Proposal for High Media Rate Trade-Up protocol.
By Ivar Jeppesen, Jan. 1998

The purpose of the High Media Rate Trade-Up protocol is to define a sequence, for two 100/16/4 Mbit/s capable TXI entities connecting at 16/4 Mbit/s, to change operation speed (trade up) to 100 Mbit/s.
This situation occur when a C-port is opening, while a DTR Station or C-port in Station Emulation mode register at 16 or 4 Mbit/s. The Station alternate trying to connect at 100 Mbit/s and 16/4 Mbit/s.

When the Station register at 16 or 4 Mbit/s (FSRMO<2) it indicate to the C-Port that it is capable of 100 Mbit/s. When the C-Port has transmitted the Registration Response frame, indicating to the Station that it is capable of 100 Mbit/s, both Station and C-Port return to the Bypass state, and the Station then reregister at 100 Mbit/s (FSRMO=2).

Definitions

Modified X'0E'-Access Protocol Request (AP_REQ).
This subvector has a value field 2 octets long and is used by the Station in the Registration Request MAC frame to indicate to the C-Port which access protocol is being requested. As defined in Table 10-7, the Station can only request one access protocol permitting the C-Port to use the mask PPV(AP_MASK) to determine if the Station is requesting an acceptable access protocol. At Lower Media Rates the Station can also request High Media Rate Trade-Up. All other values are reserved for future standardization.

Table 10-7: Access Protocol Request Subvector Definition

Value	Definition
X'0002'	Transmit Immediate (TXI) Access Protocol requested.
X'0006'	TXI Access Protocol request and 100 Mbit/s available. << 4 and 16 Mbit/s only>>

Modified X'0F'-Access Protocol Response (AP_RSP).
This subvector has a value field 2 octets long and is used by the C-Port in Port Mode in the Registration Response MAC frame in response to the Registration Request MAC frame. This subvector's value indicates whether the requested access protocol, phantom signaling and wire fault support method have been accepted or denied as defined in Table 10-8. The C-Port can also request High Media Rate Trade-Up. All other values are reserved for future standardization.

Table 10-8: Access Protocol Response Subvector Definition

Value	Definition
X'0000'	Access Denied. The Access Protocol or the phantom signaling and wire fault support method is unsupported by the C-Port in Port Mode either by design or by management.
X'0002'	Transmit Immediate (TXI) Access Protocol and phantom signaling and wire fault support method accepted.
X'0004'	100 Mbit/s Trade-Up accepted. << 4 and 16 Mbit/s only>>

Station policy flag, High Media Rate Trade-Up Option (FSHTUO)
When this flag is set to 1 the Station indicate to the C-port that it is capable of High Media Rate when connecting at 16 or 4 Mbit/s. Enabling this option require the 100 Mbit/s capability set in the SPV(AP_MASK) variable and flag FSMRO<2.

Station Policy Variables

Variable	Permitted Values	Description
SPV(AP_MASK)	• A value of X'0001' shall indicate the TKP Access Protocol is being supported. • A value of X'0002' shall indicate the TXI Access Protocol is being supported. • A value of X'0004' shall indicate 100 Mbit/s capability. • The Station shall not use any other bits of SPV(AP_MASK)	The Station policy variable SPV(AP_MASK) represents the mask used to indicate which access protocols and High Media Rates are being supported.

C-Port Policy Variables

Variable	Permitted Values	Description
PPV(AP_MASK)	• A value of X'0001' shall indicate the TKP Access Protocol is supported. • A value of X'0002' shall indicate the TXI Access Protocol is supported. • A value of X'0004' shall indicate 100 Mbit/s capability. • The C-Port shall not use any other bits of PPV(AP_MASK)	The C-Port policy variable PPV(AP_MASK) represents the mask used to indicate which access protocols and High Media Rates are being supported. The C-Port uses the variable to determine whether it can support the station's access protocol request. The details on how the C-Port determines if the AP request is acceptable is described in clause 9.1.4.2.

Proposed Station Transitions

Event / Event & Conditions	Actions / Outputs
FR_REG_RSP(AP_RSP=0004) & FSHTUO=1 & FSREGO=1 & JS=SREG << Response indicates C-Port is supporting 100 Mbit/s. >>	JS=BP; << Station change to 100 Mbit/s and restart the registration. This is High Media Rate Trade-Up >>
TSIS=E & FSMRO<2 & JS=SREG << DTR Station makes its *first* request for TXI Access Protocol setup by setting subvector values for the REG_REQ_MAC frame and then queues the frame for transmission. Request High Media Rate Trade-Up if option enabled.>> <<< modified transition 3119 >>>	CSREQ=n6; TSREQ=R; FSPDA=1; TXI_REG_REQ (if FSHTUO=0 then AP_REQ=0002; if FSHTUO=1 then AP_REQ=0006; IAC=SPV(IAC); PD=SPV(PD))

TSREQ=E & CSREQ>0 & FSRC=0 & JS=SREG
 	
<< DTR Station makes *another* request for TXI Access Protocol setup by setting subvector values for the REG_REQ_MAC frame allowing Phantom Drive (4, 16 or High Media Rate) or no Phantom Drive (High Media Rate only) and then queues the frame for transmission. Request High Media Rate Trade-Up if option enabled and Media Rate is 4 or 16 Mbit/s >>
 	
<<< modified transaction 3122 >>>
	CSREQ=(CSREQ-1); TSREQ=R;
	TXI_REG_REQ
	 (if FSMRO>1 then AP_REQ=0002;
	 if FSMRO<2 & FSHTUO=0 then AP_REQ=0002;
	 if FSMRO<2 & FSHTUO=1 then AP_REQ=0006;
	 IAC=SPV(IAC);
	 If FSPDA=0 then PD=0002;
	 If FSPDA=1 then PD=0001;)

Proposed C-Port Transitions

Event / Event & Conditions	Actions / Outputs
FPEFS=1 & FPBPW=1 & JS=PREG	JS=BP << Port closes after sending Registration Response MAC frame, requesting Station to reregister at High Media Rate >>
FR_REG_REQ(AP_REQ=0006) & FPMRO<2 & AND(PPV(AP_MASK),AP_REQ)=0006 & JS=PREG <<Station requesting TXI Access Protocol at 100 Mbit/s which is supported by this C-Port>> << 4 and 16 Mbit/s only >>	FPBLT=FPEFS=FPRPT=0; FPBPW=1; TXI_REG_RSP_PDU(AP_RSP=0004) << C-Port request High Media Rate Trade-Up>>
FR_REG_REQ(AP_REQ=0006) & FPMRO<2 & AND(PPV(AP_MASK),AP_REQ)=0002 & AND(PPV(PD_MASK),PD)=0001 & JS=PREG <<Station requesting TXI Access Protocol at 100 Mbit/s. The C-Port do not support 100 Mbit/s.>> << 4 and 16 Mbit/s only >>	JS=PLT; FPDTUREQ=1; FPBLT=FPEFS=FPRPT=0; TPLMTR=R; SPD=PD; S_AP=AP_REQ; SIAC=IAC; SUA=SA; TXI_REG_RSP_PDU(AP_RSP=0002); DTU_DAC.request(SA, SIAC) << C-Port accept registration at current Media Rate >> <<< same Action as 1003 >>>