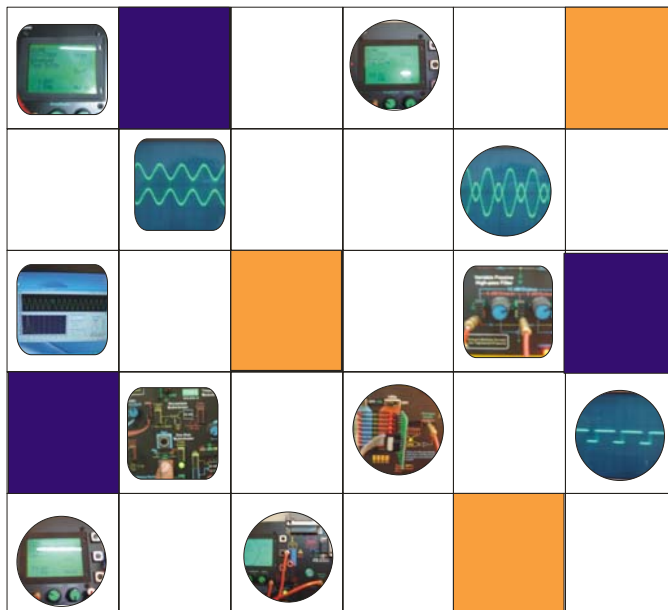


RIMSResearch Instrumentation
& Measurement Systems**DEV-2771**

Microprocessor Interface Trainer

OPERATION MANUAL

PART NO. 2771-00-301



**COMPREHENSIVE AND ILLUSTRATED
EASY EXPERIMENTS STARTUP
LAB MANUAL**

THANK YOU FOR CHOOSING RIMS EDUCATION PRODUCTS AND SERVICES

Once you have made it through this guide, you will have a firm grip on your lab experiments and operations of the RIMS product you are using. How to get your training equipment operational, basic maintenance and setting up desired experiments will just be a breeze. Everything you need for a quick and easy start is presented here—useful hints and tips makes it simple to conduct your lab and hands-on training sessions. We are happy that you have joined our vast community of over 30 thousand valued users, which grow as we bring you the latest technology at most competitive prices. We value your business and hope that you will enjoy being an important member of the RIMS Education Community.

Customer Support Team



EU, USA and Canada

Weston Villa, 37 Wolsey Road, Esher, Surrey
United Kingdom KT10 8NT
www.rims-tech.co.uk

Middle East & Asia Pacific

632-B Chakala Scheme-III Rawalpindi
Pakistan 46000
www.rimsedu.com

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LEARNING OBJECTIVES

WHAT YOU SHOULD KNOW AFTER READING THIS MANUAL?

- Rims part numbers, how to order and get support for your trainer
- About RIMS copyrights, basic signals know how and recognizing them on oscilloscope
- What are generic features of Microprocessor Interface Trainer?

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General Information

- Understanding RIMS part numbers
- Signals Terminology

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1

UNDERSTANDING RIMS
PART NUMBERS?

Normally the trainer packaging contains the part numbers that you have ordered. You must understand the order number system for checking your packing note or even for later re-ordering of the equipment.

Trainer	-	Prefix	-	Sub-Category
DEV-2771	-	00	-	101

CODE	PF	SUB	Description
DEV-2785			Advanced I
DEV-2785	M	001	Trainer DEV
DEV-2785	00	101	Power Co
DEV-2785	00	331	Softw
DEV-2785	00	301	Use

Trainer name is the broad category e.g., 2771 is a Microprocessor Interface Trainer

The trainer has a prefix that represents the model Number of trainer e.g., 'M' or 'N'

Sub assembly is the hardware component that can be connected to the trainer some modules are compatible with other trainers as well but the part number would only be related to the trainer for which the have been designed

CODE	PF	SUB	Description
DEV-2785			Advanced I
DEV-2785	M	001	Trainer DEV
DEV-2785	00	101	Power Co
DEV-2785	00	331	Softw
DEV-2785	00	301	Use

Category is most important feature of this numbering. The under lying structure for category is same for all rims products, the category list is given here,

001-100	Hardware ID
101-200	Cables & Accessories
201-300	Special Attachments
301-400	Data Pack and Media
401-500	Services, Freight and Installations
501-600	Extended Warranties

Here are some common sub categories

101-110	Power Cord
111-120	Interconnecting aids & Data buses
121-130	Dust Covers

131-140	Bread boarding accessories
141-150	Specialized Power Cables
151-160	Extensions and boards
161-170	Cables Serial and Parallel
171-180	Specialized Cables
301-310	Operation Manuals and User Guide
321-330	Experiment Manuals
331-350	SOFTWARE
401-410	Services, Freight and Installations
501-510	Extended Warranties

CODE	P	SUB	Description
DEV-2765			Advanced U
DEV-2765	M	001	Trainer DEV
DEV-2765	00	101	Power Ca
DEV-2765	00	331	Softw
DEV-2765	00	301	Use

Please use the appropriate order code for either re-ordering components or the equipment from RIMS. The list is subject to further change without altering the existing structure. Please visit RIMS website for any further details about the updates on support pages.

2**SIGNALS TERMINOLOGY**

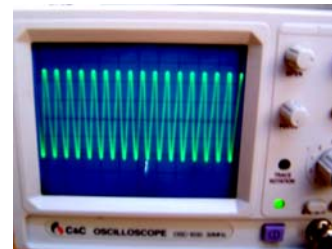
Following terms are used for various signals

Frequency

Number of cycles per second

Carrier Signal

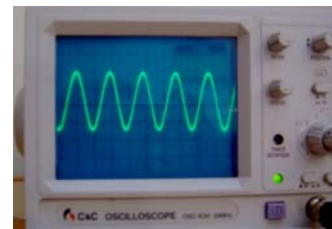
Signal that is used as base for carrying signals over long distance usually high frequency signal



Carrier

Modulating Signal

Signal that is being modulated such as audio or low frequency signal relative to carrier



Modulating Signal/ Audio Signal

Modulated Signal

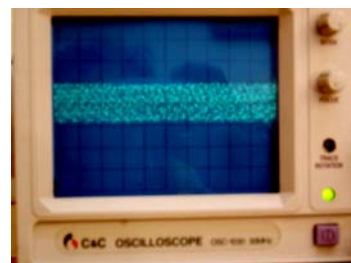
Signal after modulating on the carrier



Modulating Signal

Noise

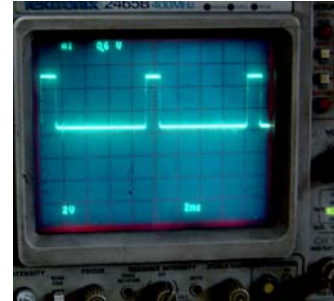
Uncertainty or randomness in a signal that is represented by sufficient statistics such as mean, variance etc.



Noise

Clock

TTL or square wave for digital control



Clock/Pulse

Voltage

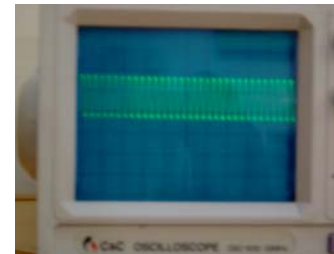
A certain level of signal fixed and not varying e.g., 2.3Volts

Drift

Slowly varying noise (undesired signal)

Offset/Bias

DC level in a signal



Offset/DC Level in AC Signal

Keying

Shifting frequencies within discrete levels

Audio Signal

Normally 300-3500Hz for communications application. Audible range is 20-20KHz, but the telephonic bandwidth is one given above. Above 10KHz and below 300Hz is considered as HI-FI (high fidelity)

Sampling Frequency

Rate at which a signal is digitized by a analog to digital converter

Power

Signal for driving the devices and running the system electronic, while other electronics signals are referred to as signal

DEV-2771 EXPLAINED

- DEV-2771 MICROPROCESSOR INTERFACE TRAINER
- WHAT YOU GET WITH THE DEV-2771?
- GETTING TO KNOW DEV-2771
- INTRODUCTION TO DEV-2771E

Product Title: RIMS Microprocessor interface trainer
Document Code: DEV2771-00-301
Revision 2.0.0 dated 16 April 2007
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STEP 1**DEV-2771E MICROPROCESSOR
INTERFACE TRAINER**

DEV-2771E is a relatively advanced trainer in the RIMS Training Solutions series. It is aimed at being a teaching and development tool for students and professionals of computer sciences. The emphasis of this trainer is on interfacing external devices to a PC. Hands on experience on this trainer will go a long way in preparing students for industrial level microprocessor control.

STEP 2**WHAT YOU GET WITH THE DEV-
2771E?**

If you have purchased the complete development pack, it consists of the following items:

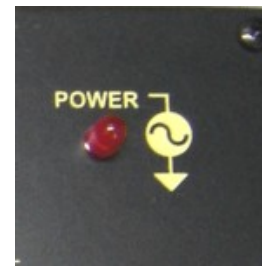
- Trainer DEV-2771.
- Power cord 220VAC.
- Serial Cable.
- Parallel Cable
- Data Bus.
- Circuit patching wire.
- User manual
- Software CD
- Dust cover for the Trainer

STEP 3	GETTING TO KNOW DEV-2771E
---------------	----------------------------------

If by now have unpacked the DEV-2771E and its accompanying accessories, you would be looking at a black casing with various knobs, switches, LED's, keypad, ports and selector switches etc. This section would give you a tour around the DEV-2771E.

STEP 4	INTRODUCTION TO DEV-2771E MICROPROCESSOR INTERFACE TRAINER
---------------	---

- Power LED Shows the Status of Power ON or Power OFF



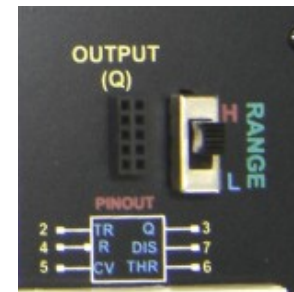
- Status LED's Eight LED's for indicating presence of TTL high logic
- Logic Switches Eight logic switches for providing TTL logic level high (5V) and low (0V) at the corresponding output point of the sockets.
- Digital Input/Output Eight sockets for output of the Logic Switches and providing logic input. When a TTL high is provided at this Digital Input Socket, corresponding status LED glows.



- ☑ 555 Timer Block a source of clock of adjustable frequency and duty cycle. Consists of two knobs labeled Duty Cycle and Frequency, a socket for Clock Output and a switch for selecting Range.



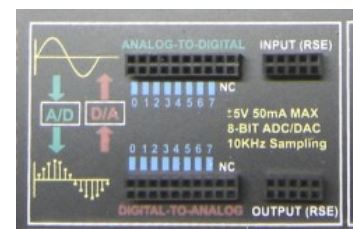
- ☑ Output (Q) a 10-pin socket for output of 555 Timer.
- ☑ Range Switch a two-position selector switch for High and Low time of 555 Timer output waveform



- ☑ Bread Board for electronic/digital circuit patching.



- ☑ Analog to Digital Converter consists of an 8 bit Analog to Digital Converter (ADC).
- ☑ Digital to Analog Converter consists of an 8 bit Digital to Analog Converter



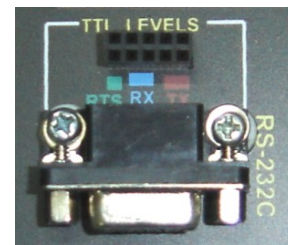
- ☑ +5 VDC Socket for +5V±10% DC fixed.
- ☑ +12 VDC Socket for +12V±10% DC fixed
- ☑ GND socket for ground
- ☑ -5 VDC Socket for -5V±10% DC fixed
- ☑ -12 VDC Socket for -12V±10% DC fixed



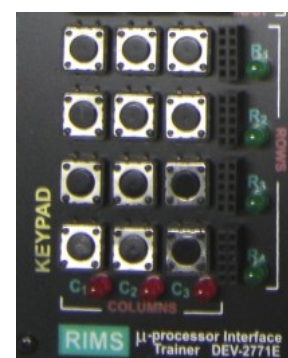
- ☑ Temperature Sensor Reads temperature in degrees Kelvin with scale of 10mV/°K. Temperature OUT can be taken from the 10-pin female socket placed adjacent to the temperature sensor.
- ☑ Logic Probe Two LED's for indicating TTL High or Low levels picked up by the logic probe.



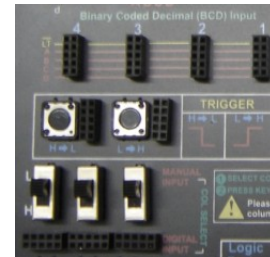
- ☑ RS-232 Serial Port Interface A 9-pin female jack for connecting to the serial port of a PC and an associated socket for interfacing its input and output to connections on the trainer.



- ☑ Push Button Key Pad a standard telephone set keypad and an associated 40 connections female socket for interfacing it with a telephone handset and line.



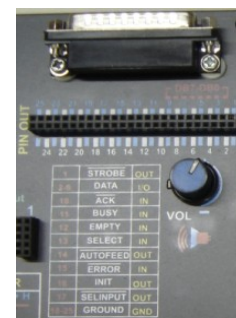
- ☑ Key Pad Switches Three H→L switches, one for each column of key pad.
- ☑ Trigger H→L and L→H trigger switches with input/output female sockets.
- ☑ BCD Inputs Binary coded decimal (BCD) input for the 7segment display.



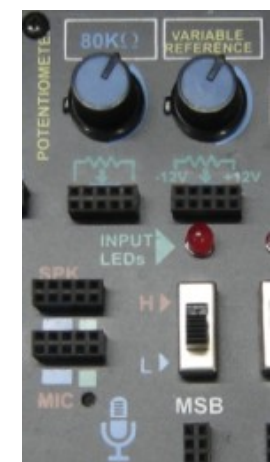
- ☑ Seven Segment Display A display that takes BCD input and displays the decimal value.



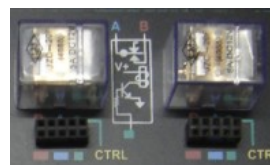
- ☑ Volume Control for speaker output.
- ☑ Parallel Port Interface a 25 pin male jack for connecting to the parallel port of a PC and an associated socket for interfacing its input and output to connections on the trainer.



- ☑ MIC-IN Female sockets of 10 connections for connecting to the output of a MIC on the trainer.
- ☑ Spk-IN Female socket of 10 connections for connecting an input to a speaker on the trainer.
- ☑ Potentiometer 0 to 80KΩ+20% variable resistor
- ☑ Variable Reference can be used as -12V to +12V variable voltage source.



- ☑ Relays two electronic relays that operate with 5VDC.



DEV-2771-00-304**DEV-2771 MICROPROCESSOR INTERFACE TRAINER
ACCESSORIES****Power Cord 220V AC**

A standard power cord for 220VAC or 110VAC mains

**Serial Cable**

Serial cable is connected to a 9-pin female connector on the trainer. The other end of this cable is connected to the PC's serial port. It is RS-232C to TTL Converter.

**Parallel Cable**

Parallel cable is connected to a 25-pin male connector on the trainer. The other end of this cable is connected to the PC's Parallel / printer port. Parallel cable interconnects the onboard RIMS ADC / DAC with the PC.

**Circuit Patching Wire**

Sized for the breadboard usage with a reusable plastic plate.

**Software CD**

Contains software, other resources and experiments they are very useful for instructors as a resource for developing lab experiments according to their course outlines



Dustcover

Dust cover protects your trainer from dust and sunlight
A must for trainer house keeping.



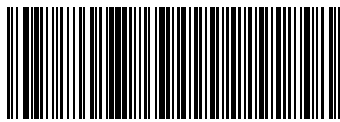


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