A.u.S. SPIELGERÄTE GMBH
SCHEYDGASSE 48, AT 1210 WIEN
+43 (0) 1 271 66 00 65 FAX +43 (0) 1 271 66 00 75
www.aus.at verkauf@aus.at

	BIN	PAR	PL1	SIO	SSP	eSSP	MDB	CCT	CC2	CC4
SMART Payout						x	x		x	
SMART Hopper						x			x	
SMART Coin System						x			x	
Twin SMART Coin System						x			x	
NV9	x	x	x	x	x	x	x	x		
NV200				x	x	x	x	x	x	
NV11						x	x			x
NV10	x	x	x	x	x	x	x	x		
BV50	x	x	x	x	x	x	x	x		
BV20	x	x	x	x	x	x	x	x		
BV100	x	x	x	x	x	x	x	x		
Bulk Coin Validator						x			x	
NV200Spectral					x	x		x	x	
NV9Spectral					x	x		x	x	x
TEBS						x				

	Line by Line	eSSP	Pulse	CCT
SMART Ticket		x		
NV12		x		x
CR-158	x	x	x	x
RP-80		x		

A.u.S. Spielgeräte GesmbH.
1210 Wien Scheydgasse 48 Tel. 0043/1/ 271 66 00 Fax. DW 75
http://www.aus.at E-mail: verkauf@aus.at

Banknote validator protocols explained

The banknote validator communicates with its host machine via a protocol that determines how the validator and the host machine transfer information. The host machine generally controls the validator by enabling it to accept banknotes and then interpret signals from the validator, allowing the host machine to determine the value of the note being read. Listed below are various available protocols that vary in terms of complexity, security and implementation. Innovative Technology's own protocol SSP (Smiley Secure Protocol) is a group 3, recommended protocol with increased security.

Group 1 Protocols

1. Parallel.

This is a basic 4 wire interface system where each note is recognised as a signal on an individual wire. There are four corresponding inhibit / enable lines on the validator so that individual note denominations can be selected. This interface provides a signal which is 100ms active low with the vend line dependant on the note that has been accepted. The host machine requires a pull up resistor, as all validator outputs are open collector. There is also an option to include an escrow control line from the host machine to the validator.

2. Binary.

Allowing up to 15 individual channels to be programmed into the validator the output signals are provided as a binary number representation on up to 4 output pins. It is only possible to Inhibit / enable a maximum of 4 individual channels. This interface also provides signals which are 100ms active low with the vend lines dependant on the note which has been accepted. The host machine requires a pull up resistor as all validator outputs are open collector. This interface also has the option to include an Escrow control line from the host machine to the validator.

3. Pulse.

This interface system allows up to 15 individual channels to be programmed into the validator. The output signals are provided as a discreet number of pulses on a single pin. It is only possible to inhibit/enable a maximum of 4 individual channels. This interface also provides signals which are 100ms active low, where each denomination can be set to send a specific number of pulses. The host machine requires a pull up resistor as all validator outputs are open collector. This interface also has the option to include an Escrow control line from the host machine to the validator.

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Group 2 Protocols

4. Serial Input / Output (SIO).

This interface has an increased level of control and protection as compared to those in Group 1.
This protocol is based on a single byte command and response system. The host machine issues its command to the validator which then responds with its own message. This system does not incorporate error checking or encryption. The speed of the communications can be selected as 300 baud or 9600 baud.

Group 3 Protocols

5. SSP (Smiley Secure Protocol).

This interface represents a high level of security for banknote validators, incorporating error checking and is Innovative Technology's own secure protocol. The validator communicates with the host machine by responding to a Poll command, the validator then sends a packet (a number of bytes) of data to the host machine. This packet of data contains a checksum which is sent from validator to host with the host machine then calculating its own checksum from the packet of data, which must agree with the transmitted checksum. The data also includes the validator serial number information to remove the risk of swapping out the validator for a different device. This serial protocol gives improved security from manual interference, compared with the group 1 protocols. There are sample VB code examples available from ITL as well as a full user manual on the implementation of SSP.

6. ccTalk.

This interface is also a secure communications protocol and is widely used in gaming machines. Data is further protected by including a 6 bit encryption key protecting data transferred between host and validator from external interference. The ccTalk protocol is one of the special interfaces programmed on ITL validators. Full details of the ccTalk protocol can be found at www.cctalk.org. The details of the encryption coding can be obtained on signing an NDA with ITL.

7. MDB.

This interface protocol is used predominantly on vending machines. This protocol allows multiple devices on the same bus eg. banknote validator, coin acceptor and coin hopper, controlled by the system on the host machine. The MDB protocol requires a special hardware adaptor to be included between the validator and the host machine. There are many interpretations of the MDB protocol and it is necessary to check with ITL that the MDB protocol which has been implemented on the note validator is actually compatible with the MDB controller board in the machine.