

T O T A L C O N T R O L TM

Quad V.34 Modem Card

Version 2.1

RELEASE NOTES



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About This Release

Release 2.1 of the Quad V.34 Modem Card offers the following new features:

- ◆ Enhanced V.34 software capable of 33.6 Kbps connections
- ◆ Transmitter level adjustment, which allows you to adjust the modems' transmitter level for optimal performance.
- ◆ Selective reject, for better throughput under V.42 error control.
- ◆ Optional cellular support, which includes the V.42 Enhanced Throughput Cellular (V.42ETC) and MNP10 cellular protocols

Transmitter Level Adjustment

AT Command: S39

MIB Object: mdmLiTransmitLevel

TCM: Line Interface Options modem parameter group

Transmitter level has a possible range of -9 to -20 dBm for analog line sources and -3 to -30 dBm for digital T1 line sources. The default setting of -11 dBm (S39=11) provides optimal performance with most analog line sources. A setting of -13 dBm (S39=13) is recommended for most digital T1 installations.

V.34 Extended Link Rates

Enhanced V.34 software offers two new link rates: 31.2 Kbps and 33.6 Kbps. While line conditions may not always allow for 33.6 connections, the new V.34 software can improve your average connection rate, making it more likely to achieve and maintain 28.8 connections.

Requirements

33.6 Kbps connections are only possible with other 33.6 Kbps-compatible U.S. Robotics modems.

New Parameters for V.34 Extended Link Rates

Link Rate Speed Select

Added 31.2 Kbps and 33.6 Kbps settings (&N15 and &N16) for fixed connection rates.

V.34 Extended Link Rates Disable

AT Command: S56.5=1

MIB Object: mdmScV34pModeEnable

TCM: Signal Converter Settings modem parameter group

Disables the modems' capability to connect at 31.2 Kbps and 33.6 Kbps.

Result Codes

If you have enabled result codes, 31.2 and 33.6 Kbps connections report the following verbal connect messages and numeric result codes to the DTE.

Verbal	Numeric
CONNECT 31200	151
CONNECT 31200/ARQ	152
CONNECT 31200/V34	153
CONNECT 31200/ARQ/V34	154
CONNECT 33600	155
CONNECT 33600/ARQ	156
CONNECT 33600/V34	157
CONNECT 33600/ARQ/V34	158

Inquiry Displays

The ATI6 diagnostic screen has an extended protocol field that displays the actual block and window sizes, and indicates when selective reject has been negotiated. The I11 screen displays "V34+" for connections with other U.S. Robotics modems using the new V.34 software.

Selective Reject

This feature works under V.42 error control and offers significant throughput improvements over noisy lines. Selective reject reduces the number of retransmitted blocks due to block errors (blers).

Selective Reject Disable

AT Command: S51.6=1

NOTE: *Not currently configurable through SNMP.*

Cellular

Modems with cellular support can negotiate for either of two cellular protocols: ETC and MNP10. These protocols are designed to combat a variety of link establishment and data transfer problems specific to cellular calls.

This section provides guidelines for using the ETC and MNP10 cellular protocols.

NOTE: Cellular features are available only if you purchased cellular support with the Quad modem card or through your chassis NMC. For more information on the purchase of cellular support, please contact your distributor or U.S. Robotics sales representative.

Functional Description

MNP10

MNP10 modifies data transfer techniques for increased reliability over cellular links. It uses three major strategies:

Aggressive Adaptive Packet Assembly (AAPA). Adjusts the data packet size during data transfer in response to line conditions, ensuring the maximum allowable packet size at all times.

Link Management Idle (LMI). Used to monitor line conditions when no data is being sent, and helps guard against lost connections.

Dynamic Transmit Level Adjustment (DTLA). Changes the transmit level “on the fly” to adapt to changing line conditions and determine the best level for a cellular link.

DTLA is necessary only for calls across cellular links. In answer mode, the modem detects when an incoming call is using DTLA, and automatically activates its own DTLA. If you are originating calls

from a mobile site (cell side), the modem must be set for *MNP10 Cellular* (S60.3=1) to implement DTLA.

Non-Cellular Calls

MNP10 can be negotiated for non-cellular calls, but offers no advantage over other protocols for those calls. MNP10 must be disabled (S60.1=0) to originate calls under V.34, V.FC, HST, or V.32 Terbo.

ETC

When ETC is enabled, the modems recognize calls from other modems using ETC and alter settings for increased performance when transmitting data across cellular links.

ETC requires that the modems establish V.42 error control. ETC also requires a V.32 *bis*, V.32, or V.22-type connection. ETC does not function under V.34 modulation.

The modem uses ETC whenever it answers a call and receives the ETC calling tone. The modem must receive the ETC calling tone from the originating modem. It is the only way for the modem to know that it will be transmitting over a cellular link. If the modem does not receive the ETC calling tone, the call progresses normally without ETC settings.

Originating Non-Cellular Calls

When enabled for ETC, the modem implements ETC settings for *all* outgoing calls. Even if it is not connecting across a cellular link, the modem forces a V.32- or V.22-type modulation and V.42 with a reduced packet size, and will not connect using V.34. It also transmits using de-emphasis and reduced transmit level, which results in reduced throughput or even dropped calls. If the modem is going to be used for originating calls across non-cellular links, we recommend using the *Disable ETC During Originate Mode* setting (S66.7=1).

Cellular Templates

Three cellular templates stored in the modem's ROM allow you to activate V.42ETC or MNP10 with the modem settings that offer maximum performance. A template may be loaded in one of three ways:

- ◆ If you are using TCM, by using the *Modem Software Commands*.
- ◆ If you are using other SNMP Manager software, by using the Total Control Modem MIB modem command table.
- ◆ If you are using AT commands to configure the modems, by using the &Fn command.

WARNING: Do NOT load cellular templates if you have made special configuration changes to the modem. When you load a template, it overwrites all settings with the modem defaults. Instead, use the AT command string equivalent or configure cellular parameters individually with the settings listed under the appropriate template.

NOTE: Only one template may be loaded at a time. If you wish to activate *both* ETC and MNP10:

1. Load the ETC Cellular Template.
2. Configure the modem with the settings or AT Command String listed for the MNP10 template.

MNP10 Cellular Template

TCM Modem Software Command: Load MNP10 Cellular Defaults

MIB Extension: loadMnp10CllulrDflt(25)

AT Command: &F4

AT Command String Equivalent: ATS60=3

This template includes the following settings:

- ◆ **MNP10 Negotiation**
AT Command: S60.0=1
- ◆ **Enable MNP Extended Services**
AT Command: S60.1=1

ETC Fixed Site Cellular Template

TCM Modem Software Command: Load V42 Cellular Fixed Defaults

MIB Extension: loadV42CllulrFxdDflt(27)

AT Command: &F6

AT Command String Equivalent: ATS66=101 S7=90 S10=100

This template includes the following settings:

- ◆ **Negotiate ETC**

AT Command: S66.0=1

- ◆ **ETC Fixed Site Operations**

AT Command: S66.1=0

- ◆ **Enable ETC Calling Tone**

AT Command: S66.2=1

- ◆ **9600 DCE Startup Rate**

AT Command: S66.4=0 S66.5=1

- ◆ **Wait for Carrier 90 Seconds**

AT Command: S7=90

Lengthens the time the modem waits for a carrier to 90 seconds, since modems often take longer to establish a carrier over cellular links.

- ◆ **Loss of Carrier Disconnect**

AT Command: S10=100

Cellular links frequently receive disturbances that cause extended loss of carrier. This setting lengthens the time before the modem hangs up upon loss of carrier (guard time) to 10 seconds.

ETC Mobile Cellular Template

TCM Modem Software Command: Load V42 Cellular Mobile Defaults

MIB Extension: loadV42CllulrMblDflt(26)

AT Command: &F5

AT Command String Equivalent: ATS66=103 S7=90 S10=100

Enables ETC when the modem is answering or dialing from a cellular phone. Although the Quad modem is usually not located on the mobile end (cell side) of a connection, you can advise callers to use these settings when placing calls from mobile locations.

Settings for this template are identical to those for the ETC fixed site template (&F6), except for the following setting:

- ◆ **Enable ETC Mobile**

AT Command: S66.1=1

MNP10 Parameters

NOTE: All the options listed apply only for MNP10 calls. The settings do not affect normal connections.

MNP10 Negotiation

AT Command: S60.0=n

MIB Extension: mdmCeMnp10Dis

Enables / disables MNP10 negotiation.

Settings: S60.0=0 Disabled
 S60.0=1 Enabled

Enable MNP Extended Services

AT Command: S60.1=1

MIB Extension: mdmCeMnp10Dis

Extended Services (MNPX) allows the modems to negotiate MNP10 as a part of the V.42 negotiation process. If the connecting modem does not support either V.42 or MNPX, MNP10 is negotiated under MNP.

NOTE: If MNPX is disabled, calls from modems using MNPX and V.42 connect without MNP10.

Settings: S60.1=0 Disabled
 S60.1=1 MNPX enabled

Disable V.42bis Compression

AT Command: S60.2=1

MIB Extension: mdmCeComp

Disables V.42bis compression for MNP10 calls. When disabled, the modem negotiates for MNP5 compression, and if unsuccessful, connects without compression. Used for testing purposes only.

Settings: S60.2=0 Enable V.42bis
 S60.2=1 Disable V.42bis

MNP10 Cellular

AT Command: S60.3=1

MIB Extension: mdmCeOperDis

When set for MNP10 Cellular, Dynamic Transmit Level Adjustment (DTLA) is used. With the default, non-cellular setting, DTLA is only used if the originating modem is set for cellular.

Settings: S60.3=0 MNP10
 S60.3=1 MNP10 Cellular

Force 1200 bps Connection

AT Command: S60.4=1

MIB Extension: mdmCeLinkSpeed

This setting forces a V.22 1200 bps link rate for MNP10 connections. Provides stability and reliability for extremely noisy link conditions.

Settings: S60.4=0 Negotiate for highest rate
 S60.4=1 Force 1200 bps

Disable MNP10 Fallback

AT Command: S60.5=1

MIB Extension: mdmCeMnp10FallbackDis

Prevents the modem from falling back to lower speeds during MNP10 connections. Used for testing purposes only.

Settings: S60.5=0 Fallback
 S60.5=1 Disable fallback

Disable MNP10 Fallforward

AT Command: S60.6=1

MIB Extension: mdmCeMnp10FallforDis

Prevents the modem from falling forward to higher speeds during MNP10 connections. Used for testing purposes only.

Settings: S60.6=0 Fallforward
 S60.6=1 Disable fallforward

Disable MNPX Detection Pattern

AT Command: S60.7=1

MIB Extension: mdmCeMnpDetPhEna

The MNPX pattern expedites connections under MNP10 when connecting with other modems that support MNPX.

The MNPX detection pattern can cause problems when dialing to MNP10 modems without MNPX—they connect, but without MNP10. Disable the MNPX detection pattern if you experience this problem when dialing to modems without MNPX. In answer mode, the MNPX detection pattern should always be enabled.

Settings: S60.7=0 Enable detection pattern
 S60.7=1 Disable MNPX detection pattern

V.42 *bis* Short Form Negotiation Rules

AT Command: S61=n

MIB Extension: mdmCeShortFormRules

Provides V.42*bis* compatibility when originating to some older MNP10 modems that do not have MNPX capabilities. The short form assumes that the maximum string length is 32 octets and the direction of compression is always bi-directional.

Settings: S61=0 Normal V.42*bis* Compression

S61=1 Form 1 Code Words 512

S61=2 Form 2 Code Words 1024

S61=3 Form 3 Code Words 2048

ETC Parameters

NOTE: All the options listed apply only for V.42ETC calls. The settings do not affect normal connections.

Enable ETC

AT Command: S66.0=1

MIB Extension: mdmCeEtcDis

Modem uses ETC in response to the ETC calling tone.

Settings: S66.0=0 Disabled

S66.0=1 Enabled

ETC Site Operations

AT Command: S66.1=n

MIB Extension: mdmCeV42CellSite

Determines whether the modem uses a fixed site or mobile site cellular profile. The cellular profile sets transmit levels based on ETC specifications. Most Total Control Quad Modem Card installations are fixed site.

Settings: S66.1=0 Fixed site

S66.1=1 Mobile site

Enable ETC Calling Tone

AT Command: S66.2=1

MIB Extension: mdmCeV42EtcCallToneDis

With this setting, the modem generates an ETC calling tone when it originates a call. The calling tone indicates to the answering modem that you wish to use the ETC cellular protocol.

Enable the ETC calling tone when originating calls to cellular modems. Disable calling tone only if you experience problems when originating calls to non-cellular modems.

Settings: S66.2=0 Disable calling tone
 S66.2=1 Enable calling tone

Force ETC

AT Command: S66.3=1

MIB Extension: mdmCeV42EtcTxLevConDis

Some callers may wish to negotiate ETC using the earlier 1.0 version, which does not generate the ETC calling tone used in version 1.1. In order for the modem to implement ETC when answering calls from modems with the earlier 1.0 version, it must be set to force ETC for every call it receives. (In this circumstance, the system administrator may wish to dedicate some modems for cellular calls only.)

Settings: S66.3=0 ETC on calling tone detect only
 S66.3=1 Force ETC for all calls

DCE Startup Rate

AT Command: S66.4 and S66.5 (see the following table).

MIB Extension: mdmCeDceStartRate

Some cellular links may be so poor that calls are dropped even before the modems can initialize modulation and error control negotiation. To reduce the number of dropped calls, the modem should be set to a 9600 bps startup rate. The modems negotiate at the lower and more stable link rate, and after ETC has been implemented, raise the link rate to the higher levels afforded by ETC.

S66.4=	S66.5=	Startup Rate
0	0	Auto
1	0	4800
0	1	9600
1	1	<i>Reserved</i>

Enable Transmit De-emphasis

AT Command: S66.6=1

MIB Extension: mdmCeV42DceTxDemDis

Transmit de-emphasis is recommended when connecting over a cellular link, whether the modem is on the fixed site or mobile site. When enabled, transmit de-emphasis is automatically implemented whenever the modem receives an ETC call.

Settings: S66.6=0 Disabled
 S66.6=1 Enabled

Disable ETC During Originate Mode

AT Command: S66.7=1

MIB Extension: mdmCeDbNoEtcDis

This setting disables ETC when originating calls, yet allows it to negotiate ETC in answer mode. If the modem is used to place outgoing calls to non-cellular modems, use this setting to disable ETC during originate mode.

Settings: S66.7=0 Originate ETC
 S66.7=1 Disable ETC during originate

Set Maximum Link Rate

AT Command: S64

MIB Extension: mdmCeDceBitraLim

Lowering the maximum link rate to 9600 bps can provide more stability for cellular calls under adverse conditions. However, higher throughput is sacrificed for most calls.

Settings: S64=0 Modem selects maximum link rate.

To set maximum rate, see the following table. Selecting values not listed is invalid and leaves the setting unchanged.

Setting	Max Rate
S64=4	4800 bps
S64=5	7200 bps
S64=6	9600 bps
S64=7	12000 bps
S64=8	14400 bps

Set ETC Transmit Level

AT Command: S65

MIB Extension: mdmCeDceTxLev

A reduced transmit level is required for data transfer across cellular links. When ETC is established for a call, the modem automatically reduces its transmit (TX) level to the value specified by this parameter.

With the default setting, the modem sets the TX level according to ETC specifications based on whether it is transmitting over T1 or analog lines and whether the modem is set for fixed site or mobile. We do not recommend changing this setting.

Settings: S65=0 Modem controls TX level
 S65=*n* TX level fixed to *n* for ETC calls, where *n*=10–25 (-dBms)

