Connecting FreeSpeakII Transceivers and Splitters via fiber

Version 3.0

The fiber solution for FreeSpeakII antenna links utilizes 3rd party components. This solution has been used in temporary and in permanent installations to connect remote splitters and antennas via fiber. The users that have used this solution have reported success.

The solution utilizes standard E1 media converters for the audio datastream and a serial media converter for transport of the critical DECT sync (as per the DECT standard the sync follows the electrical characteristics of RS422/485).

Before proceeding, it is important to understand the following;

1) This solution isn't officially supported by Clear-Com.
   Clear-Com can provide some information. If the solution fails, Clear-Com won't be able to use Engineering resources to troubleshoot.
2) Clear-Com can't be held liable for any damages it may cause. The solution utilizes third party devices that Clear-Com has no control over.
3) This solution, when implement correctly, works for a recent software release. Clear-Com's engineering team is always moving forward. We can't guarantee that future versions and future features will work using this solution.

Video overview;
https://www.dropbox.com/s/6cdgpq39j1oskwz/IMG_2851.MP4?dl=0

COMPONENTS – MEDIA CONVERTERS

E1 media converter @ approximately $245 each
http://datainterfaces.com/FRM220-E1-T1-SFP.aspx

Serial media converter @ approximately $170 each
http://datainterfaces.com/FRM220-SERIAL-SFP.aspx

These media converter modules come in a standalone chassis with a small PSU wall wart and are similar in size to a direct box.

The media converters listed above utilize SFP (Small Format Pluggable) fiber transceivers that are not included with the modules.

COMPONENTS – CHASSIS

The media converter modules can alternatively be mounted in an optional chassis with built in AC PSUs;

19” Chassis for 8 modules @ ~ $239 each
http://datainterfaces.com/FRM220-CH08.aspx
AC PSU for 19” chassis (one or two can be mounted in the chassis) @ ~ $139 each
http://datainterfaces.com/FRM220-CH08-AC.aspx

8 slot rackmount chassis

Network management module for the rack frame with OPTIONAL webserver @ ~ $264 each
http://datainterfaces.com/FRM220-NMC.aspx

Standalone chassis for two media converter modules with built in AC PSU @ ~ $88 each
http://datainterfaces.com/FRM220-CH02M-AC.aspx

E1 and Serial Media Converter loaded in a 2 slot chassis

COMPONENTS – SFP FIBER TRANCEIVERS

SFP fiber transceivers MUST be capable of operating at data speeds of 36.864Mbps as many Fast Ethernet/155MB SONET capable transceivers can. More commonly available 1GB (or higher speed) SFP fiber transceivers may not work in these media converters.

Various versions of transceivers are available depending on the application to allow it to match distance requirements and fiber size (single mode / multi mode).

BiDirectional single mode SFP fiber transceiver to allow a link to be transported on 2 strands of fiber @ ~ $35 each (total 4 needed per link – 2 per side).

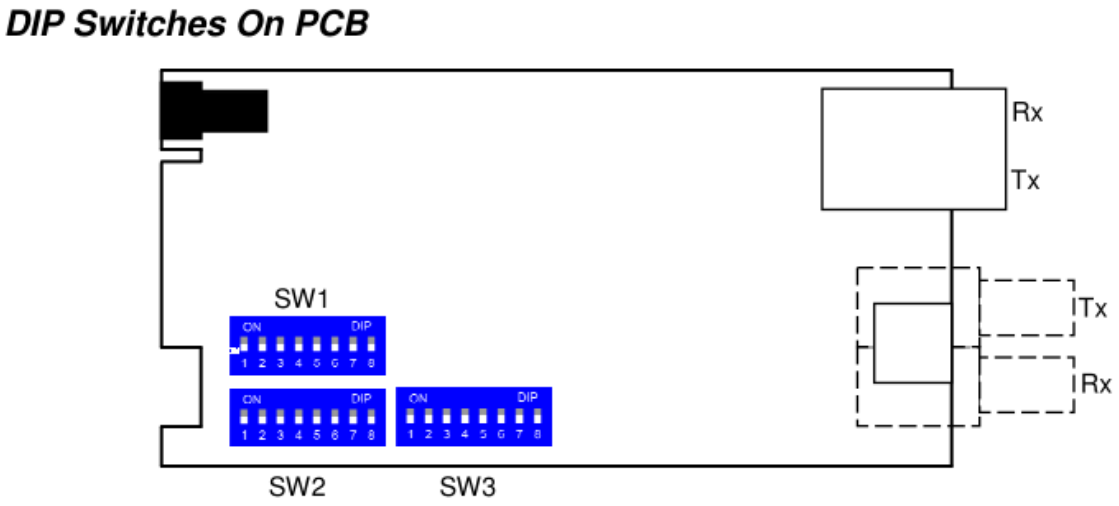
When using BiDirectional transceivers one side of a link must use A type and connect to a B type transceiver on the other side.
2 x SFS-5020-WA – A type
2 x SFS-5020-WB – B type
http://datainterfaces.com/SFP-OC3-155M-Fast-Ethernet.aspx

CONFIGURATION – MODULE DIP SWITCHES

The E1 and Serial Media Converters MUST have all DIP switches set to OFF.

E1 module -> E1 unframed mode
Serial -> RS422 half duplex mode

We normally see the devices come out of the box in this configuration.



CONFIGURATION – CONFIGURATION via SERIAL TERMINAL

When the E1 media converter is used in a chassis with DB9 Female console port, the card must be set via the serial console.

The E1 media converter will NOT follow the modules DIP switch settings when used in a chassis with a console port.

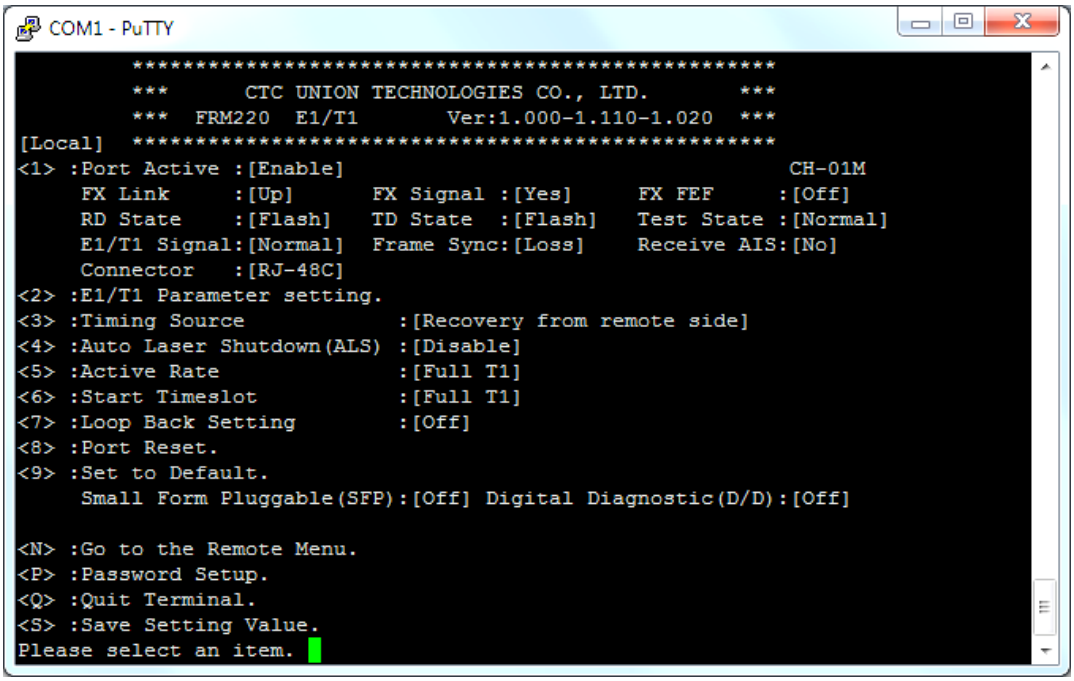
Connection to the console port requires

- 1:1 DB9 cable from a PC (or USB-to-RS232 adapter)

Terminal software should be set to;

- 38.400bps
- 8 bit
- no parity
- 1 stop bit
- no handshaking

The serial console menu looks like this:



To configure the media converter for E1, do the following menu operations on both devices:

<9> Set to Default
E1 is default, HDB3, Unframed, no CRC4
<S> Save Setting Value
<1> Save and Quit

Please note:
The Serial Media Converter does not need to be configured by serial terminal when in a chassis with a serial terminal port. Only DIP switch configuration is needed.

CONFIGURATION – IP CONFIGURATION

When the card is placed in a managed chassis with NMC (SNMP management card), all settings by DIP and/or console are overridden by the management card.

Refer to the NMC operation manual for configuration of the E1 Media Converter.

Please note:
The Serial Media Converter does not need to be configured by IP when in a chassis with the NMC module. Only DIP switch configuration is needed.

WIRING

Special cables must be built to connect the media converters to your FSII system.

The E1 media converter's E1 port is wired;
1 & 2 receive
4 & 5 transmit
as per USOC RJ48C wiring recommendations.

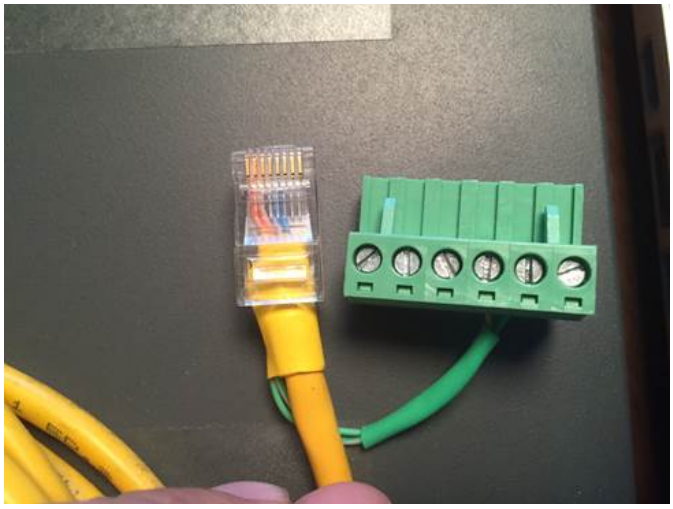
The Serial port is wired;
2 & 3 - transmit
4 & 5 - receive

The following assumes a T568B color coding for category cabling.
https://en.wikipedia.org/wiki/TIA/EIA-568

Wiring from E-QUE card/ FSII-Base to the Media Converters:

-> RJ45 connecting to the E1 Media Converter
1: ORANGE
2: ORANGE/WHITE
3: not connected
4: BLUE/WHITE
5: BLUE
6: not connected
7: not connected
8: not connected

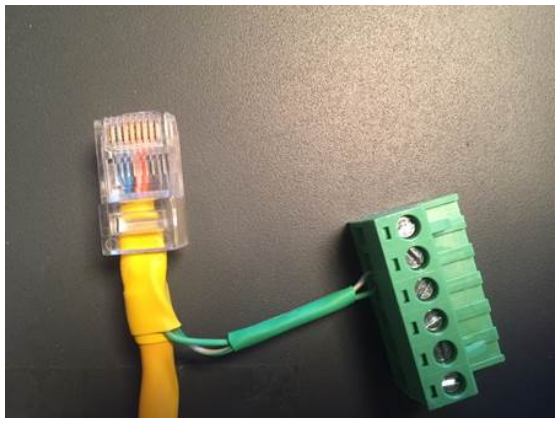
-> Phoenix Connector connecting to the Serial Media Converter
1: not connected
2: not connected
3: not connected
4: GREEN/WHITE
5: GREEN
6: not connected



Wiring from the Media Converters to a Splitter or an Antenna:

-> RJ45 connecting to the E1 Media Converter
1: BLUE/WHITE
2: BLUE
3: not connected
4: ORANGE/WHITE
5: ORANGE
6: not connected
7: not connected
8: not connected

-> Phoenix Connector connecting to the Serial Media Converter
1: not connected
2: GREEN/WHITE
3: GREEN
4: not connected
5: not connected
6: not connected



MANUALS

http://datainterfaces.com/usermanual/FRM220-E1-T1-manual.pdf
http://datainterfaces.com/usermanual/FRM220-SERIAL-manual.pdf

CONTACT INFORMATION FOR A PURCHASE OF THIRD PARTY COMPONENTS

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