

# VegaStream

## Information Note

### ISDN Clocks






#### Introduction.

When connecting a digital Vega to an ISDN network, one end (the Vega or the Network) must supply a clocking signal to the line and the other must receive the clock from the line. Which end supplies the clock and which end receives the clock depends upon the system configuration though, typically the PSTN provides the clock and devices connected to it receive the clock.

This document identifies the parameters that need to be configured within the Vega, and the values to use in various scenarios.

The configuration scenarios defined in this document are relevant to the Vega 50 BRI the Vega 100 T1, Vega 100 E1 and the Vega 400 E1/T1.

#### *Vega parameters*

1. NT/TE (dsl.port.x.nt)
2. Clock master (dsl.port.x.clock\_master) Vega 100 and Vega 400 only
3.  Bus Master (dsl.bus\_master)
4.  Switch\_clock (\_advanced.isdn.switch\_clock) Vega 100 only
5.  Bus Master Priority (dsl.port.x.bus\_master\_priority)

#### **NT versus TE and clock\_master**

NT means NeTwork, and TE means Terminal Equipment. To interoperate a TE device must be connected to an NT device.

Strictly the NT / TE configuration defines the operation of the signalling state machine run on the interface, however, in practice it also tends to define whether the interface is a clock provider or a clock receiver. The NT (network) device typically provides the clock, and the TE device receives the clock.

On the Vega 100 and Vega 400 it is possible to independently configure NT / TE and clock\_master. On the Vega 50 BRI clock\_master is internally configured to be the same as NT; if a port is NT it will source the clock (be clock\_master), and if TE it will receive the clock.

To configure a Vega trunk as NT set `dsl.port.x.nt=1`; to configure a Vega trunk as TE set `dsl.port.x.nt=0`.

To configure a Vega 100 or Vega 400 trunk to supply the clock set `dsl.port.x.clock_master=1`; to configure a Vega 100 or Vega 400 trunk as clock receiver set `dsl.port.x.clock_master=0`.

Typically it is best to set `dsl.port.x.nt` to be the same value as `dsl.port.x.clock_master` (NT = clock provider and TE = clock receiver).


These values may also be configured on the individual port pages off the main DSL page of the web browser.

## Bus master

The Vega receives a clock on all ports configured with `clock_master = 0` (Vega 100 and Vega 400) and with `nt=0` (Vega 50 BRI). The Vega needs to select one of these ports as the one to synchronise its internal clock with.

If the Vega is not configured to synchronise with the ISDN Network that it is attached to, but is allowed to clock at some other rate, then, because the clock rates will not be exactly identical this will introduce "clock slip". The result of "clock slip" is loss of small segments of data between the Network and the Vega, hence it may introduce clicks in the audio. With audio calls this may just be annoying, however with fax and modem calls re-transmissions of data will be required to get around this – resulting in longer phone calls, or if the slip is too bad, failed calls will result as the re-transmissions may not cope with the drop out.


If all Vega ports are configured as NT the Vega will be providing the clock on all of them. Therefore there is no incoming clock to synchronise with, and so no port will be bus master.

 Prior to release 7, the configuration parameter `bus_master` defined which trunk the Vega would synchronise its internal clock with.

Valid values for `bus_master` are:

- Vega 100 = 1 or 2
- Vega 50 BRI = 1 to 4

`bus_master` should be configured to the port ID of a port configured to receive the clock.

 From release 7 an enhanced scheme for choosing bus master is supported. Each ISDN port has a `bus_master_priority` parameter.

Valid values for `bus_master_priority` are:

- Vega 400 = 0 to 4
- Vega 100 = 0 to 4
- Vega 50 BRI = 0 to 4

A value of 0 identifies that this port should never be used to synchronise the clock. Ports which are clock master can have `bus_master_priority` set to 0 (though internally a Vega treats clock master ports as though their `bus_master_priority=0` anyway).

`bus_master_priority= 1 to 4` defines a preference level for that port being the synchronising source for the clock. A value 1 is the highest preferred value, and 4 the least preferred.

The Vega will synchronise its internal clock with the port that is configured as clock slave (clock receiver), has layer 1 up, and has the highest `bus_master_priority` value. If no port satisfies these criteria, the Vega will run using its own internal clock.

## **Switch\_clock**

Vega 100 units have an additional parameter to control the actions of the unit under network disconnection / failure conditions. A parameter `switch_clock` specifies whether the Vega should actively do something if the clock source to the bus\_master trunk fails.

`switch_clock=1`

configures the Vega so that if its bus master loses its input clock it will switch to using the internal system clock as its clock source.

`switch_clock=0`

is available for backward compatibility purposes only; if the Vega loses its clock it will still try to synchronise to the trunk, which if not being driven will be clocking at its free-run speed.

It is recommended that on Vega 100s `Switch_clock` is always set to 1.



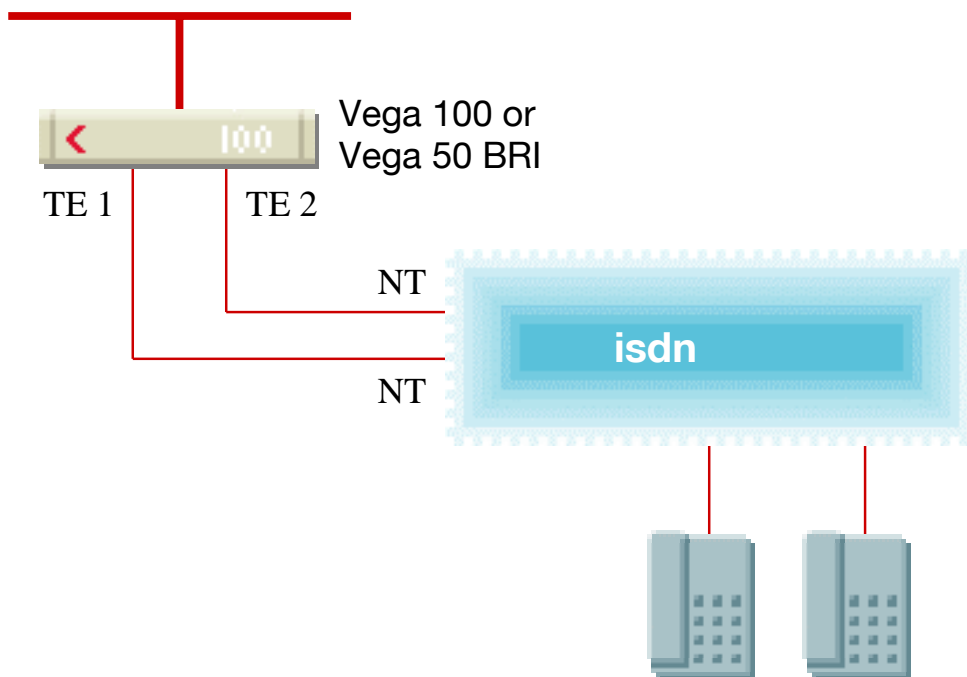
### **WARNING!**


**If `switch_clock (_advanced.isdn.switch_clock)` is set to 0, and the trunk which is configured as `bus_master=1` and `clock_master=0` loses its incoming clock signal from the ISDN Network, the interface chip will free run at an indeterminate rate (maybe within or outside the clocking spec). The Vega will synchronise its internal clock from this signal and hence**


- a) **if the other trunk is `clock_master=1` then the driven clock will be synchronised to this indeterminate clock source;**
- b) **if the other trunk is also `clock_master = 0` then “clock slip” will occur as the rate of the free running clock will not be identical to that of the attached clock master (ISDN Network).**



### Configuring a Vega with one or more trunks configured as TEs

For example a Vega with two trunks each connected to the ISDN



Trunk TE1	Vega 100	Vega 50 BRI
dsl.port.1.nt	0	0
dsl.port.1.clock_master	0	N/A
 dsl.port.1.bus_master_priority	1 to 4	1 to 4

Trunk TE2	Vega 100	Vega 50 BRI
dsl.port.2.nt	0	0
dsl.port.2.clock_master	0	N/A
 dsl.port.2.bus_master_priority	1 to 4	1 to 4

Other	Vega 100	Vega 50 BRI
 dsl.bus_master	1 or 2*	1 or 2**
 advanced.isdn.switch_clock	1	N/A

\*set to desired trunk (one which is a clock receiver, V100 clock\_master =0 or Vega 50 BRI nt=0)

+ If trunks 3 and 4 are also connected to the ISDN and configured as TE (nt=0), then selecting 3 or 4 is also acceptable



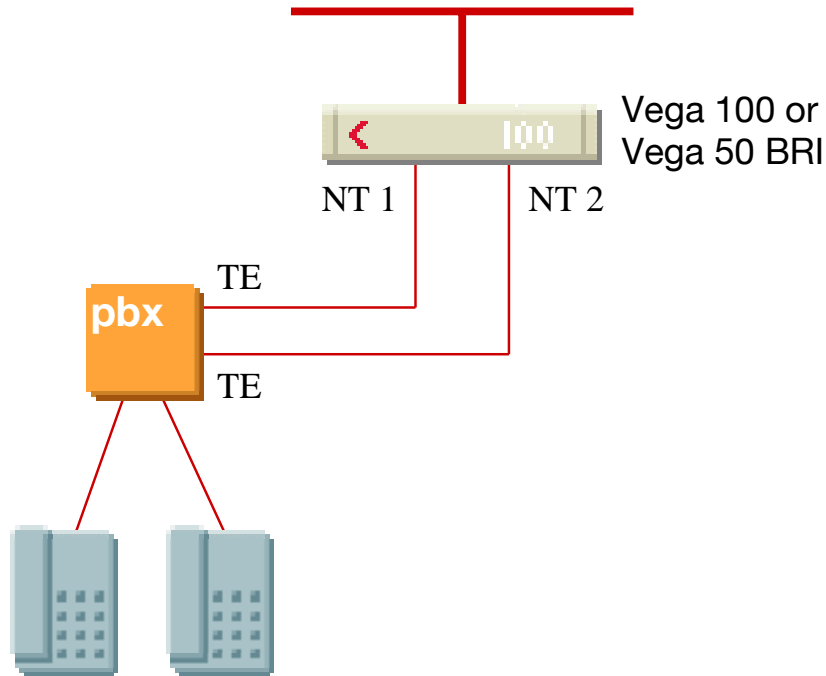
#### WARNING!


If different unsynchronised devices are attached to a Vega, each providing the clock (being clock\_master), then there will be “clock slip” on ports which are not bus master.


Slip may result in clicks in the audio and, for example, failed fax transmissions.



System design should ensure that all clocks are mastered from a single source – typically the telephony network.

**Configuring a Vega with all trunks = NT**

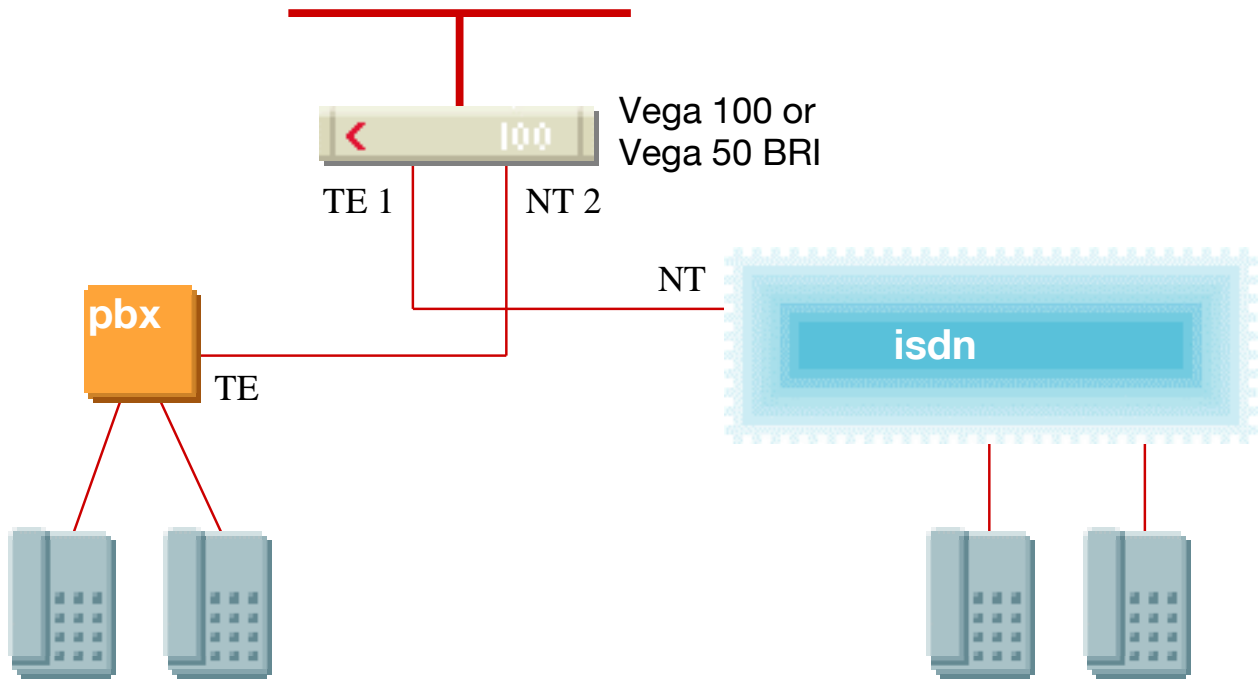



Trunk NT1	Vega 100	Vega 50 BRI
dsl.port.1.nt	1	1
dsl.port.1.clock_master	1	N/A
 dsl.port.1.bus_master_priority	0	0


Trunk NT2	Vega 100	Vega 50 BRI
dsl.port.2.nt	1	1
dsl.port.2.clock_master	1	N/A
 dsl.port.1.bus_master_priority	0	0



Other	Vega 100	Vega 50 BRI
 dsl.bus_master	1 or 2	1 or 2 (or 3 or 4)
 advanced.isdn.switch_clock	1	N/A

Configuring a Vega with 1 trunk = TE and 1 trunk = NT



Trunk TE1	Vega 100	Vega 50 BRI
dsl.port.1.nt	0	0
dsl.port.1.clock_master	0	N/A
 dsl.port.1.bus_master_priority	1 to 4	1 to 4

Trunk NT2	Vega 100	Vega 50 BRI
dsl.port.2.nt	1	1
dsl.port.2.clock_master	1	N/A
 dsl.port.1.bus_master_priority	0	0

Other	Vega 100	Vega 50 BRI
 dsl.bus_master	1	1
 _advanced.isdn.switch_clock	1	N/A

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