

INFORMATION FOR MEMBERS

***SUBJECT AREA: OVERVIEW OF VENDING MACHINE
INTERFACES***

1. INTRODUCTION

This document is intended to be a brief guide to vending machine interfaces, it assumes the reader has little knowledge of interfaces and is looking for a starting point. This guide does not go into the details of any specific interface but seeks to provide references to the relevant specifications so the reader can investigate areas of particular interest. It is intended to give an overview of the market and explain why it has developed to its current position.

1.1. REFERENCES

- BDV001
- EVA-DTS
- MEI Protocol A specification Executive
- MEI Micromech Specification
- MDB/ICP (NAMA/EVMMA/EVA)

2. OVERVIEW

Interfaces break down into two main categories:

- serial
- electromechanical

The Electromechanical type is older and started in the 1960's, these interfaces were used to directly control parts of the vending machine (which were relatively uncomplicated compared to today's machines) and did not have microprocessors in them. Typically the interface operates at high voltages, which may be hazardous. There are lots of connections and a variety of different connector types and wiring configurations.

Serial interfaces are used to send messages between components in a vending machine; intelligent electronics at either end of the link sends and receives messages then performs the required command. Serial interfaces typically operate at low voltage levels (non hazardous) and have less electrical connections.

3. ELECTROMECHANICAL

There are various types of electromechanical interface split by market as well as different machine options.

3.1. EUROPEAN ELECTROMECHANICAL

Within the scope of the European range the following variants are available:

- 1 price
- 2 price
- 4 price
- 10 price

This refers to the number of outputs from a payment system to the vending machine. The payment system accepts money and accumulates credit. Depending on the interface the payment system supports a certain number of different priced products that can be in a machine. The simplest is the 1 price interface, where all products in a vending machine are sold at the same price. When the output line from the payment system is activated then this allows any product in the machine to be vended. There are typically several configurations of machine that use the control lines in a different sequence requiring peripherals to be configured to match

3.2. USA ELECTROMECHANICAL

Within the scope of the USA range the following variants are available:

- 1 price
- 10 price

The American interface is significantly simpler than the European version however it is electrically compatible. It only has one form and requires no configuration as the vend is controlled by a simple 80 ms pulse from the payment system, no checks are made to determine if the vend finished. The payment system controls the vend transaction.

3.3. ASIAN API ELECTROMECHANICAL

The API (**A**vailable **P**roduct **I**nformation) interface is available with the following options:

- 2 price
- 6 price

The electrical interface is different to the European and USA versions and also operates in a different fashion. The payment system controls the vend transaction.

4. SERIAL INTERFACES

4.1. PROTOCOL A (EXECUTIVE)

Also known as Executive, this protocol was developed by Mars Electronics International in the early 1980's to interface peripherals to electronically controlled vending machines. The definitive Protocol A specification is produced by Mars Electronics International. The vend transaction is controlled within the coin changer and prices can be held in the machine or the coin changer (if more detailed audit is required). The interface has evolved over the years to allow the addition of cashless products to the system. The specification defines the communications connector between the components, power is supplied separately, typically 24V AC. (Contact your local MEI Sales representative).

4.2. BDV

This interface was developed by the BDV association in Germany as a further development based on the executive protocol. Both power and communications were combined into a single connector and the specification (BDV001) was issued by the association. It has only been adopted in German speaking countries.

4.3. MDB/ICP^(*)

The MDB (multi-drop bus) was developed by CoinCo in the early 1990s for Coca-Cola, to allow development of a low cost dumb coin changer where intelligence for the vend transaction would be in the vending machine electronics. The protocol was adopted by NAMA in 1994 and supports coin changer, bill reader and cashless peripherals. The European association EVMMA (European Vending Machine Manufacturers Association) then adopted and extended the protocol calling it ICP (Internal Communications Protocol). Although ICP is almost identical to MDB there are some subtle differences, particularly in the area of cashless payment peripherals. As of October 1998 the MDB & ICP specifications have been harmonised and released as MDB/ICP version 1. This specification is now supported by NAMA, EVMMA and EVA.

The protocol is available from NAMA. The order form on the web site vending.org can be used or fax request to Darlene, Publication Orders at +1 312 704 4140. Price: \$ 35 US Funds plus shipping. If using a credit card (*only Visa, MasterCard and American Express or company check*) indicate card number, expiration date, name on card and billing address of the card (mailing address, not a post office box).

4.4. MICROMECH

This interface was initially used as the link between a coin acceptor and coin payout unit to a changer controller. This link was then extended to allow a vending machine controller to have direct control of the various peripheral parts. It is not a true serial link as it has both a serial link for communicating data from the payment system to the vending machine, and a parallel interface from the machine to the changer to control coin payout. It was designed for a 3 tube USA based changer. NAMA has published an interface specification describing how a cashless payment system can be connected using the same electrical hardware (MC500 Credit Interface). Four tube changers have recently been launched onto the market which extend the capability of the current interface. Originally the interface had a 12 pin connector with 110V power, a 24V option was then added and the connector was then altered to 15 pin, supporting both power supplied and a fourth coin tube.

4.5. SIMPLEX III/ L+

This is an extension of the Micromech interface and was developed by NRI for Simplex III and CoinCo for L+. It removes the references to specific coins that tied

^(*) The EVA supports the MDB/ICP for all new designs

the interface to the USA market and by the addition of some simple extensions allows the interface to be used in any market with a 3 tube changer.

4.6. SIMPLEX 0

Developed by NRI this is a mixed interface that consists of serial data to and from the changer to control coin inhibits and routing and transfer coin credit. Several parallel interfaces between the controller and changer are used for payout control, tube full, low indication, motor sense. The control of the vend transaction is within the vending machine controller. This interface is used in some European machines.

4.7. VCCS

This is the Coca-Cola standard interface in Japan and other Asian Pacific Rim countries. It is a serial interface that supports coin, cashless and bill note payment systems. A single connector supplies power and the two-way communication signals. The protocol is limited to references of specific coins.

4.8. HII

An interface developed by MEI in the early 1990's, based on a logical model of a payment system and vend controller and structured using the OSI protocol model. Used on various MEI products it has currently only been adopted by the payphone industry.

5. AUDIT INTERFACES

5.1. EVA-DTS, THE NEW NAME FOR VIDTS & BDV002^(*)

The Data Transfer Standard defines audit data fields and how the data is communicated from the payment system to the audit collection device.

This standard is available with EVA, European Vending Association, 216 Avenue Louise, 1050 Brussels, Tel: +32 2 512 00 75, Fax: +32 2 502 23 42, e-mail: vending@eva.be

Although the name could lead to a misinterpretation, the BDV002 is not a further revision of the BDV001 protocol. Instead, it's the original German audit standard, the data audit protocol. For the explanation of this protocol, please refer to the concepts of EVA-DTS, which took over the heritage of the BDV002. New machine designs should use the EVA-DTS which supercede this and the US VIDTS standard.

5.2. DATA FORMAT

All fields that are used to record audit (in a payment system or vending machine) are defined in the standard. Each element is assigned an identification code that is used to refer to it e.g. ID101 is the identity code for a vending machine. The basic format of DEX/UCS is used by EVA-DTS.

As well as collecting audit data this format is capable of transmitting EVA-DTS configuration data e.g. prices back into the vending machine or payment system after collecting audit data.

5.3. DATA CONNECTION

5.3.1. DEX/UCS

This interface is typically used in the USA, it consists of a 3.5 inch stereo jack plug/socket using standard RS-232 serial levels and parameters. The communication protocol is built on the ANSI X3.28 as the lowest level and then a subset of the Uniform Code Council (UCS) Direct Exchange (DEX) protocol on top of the lower

^(*) The EVA supports EVA-DTS for all new designs

layer. This was an existing protocol used in the retail industry and was adapted for the vending industry. The high level data that is transferred is a simple ASCII report containing data fields from the EVA-DTS

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5.3.2. OPTICAL AUDIT

This interface was developed to allow collection of data using an infra-red communications link that can be performed without requiring access to the inside of a vending machine. Low cost hardware as used in industry standard remote controllers was used and the DDCMP communication protocol was used as the lowest level. As various products developed a protocol for exchanging defined fixed length files of binary data was created, a new file type was added to this existing protocol to transfer variable length ASCII data file and this is the standard used by the EVA-DTS. Due to the fact that direct connection to the inside of the machine is not required, which needs a physical key, the protocol has security passwords built into it. From version 4 of the EVA-DTS an infrared interface based on IrDA (a PC standard) has been adopted.

5.3.3. PRINTER

Various machines and payment systems have the option to produce a printed report when a printer is connected. The format of the report and its content are proprietary and there is no international standard covering the printouts. The printer type and interface protocol (hardware or software controlled) is again proprietary

5.3.4. NEW DESIGNS

New designs should use only the infrared interface (version 4) and/or the DEX/UCS stereo jack. The infrared interface is common in Europe and DEX/UCS stereo jack common in the US.

6. EVA CASHLESS VENDING SPECIFICATION

Information on the EVA-CVS is available on the EVA Website, where a specific section is dedicated to the specification.