupts, program the machine, and perform preventive maintenance of the machine.

6360A RADIAL III SEQUENCER/INSERTER: ADVANCED MAINTENANCE AND TROUBLESHOOTING

Course code:
RLA2

RLA2 teaches you how to perform mechanical and electrical corrective maintenance and troubleshooting of Universal's 6360A Radial III Sequencer/Inserter. This advanced course builds upon the skills gained in course RLA1, and gives you an opportunity to practice machine troubleshooting and corrective maintenance procedures.

DYNAPERT UCSM-G: LEVEL 1 OPERATION, PROGRAMMING, AND MAINTENANCE

Course code:
UCSM-G-L1

This course is designed for individuals who need to operate, program, and maintain the Dynapert UCSM-G machine. During this course you will perform product changeover, operate the machine, recover from machine interrupts, program the machine, and perform preventive maintenance of the machine.

DYNAPERT UCSM-G: LEVEL 2 ADVANCED MAINTENANCE AND TROUBLESHOOTING

Course code:
UCSM-G-L2

UCSM-G-L2 teaches you how to perform mechanical and electrical corrective maintenance and troubleshooting of Dynapert's UCSM-G machine. This advanced course builds upon the skills gained in course UCSM-G-L1, and gives you an opportunity to practice machine troubleshooting and corrective maintenance procedures.

DYNAPERT V12000: LEVEL 1 OPERATION, PROGRAMMING, AND MAINTENANCE

Course code:
V12000-L1

This course is designed for individuals who need to operate, program, and maintain the Dynapert V12000 machine. During this course you will perform product changeover, operate the machine, recover from machine interrupts, program the machine, and perform preventive maintenance of the machine.

DYNAPERT V12000: LEVEL 2 ADVANCED MAINTENANCE AND TROUBLESHOOTING

Course code:
V12000-L2

V12000-L2 teaches you how to perform mechanical and electrical corrective maintenance and troubleshooting of the Dynapert V12000 machine. This advanced course builds upon the skills gained in course V12000-L1, and gives you an opportunity to practice machine troubleshooting and corrective maintenance procedures.

DYNAPERT VCD-G: LEVEL 1 OPERATION, PROGRAMMING, AND MAINTENANCE

Course code:
VCD-G-L1

This course is designed for individuals who need to operate, write programs for, and provide routine maintenance for the Dynapert VCD-G Axial Inserter. During this course you will perform product changeover, operate the machine, recover from machine interrupts, program the machine, and perform preventive and corrective maintenance tasks.

DYNAPERT VCD-G: LEVEL 2 ADVANCED MAINTENANCE AND TROUBLESHOOTING

Course code:
VCD-G-L2

VCD-G-L2 teaches you how to perform mechanical and electrical corrective maintenance and troubleshooting of the Dynapert VCD-G machine. This advanced course builds upon the skills gained in course VCD-G-L1, and gives you an opportunity to practice machine troubleshooting and corrective maintenance procedures.

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.





TTT: TRAIN-THE-TRAINER

Course level: Level 1

Relevant product codes: All Universal machines

Course length: Variable

Overview: The Train-the-Trainer course is a customized program that prepares and qualifies a trainer to deliver a Universal Level 1 training course for a given product. This program provides a cost-effective solution for companies that require large numbers of employees to be trained. This program prepares trainers to deliver training in:

- Machine operation
- Level 1 machine maintenance
- Level 1 machine programming

Who should take this course? Customer trainers who need to deliver training on a given Universal product should attend this program. To obtain the maximum benefit from this program, the trainer who attends should deliver the applicable course(s) on a regular basis after this program is completed.

Prerequisites: Before taking this course, the trainer should have these traits and skills:

- Ability to support trainees by providing effective feedback
- Ability to enable learning by demonstrating tasks and then allowing trainees ample practice time to perform the tasks
- Demonstrated initiative in improving and developing abilities related to the course and training
- Effective communication skills in one-on-one or group situations
- Ability to communicate ideas clearly
- Ability to maintain a high level of energy and morale in the classroom

Universal's Train-the-Trainer program can accommodate individuals with a wide variety of training and machine-related skills. However, the program is most time-efficient if the individual has both presentation skills and considerable experience with the machine prior to attending the course.

Typical course: The program can be customized according to students' backgrounds. Generally, the typical program will include:

- Trainer strategies and tools for introducing topics, maintaining student hands-on participation, and activity closure
- Feedback during each phase of the Train-the-Trainer process

Course availability: *This course is typically designed around and taught according to your needs.*

To schedule a course, request a course schedule, or inquire about additional courses, please call a Product Training Center. Telephone numbers are listed on the inside back cover of this catalog.

TA: TECH ADVISOR

Relevant product codes: 6241D/6248D/6242E VCD-Sequencer/Inserter 5 and 6360B/C/D/E Radial IIIxQ/Radial 5

Overview: Tech Advisor is an electronic technical performance support product that provides you with information and assistance on Universal Instruments machine operation, troubleshooting, maintenance, and repair at the time of need right at the machine. This can decrease your machine downtime and increase your productivity.

Tech Advisor is an interactive system that provides you with as little or as much information as you desire. You can progress at your own speed, choosing among various screens to access needed information. Since information pathways are not sequential, Tech Advisor accommodates novice machine operators, as well as machine experts.

Examples of content:

- Job aids
- Adjustment procedures
- Troubleshooting guides
- Maintenance schedules

Benefits:

- Increases workforce competency, improving productivity
- Increases comprehension with user-selectable English, Spanish, or Chinese language
- Maximizes machine uptime by providing information quickly and easily
- Reduces training time and costs since information is available in the workplace
- Select only information you need at that time

Features:

- Access information using menus, indexes, a system organization map, hot words within the text, or through prompts
- Mark a display for quick return with electronic paper clips
- Write and save notes with notepad function
- Look up information in the system glossary
- View hundreds of illustrations of machine components
- Designed and developed by an instructional design staff based on content created by subject matter experts

Released Tech Advisors:

PRODUCT NAME	MACHINE NAME AND PRODUCT CODE	PART NUMBER
TECH ADVISOR AXIAL	6241D/6248D/6242E VCD-SEQUENCER/INSERTER 5 (ENGLISH/SPANISH/CHINESE)	46563701
	6241D/6248D/6242E VCD-SEQUENCER/INSERTER 5 DEMO (ENGLISH/SPANISH/CHINESE)	46872001
TECH ADVISOR RADIAL	6360B/C/D RADIAL IIIxQ/RADIAL 5 (ENGLISH/SPANISH)	45818901
	6360B/C/D RADIAL IIIxQ/RADIAL 5 (ENGLISH/CHINESE)	46125601
	6360E RADIAL 5 (ENGLISH/SPANISH/CHINESE)	46769001
	6360B/C/D/E RADIAL IIIxQ/RADIAL 5 DEMO (ENGLISH/SPANISH/CHINESE)	46206702





PT: PRODUCT TRAINER

Relevant product codes:

6241D/6248D/6242E VCD-Sequencer/Inserter, 6360B/C/D/E Radial IIIxq/Radial 5, 4681A/4688A GSM1 Platform and GSM2 Platform, 4796A/B/L/R HSP, 6241F VCD/Sequencer 8, 6292C/6298C VCD DH 8 Axial Inserter, 6293C/6299C JW DH 8 Jumper Wire Inserter, and 6380A/6388A/6389A Radial 8

Overview:

Product Trainer is a computer-assisted instructional tool you can use to increase the competency of your workforce and improve your machine productivity by meeting personnel training needs. Product Trainer provides knowledge and skills necessary to operate certain Universal machines. The programs consist of self-paced lessons. Since Product Trainer provides performance support in the workplace, training time on the production floor is reduced. This is especially important if you have high operator turnover. You can also use the program to complement formal training.

How to use:

The best way to use a Product Trainer program is to have a supervisor or manager identify all appropriate tasks that trainees perform. A qualified trainer then demonstrates basic machine tasks and normal sequence of events or a process line to the trainee on a machine or line, if available. Next, the trainee completes all the appropriate tasks in Product Trainer on a personal computer. The supervisor or manager logs onto Product Trainer as the Manager (see Features below) and uses the Progress Report view to ensure the trainee has completed all appropriate Product Trainer tasks. The trainee then performs all appropriate tasks on a machine on the production floor under the supervision of a Universal-certified trainer or an otherwise qualified person.

Features:

- A button on the menu bar lets you select different languages
- Video clips aid the learning process
- Interactive screens and nonsequential pathways let you access information or progress through the tutorial at your own pace
- Information is organized into modules that can be accessed through menus or through a progress map
- Hotwords link to additional information
- Pretests, self-tests, and progress reports identify areas of strength and weakness for future training
- You can print screens for future reference
- Multiple trainees can create individual accounts using one Product Trainer program
- A Manager account allows a supervisor or manager to monitor the progress of trainees in a Product Trainer program
- Designed and developed by an instructional design staff based on content created by subject matter experts

Released Product Trainers:

PRODUCT NAME	MACHINE NAME AND PRODUCT CODE	PART NUMBER
PRODUCT TRAINER	ANY SURFACE MOUNT ASSEMBLY EQUIPMENT	48888301
INTRODUCTION TO SURFACE MOUNT ASSEMBLY FOR OPERATORS	(MULTILINGUAL)	
PRODUCT TRAINER OPERATION AND PREVENTIVE MAINTENANCE	6241D/6248D/6242E VCD-SEQUENCER/INSERTER (ENGLISH/SPANISH/CHINESE)	46674301
PRODUCT TRAINER OPERATION	6360B/C/D/E RADIAL IIIxq/RADIAL 5 (ENGLISH/SPANISH/CHINESE)	46563801
PRODUCT TRAINER OPERATION	4796 SERIES HSP (ENGLISH/SPANISH/CHINESE)	48096701
	4681A/4688A GSM1 PLATFORM/GSM2 PLATFORM (ENGLISH/SPANISH/CHINESE)	47798401
	6241F VCD/SEQUENCER 8 (ENGLISH/SPANISH/CHINESE)	47940301
	6293C/6299C JW DH 8 JUMPER WIRE INSERTER (ENGLISH/SPANISH/CHINESE)	47798301
	6292C/6298C VCD DH 8 AXIAL INSERTER (ENGLISH/SPANISH/CHINESE)	47685201
	6380A/6388A/6389A RADIAL 8 (ENGLISH/SPANISH/CHINESE)	47674501

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Automation in Electronic Assembly

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