
Aprisa XE Technical Paper

Radio Clocking Configuration

February 2009 Version 1.2

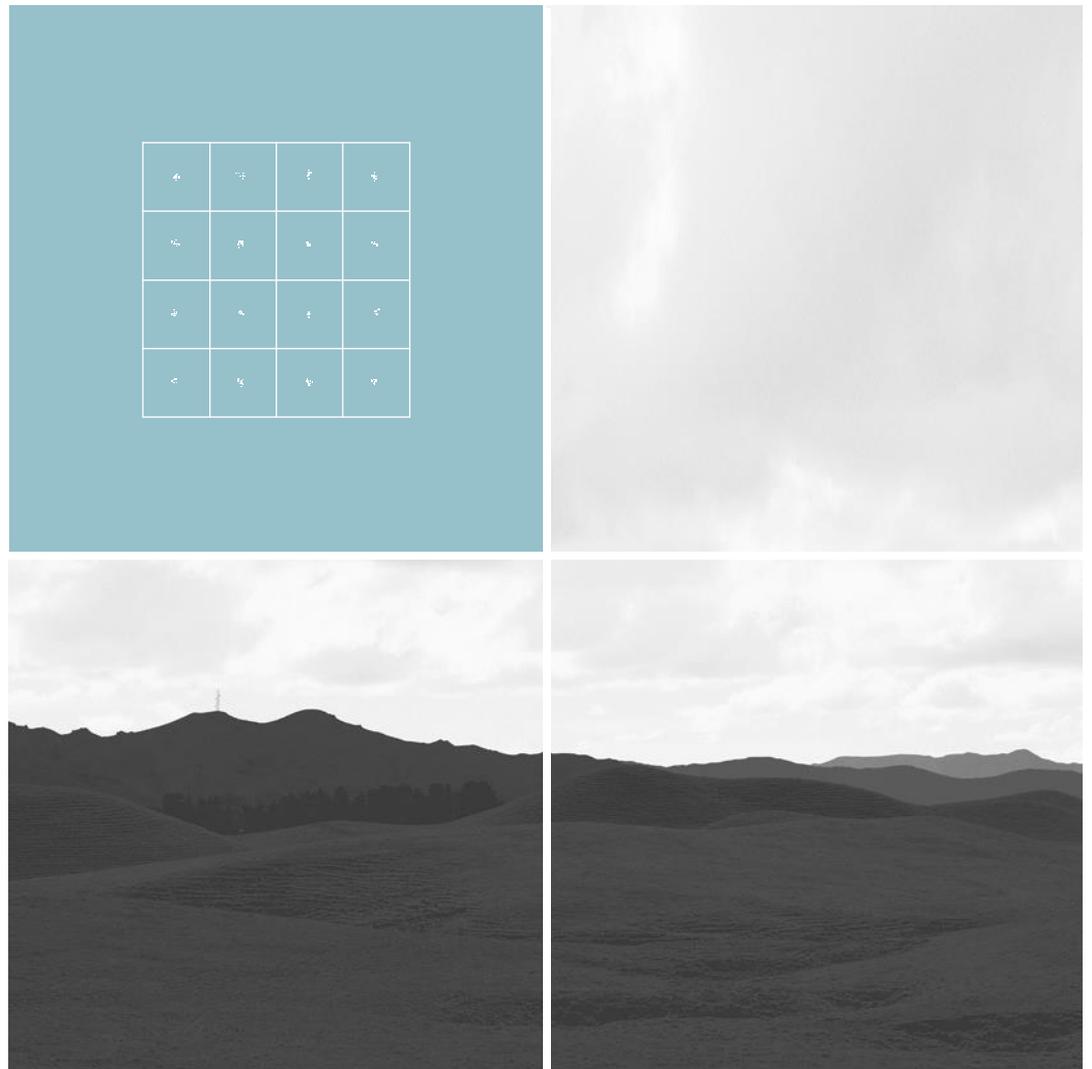


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1. Radio Clocking

1.1. Introduction

This Technical Paper gives information on how to setup the clocking for the Aprisa XE radio in various network configurations.

Setting the Aprisa XE clocking correctly is one of the most important aspects of network configuration. Due to the versatility of the Aprisa XE it can be used in a number of different applications. This Technical Paper has been created so that these situations can be better understood and the Aprisa XE set up accordingly in your network.

All clocking configuration is done via the Aprisa XE SuperVisor software. See the Aprisa XE manual for more detailed information on how to connect to an Aprisa XE radio via Ethernet.

This Technical Paper covers software version 8.2.10 and earlier.

Once SuperVisor is open radio clocking options can be accessed from the Clocking menu, as shown in figure 1 below.

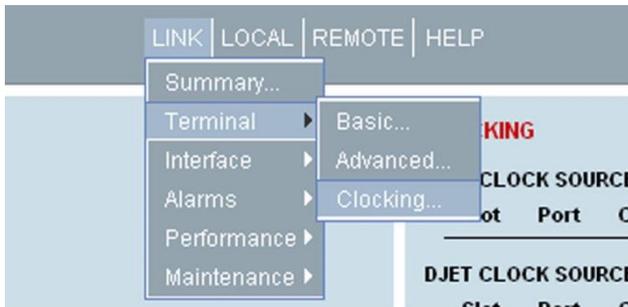


Figure 1 : Clocking Menu

2. Clocking Setup

2.1. Internal

To select internal as the radios clocking mode, select “Internal” from the Clock Source drop down box. Once selected, click on the “Apply” button. This will apply the clocking changes to the radio.

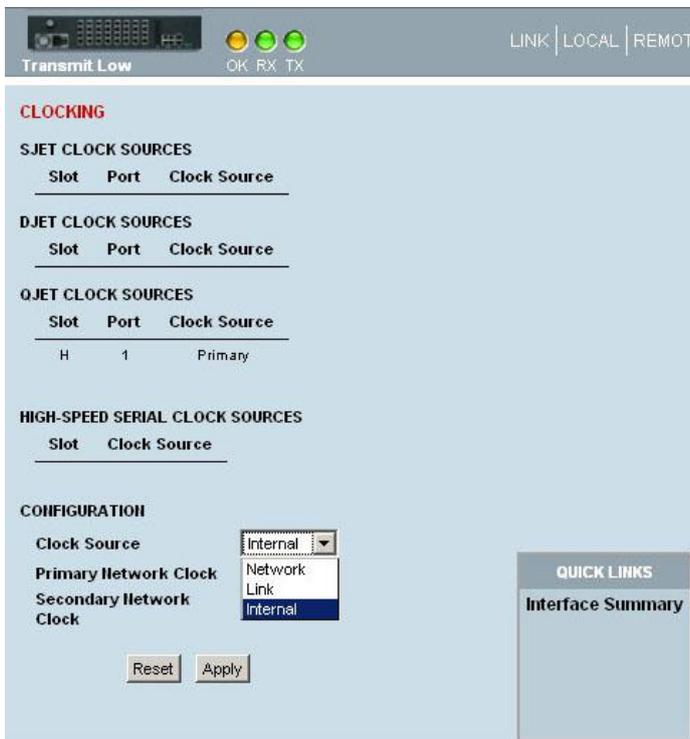


Figure 2 : Internal Clocking Option

2.2. Link

To select link as the radios clocking mode, select “Link” from the Clock Source drop down box. Once selected, click on the “Apply” button. This will apply the clocking changes to the radio.

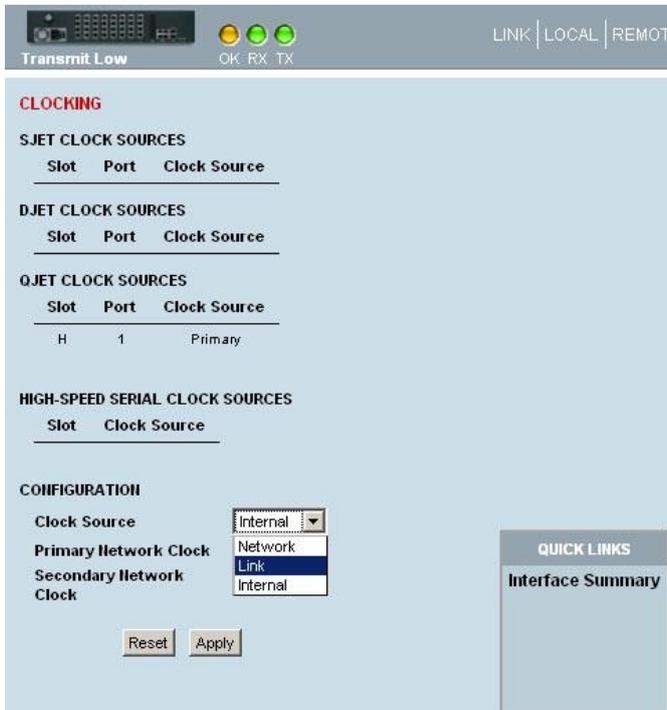


Figure 3 : Link Clocking Option

2.3. Network

Selecting a Network clocking source is a two step process. First the radio must be set to Network clocking. Then an interface must be configured as the network clock input.

Select “Network” from the Clock Source drop down box. Once selected, click on the “Apply” button.

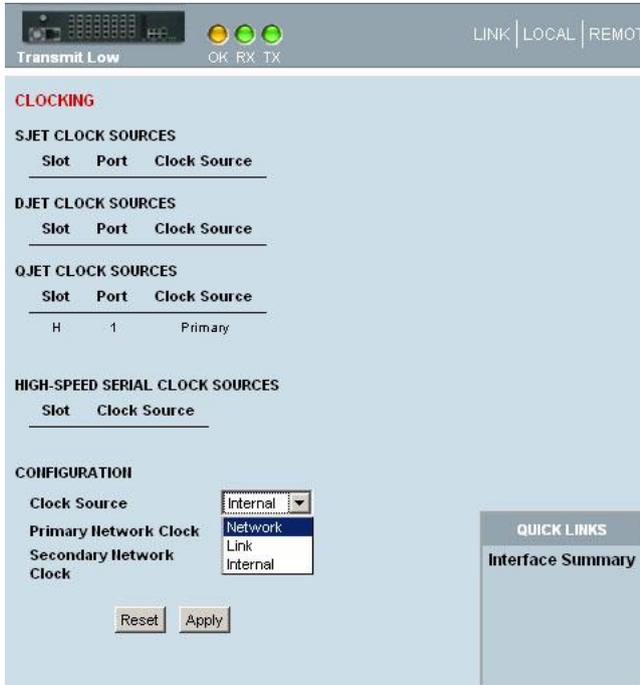


Figure 4 : External Clocking Option

The next step involves selecting the external interface that the radio is to clock from, be it an E1/T1 or HSS port.

Before setting up network clocks the cross-connect application must be started and a cross-connect between the ports you wish to use as external clocks established.

Once cross-connections are made navigate to the interface page and select the card and then port which you want to clock from, as shown in the figures below.



Figure 5 : Interface Summary menu

Select the slot of the card which you want to make the network clock source. Click on “Configure Interfaces” button once selected.

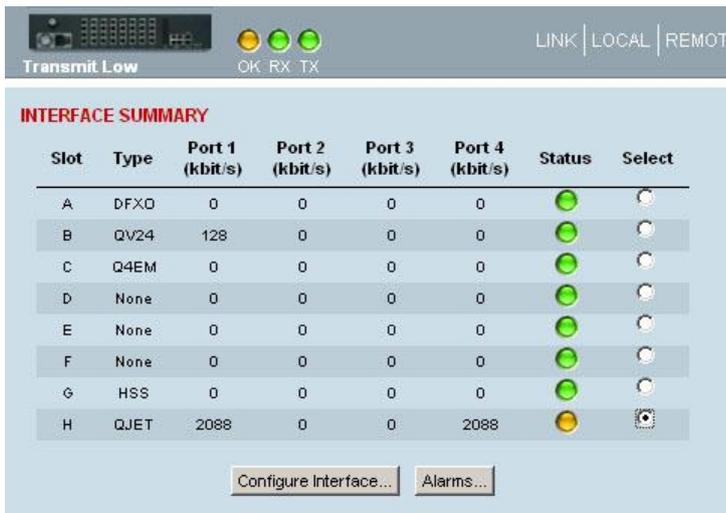


Figure 6 : Card select

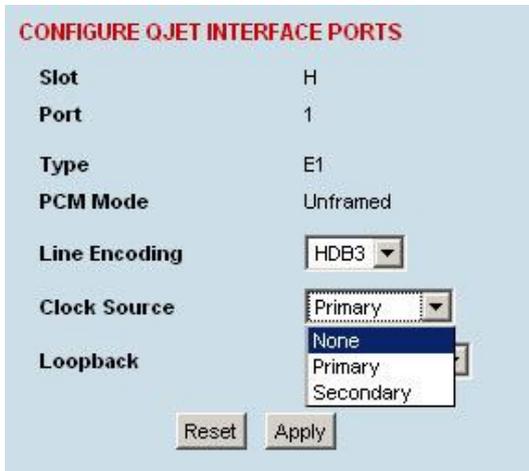
Select the port of the card which you want to make the network clock source. Click on “Edit” button once selected. For HSS cards this step is not required as the HSS card only has a single port.



Figure 7 : Interface port select

Using the “Clock Source” drop down box, select the clock source type, primary or secondary. Then click on the “Apply” button to make changes.

2.3.1. QJET clocking setup

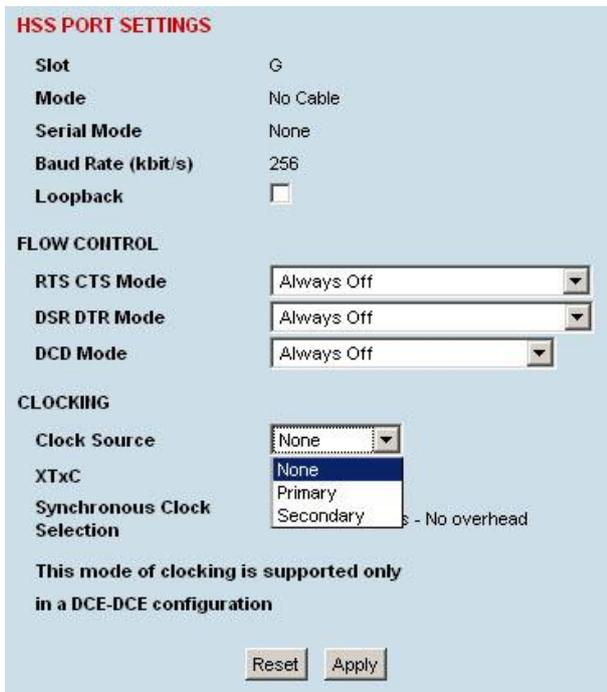


CONFIGURE QJET INTERFACE PORTS

Slot: H
 Port: 1
 Type: E1
 PCM Mode: Unframed
 Line Encoding: HDB3
 Clock Source: Primary (dropdown menu open showing None, Primary, Secondary)
 Loopback:
 Buttons: Reset, Apply

Figure 8 : QJET port clock setting

2.3.2. HSS clocking setup



HSS PORT SETTINGS

Slot: G
 Mode: No Cable
 Serial Mode: None
 Baud Rate (kbit/s): 256
 Loopback:

FLOW CONTROL

RTS CTS Mode: Always Off
 DSR DTR Mode: Always Off
 DCD Mode: Always Off

CLOCKING

Clock Source: None (dropdown menu open showing None, Primary, Secondary)
 XTxC:
 Synchronous Clock Selection: - No overhead
 Note: This mode of clocking is supported only in a DCE-DCE configuration
 Buttons: Reset, Apply

Figure 9 : HSS clock setting

Repeat the above process to set up a secondary external clock source if needed.

3. External Clock Failure

If the terminal Clock Source is set to Network, the terminal will automatically clock from the nominated primary clock source if that clock source is available.

If the nominated primary clock source is not available, the terminal will clock from the nominated secondary clock source if that clock source is available.

If the nominated secondary clock source is not available, the terminal will clock from the internal clock source.

When a nominated clock source becomes available (primary or secondary), the terminal will then clock from that clock source.

4. Network Clocking Examples

4.1. Single Link

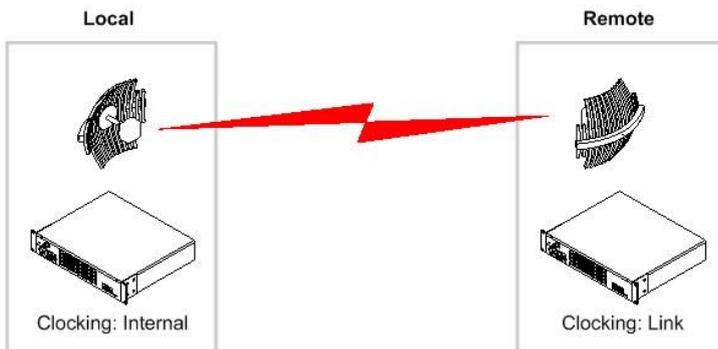


Figure 10 : Single link network diagram

The above network is the simplest network possible. One radio is set to “Internal” clocking and the other “Link”. The radio set to internal will generate an internal clock for timing. The radio set to “Link” will use the clock extracted from data stream passed over the RF link.

4.2. Back to back links – Unframed E1

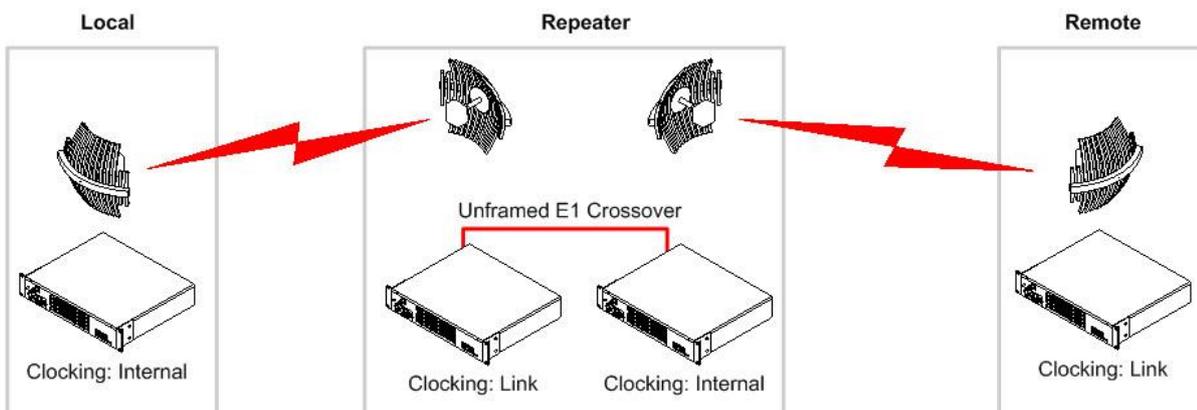


Figure 11 : Back to back unframed E1 network diagram

The above network uses a repeater site to pass the radio traffic between three sites. At the repeater site the radios are interlinked via Unframed E1. As clocking information is carried across this E1 circuit the next radio pair can be set to Internal and its partner Link.

4.3. Back to back links – Framed E1

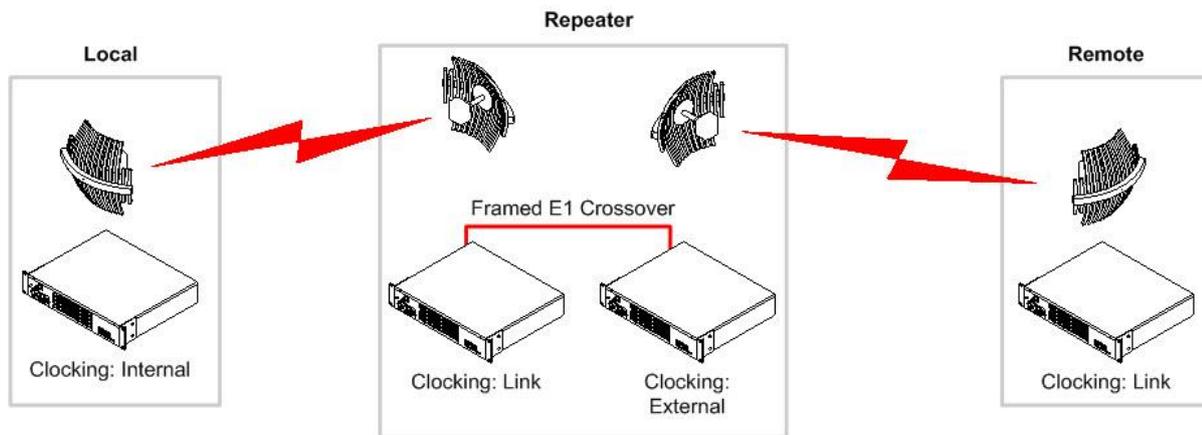


Figure 12 : Back to back framed E1 network diagram

The above network uses a repeater site to pass the radio traffic between two sites. The radio at the local site is set to internal and will generate the clocking for the entire network. The radios set to “Link” will derive their clocking from the corresponding radio. At the repeater site the radios are interlinked via framed E1. Because clocking information is not passed over a framed E1 the second radio link needs to clock from the first radio link, in order to maintain synchronisation across the network. The radio at the repeater site is set to External and is clocked of the incoming Framed E1 circuit.

4.4. 4 wire drop and insert

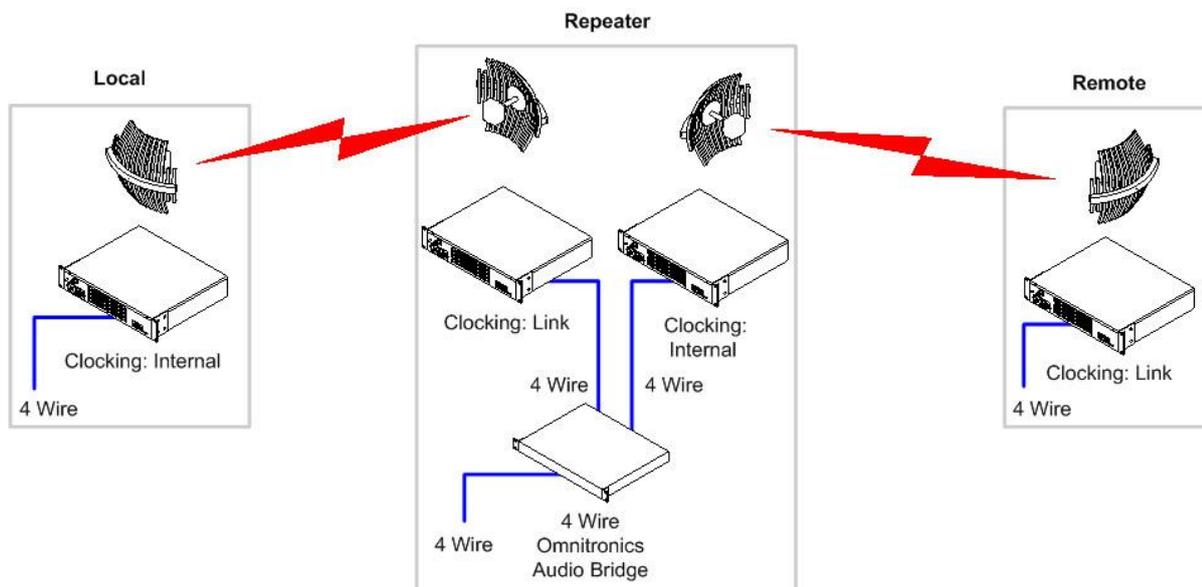


Figure 13 : Drop and insert 4 wire network diagram

The above network uses a repeater site to pass a 4 wire circuit between sites. This would be a typical setup for 2 way radio site interlink, where keying of all sites at once is required. To facilitate the drop and insert of the 4 wire circuits an external audio bridge is used.

As the traffic being transported is not digital, paired radios can be set to internal and link.

4.5. Branched Network - Mixed

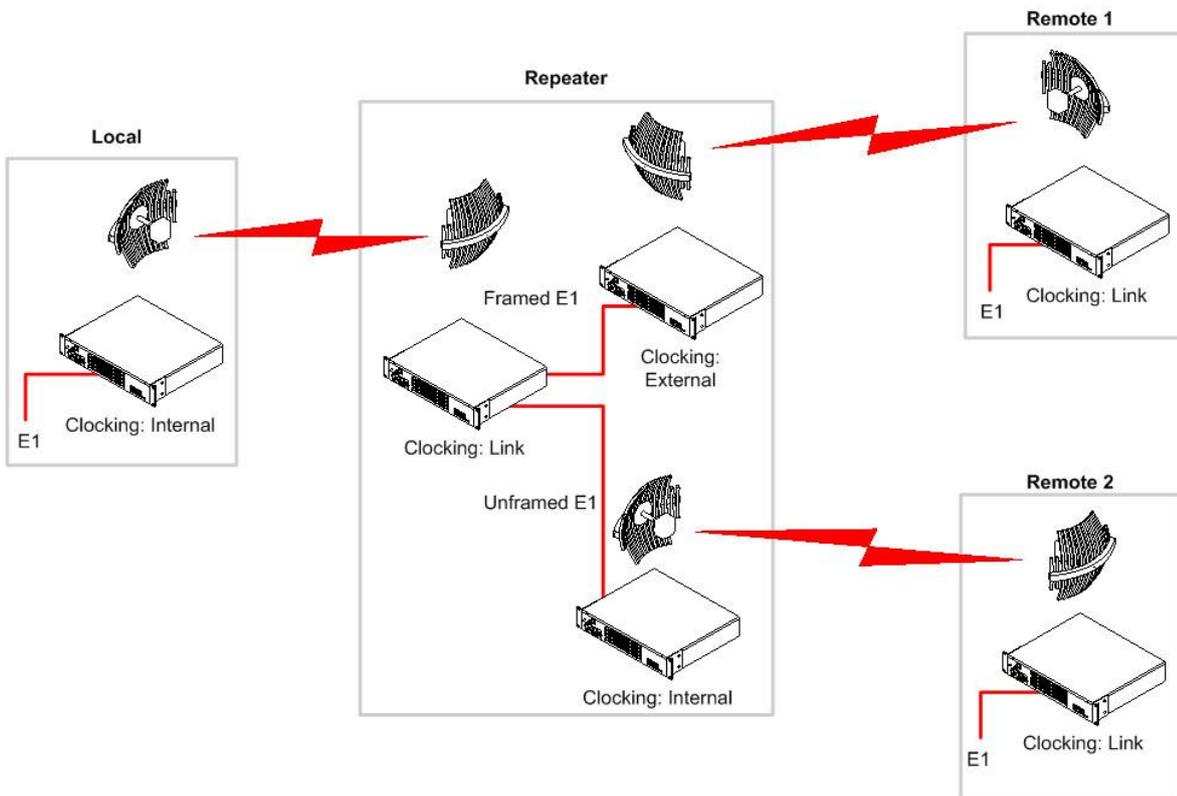


Figure 14 : Branched network diagram

The above network uses a repeater site to pass E1 to two sites. In this case a mix of Framed E1 and Unframed E1 is used. As in previous examples Framed E1 needs to have external clocking used. Unframed E1 can have Internal clocking used.

The radios linking between the Repeater site and Remote 1 have clocking set to External / Link as Framed E1 is being carried.

The radios linking between the Repeater site and Remote 2 have clocking set to Internal / Link as Framed E1 is being carried.

4.6. Central Master Clock

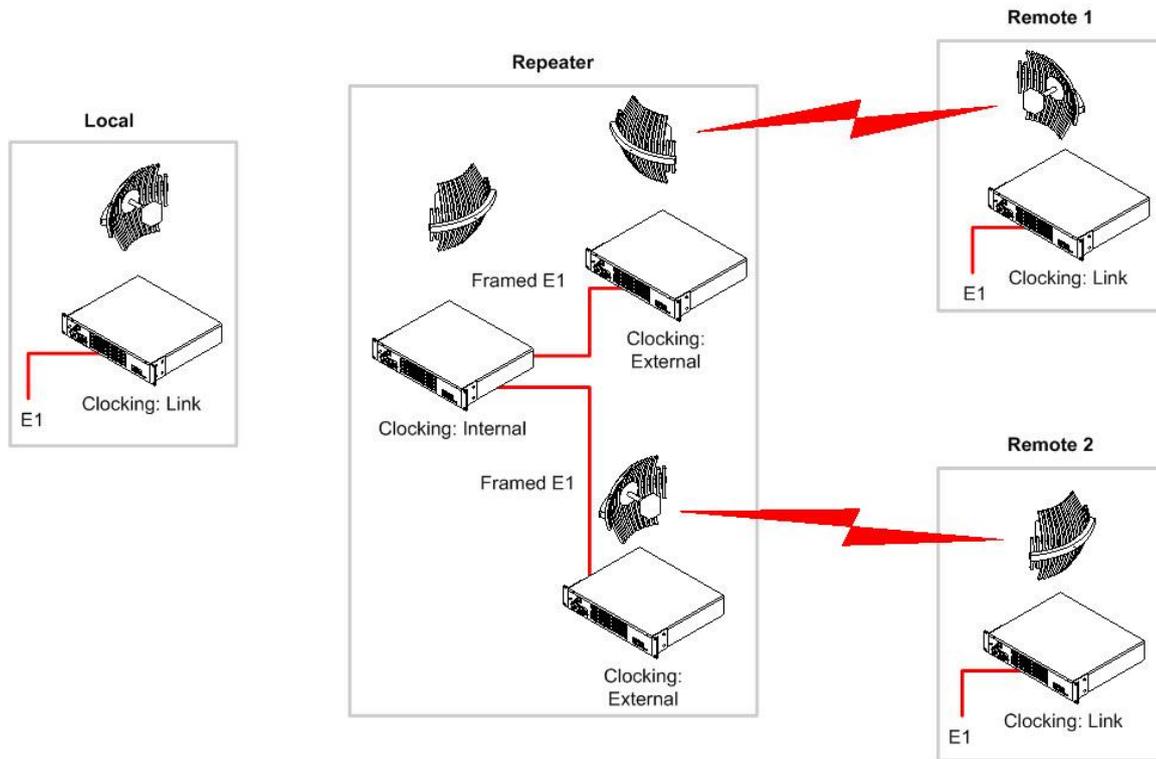


Figure 15 : Central Master Clock

The above network uses a repeater site to pass Framed E1 to two sites. One radio at the repeater site is set to “Internal” and is the clock source for the entire network.

As in previous examples Framed E1 needs to have external clocking used. So each radio pair going to Remote 1 and Remote 2 have the clocking set to External and Link.

4.7. External E1 master clock

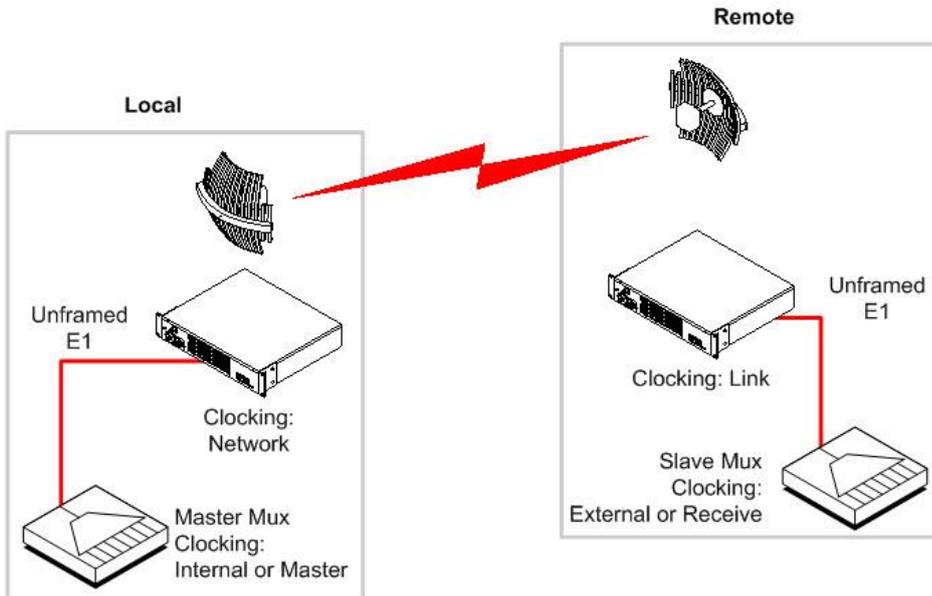


Figure 16 : External E1 master clock network diagram

The above network has external multiplexers which require the transport of Unframed E1. The Master multiplexer at the "Local" site will provide the clocking for the entire network. The first radio clocks off the Unframed E1 coming from the "Master Mux" with its clocking source set to External. The radio at the far end of the link is set to "Link". The multiplexer at the "Remote" site has to be set to "External" or "Receive" clocking (naming dependant on manufacturer)

As clocking information is carried in the Unframed E1 the radios could also be set to Internal at the Local site and Link at the Remote site.

4.8. External HSS master clock

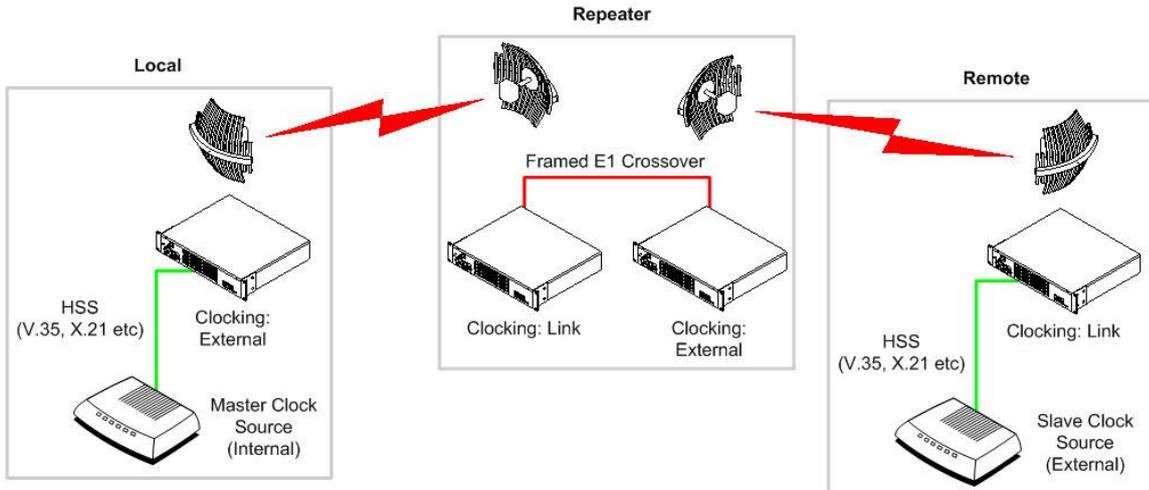


Figure 17 : External HSS master clock

The above network has external devices which require the transport of High Speed Synchronise (HSS) Data (X.21, V.35 etc). The Master device at the local site will provide the clocking for the entire network. The first radio clocks off the HSS coming from the Master HSS device with its clocking source set to External. At the repeater site the two radios are interconnected with Framed E1. Because of this, external clocking needs to be used on the second repeater radio. The HSS device at the remote site needs to be set to receive or external clocking (naming dependant on manufacturer).