IPM-1SE Application example

The following is broken into 5 steps that need to be configured for each unit. For clocking concerns, the IPM-1SE pair can be considered transparent. However, for proper operation, the configuration must be set to place the "Master" unit towards the E1 clock source (towards the up stream) and place the "Slave" unit towards the CPE side.

Connect the IPM-1SE via serial console cable to a PC or notebook with HyperTerminal program or other VT-100 compatible terminal program and set the communication parameters for 115.2k, 8 bits, no parity, 1 stop bit, and no flow control. Once the terminal is connected to the IPM, power on the IPM and the terminal show display the IPM's prompt. Comments are placed in brackets { }.

```
RS160:\>
```

Configuration Steps for Master unit.
Step 1. dBase initialize

```
RS160:\> a                          {enter the admin menu}
RS160:\Admin> sddb e1 loopback      {call up initial database}
RS160:\Admin> \c\rr                 {Replace & Reload}
```

Step 2. Uplink's TCP/IP setting

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> up                   {enter Uplink menu}
RS160:\Config\UPLINK> ssip 10.128.46.18      {Set Static IP}
RS160:\Config\UPLINK> ssnm 255.255.254.0     {Set SubNet Mask}
RS160:\Config\UPLINK> \c\rr         {Replace & Reload}
```

Step 3. Uplink's default gateway

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> g                    {enter general menu}
RS160:\Config\General> sdg 10.128.46.1       {Set Default Gateway}
RS160:\Config\General> \c\rr        {Replace & Reload}
```

Step 4. Configure E1

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> e1                   {enter E1 menu}
RS160:\Config\E1> sccm loopback     {set config clocking mode master}
RS160:\Config\E1> sfm framed        {set frame mode framed}
RS160:\Config\E1> sllc hdb3         {set LUI line code HDB3}
RS160:\Config\E1> sltt e1_120       {set LUI buildout E1}
RS160:\Config\E1> slrt 120ohm       {set LUI Rx termination 120 Ohms}
RS160:\Config\E1> sfp pcm31         {set frame parameter PCM31}
RS160:\Config\E1> \c\rr             {Replace & Reload}
```

Step 5. Configure TDMoIP

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> top                  {enter TDMoIP menu}
RS160:\Config\TDM_Over_Packet> ccip 10.128.46.19  {set target IP}
RS160:\Config\TDM_Over_Packet> sts 14 24 28 29    {set time slots}
RS160:\Config\TDM_Over_Packet> gfts     {get frame time slots}

Timeslot #              0----0----1----1----2----2----3-
                        0----5----0----5----0----5----0-

Running_config          FXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Modified Running_config F-------------X---------X---XX--

RS160:\Config\TDM_Over_Packet> \c\rr    {Replace & Reload}
```

Configuration Steps for Slave unit.

Step 1. dBase initialize

```
RS160:\> a                          {enter the admin menu}
RS160:\Admin> sddb e1 recovery      {call up initial database}
RS160:\Admin> \c\rr                 {Replace & Reload}
```

Step 2. Uplink's TCP/IP setting

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> up                   {enter Uplink menu}
RS160:\Config\UPLINK> ssip 10.128.46.19      {Set Static IP}
RS160:\Config\UPLINK> ssnm 255.255.254.0     {Set SubNet Mask}
RS160:\Config\UPLINK> \c\rr         {Replace & Reload}
```

Step 3. Uplink's default gateway

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> g                    {enter general menu}
RS160:\Config\General> sdg 10.128.46.2       {Set Default Gateway}
RS160:\Config\General> \c\rr        {Replace & Reload}
```

Step 4. Configure E1

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> e1                   {enter E1 menu}
RS160:\Config\E1> sccm recovery     {set config clocking mode slave}
RS160:\Config\E1> sfm framed        {set frame mode framed}
RS160:\Config\E1> sllc hdb3         {set LUI line code HDB3}
RS160:\Config\E1> sltt e1_120       {set LUI buildout E1}
RS160:\Config\E1> slrt 120ohm       {set LUI Rx termination 120 Ohms}
RS160:\Config\E1> sfp pcm31         {set frame parameter PCM31}
RS160:\Config\E1> \c\rr             {Replace & Reload}
```

Step 5. Configure TDMoIP

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> top                  {enter TDMoIP menu}
RS160:\Config\TDM_Over_Packet> ccip 10.128.46.18  {set target IP}
RS160:\Config\TDM_Over_Packet> sts 14 24 28 29    {set time slots}
RS160:\Config\TDM_Over_Packet> gfts     {get frame time slots}

Timeslot #              0----0----1----1----2----2----3-
                        0----5----0----5----0----5----0-

Running_config          FXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Modified Running_config F-------------X---------X---XX--

RS160:\Config\TDM_Over_Packet> \c\rr    {Replace & Reload}
```

The previous TDM configuration is for E1, 120 ohm connection to the RJ-45 connectors. To connect via twisted pair on the RJ-45 TDM connector, the connections are:

1 - RRING
2 - RTIP
4 - TRING
5 - TTIP

No configuration was done for the local LAN port.

Connect the IP network to the Uplink connector, straight UTP will connect to switch.

Fine tuning

There are two parameters that should be adjusted to provide error free operation in "real" networks; they are the jitter buffer and the payload length.

Jitter Buffer: The default jitter buffer for a full E1 unframed transmission is only 5ms. If the latency of Ethernet on the master to slave units is more than 5ms, errors will occur. To check LAN latency, issue a ping from the LAN A to LAN B. Find the average latency and increase the jitter buffer to handle the latency. For voice applications, keep the jitter buffer under 250ms (1/4 second) to avoid any noticeable delay in voice. The command to modify the jitter buffer is:

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> top                  {enter TDMoIP menu}
RS160:\Config\TDM_Over_Packet> cclk 100 {increase jitter to 100ms}
RS160:\Config\TDM_Over_Packet> \c\rr    {save}
```

Payload Length: In wireless applications, a large payload is preferred. In unframed E1, the default payload length is only 96bytes. To increase it do the following:

```
RS160:\> c                          {enter configuration menu}
RS160:\Config> top                  {enter TDMoIP menu}
RS160:\Config\TDM_Over_Packet> ccpl 265 {set payload to 256 bytes}
RS160:\Config\TDM_Over_Packet> \c\rr    {save}
```

<end>