

# Sonoma D12

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# Sonoma D12 *IRU*

*Pgyqtm"Vkog"Ugtxgt"Wugt"Ocpwcn*

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## About This Manual

Vjku" o cpwcn" yknn" i wkfg" {qw"vj tqwi j" uk o rng" kpuvcnncvkqp" cpf" ug" wr" r t q e g f w t g u }

Introduction N V j g" U q p q o c" F 3 4. " j q y" kv" y q t m u. " y j g t g" v q" w u g" kv. " kvu" o c k p" h g c v w t g u }  
Basic Installation N J q y" v q" e q p p g e v. " e q p L i w t g" c p f" v g u v" { q w t" U q p q o c" y k v j" { q w t" p g v y q t m }  
NTP Server and Client Set-Up N V y q" e n k g p v" u g e v k q p u= " q p g" h q t" W p k z/ n k m g" r n c v h q t o u" c p f" q p g" h q t" Y k p f q y u }  
Network Protocols - " E q x g t u" U g e w t k v { . " U P O R. " J V V R U. " K R x 8" c p f" R V R I K G G G / 3 7 : : }  
Console Port N F g u e t k r v k q p" q h" v j g" e q p u q n g" e q o o c p f u" h q t" w u g" q x g t" v j g" p g v y q t m" c p f" u g t k c n" r q t v u }  
Front-Panel Keypad and Display N J q y" v q" q r g t c v g" v j g" w u g t" k p v g t h c e g" v j c v" r t q x k f g u" e q p x g p k g p v" u g v w r" c p f" o q p k v q t k p i" q h" v j g" k p u v t w o g p v }  
Options N F g u e t k r v k q p" q h" c p { " q r v k q p c n" h g c v w t g u" v j c v" { q w t" U q p q o c" o k i j v" j c x g }

kh" { q w" f g v g e v" c p { " k p c e e w t c e k g u" q t" q o k u u k q p u. " r n g c u g" k p h q t o" w u } " G p f T w p" V g e j p q n q i k g u" e c p p q v" d g" j g n f" t g u r q p u k d n g" h q t" c p { " v g e j p k e c n" q t" v { r q i t c r j k e c n" g t t q t u" c p f" t g u g t x g u" v j g" t k i j v" v q" o c m g" e j c p i g u" v q" v j g" r t q f w e v" c p f" o c p w c n u" y k v j q w v" r t k q t" p q v k e g }

## Warranty

Vjku" r t q f w e v. " o c p w h c e v w t g f" d { " G p f T w p" V g e j p q n q i k g u. " k u" y c t t c p v g f" c i c k p u v" f g h g e v u" k p" o c v g t k c n" c p f" y q t m o c p u j k r" h q t" c" r g t k q f" q h" v j t g g" { g c t u" h t q o" f c v g" q h" u j k r o g p v. " w p f g t" p q t o c n" w u g" c p f" u g t x k e g } " F w t / k p i" v j g" y c t t c p v { " r g t k q f. " G p f T w p" y k n n" t g r c k t" q t" t g r n c e g. " c v" k v u" q r v k q p. " r t q f w e v u" y j k e j" r t q x g" v q" d g" f g / h g e v k x g } " R t q f w e v u" p q v" o c p w h c e v w t g f" d { " G p f T w p" V g e j p q n q i k g u" c t g" y c t t c p v g f" h q t" p k p g v { " f c { u" q t" n q p i g t. " c u" r t q x k f g f" d { " v j g" q t k i k p c n" g s w k r o g p v" o c p w h c e v w t g t. " h t q o" f c v g" q h" u j k r o g p v }

## Extended Warranty

Gp f T w p" r t q f w e v u" c t g" u w r r q t v g f" d { " c" u v t q p i. " e q o r t g j g p u k x g" u w c p f c t f" y c t t c p v { " \* u g g" r e t c i t c r j" c d q x g + 0 }  
G z v g p f g f" y c t t c p v k g u" c t g" c x c k n c d n g" v q" g z r c p f" v j g" e q x g t c i g" r g t k q f } " V j g" g z v g p f g f" y c t t c p v { " e c p" d g" r w t e j c u g f" c v" v j g" v k o g" q h" q t f g t. " q t" f w t k p i" v j g" n c u v" { g e t" q h" v j g" u w c p f c t f" y c t t c p v { " r g t k q f }

## Limitation of Warranty

V j g" h q t g i q k p i" g z r t g u u" y c t t c p v { " u j c m n" p q v" c r r n { " v q" f g h g e v u" t g u w n k p i" h t q o" k o r t q r g t" q t" k p c f g s w c v g" o c k p v g p c p e g" d { " D w { g t" q t" W u g t. " D w { g t / u w r r n k g f" u q h v y c t g" q t" k p v g t h c e k p i. " w p c w v j q t k | g f" o q f k L e c v k q p" q t" o k u w u g. " q r g t c v k q p" q w v u k f g" q h" v j g" g p x k t q p o g p v c n" u r g e k L e c v k q p u" h q t" v j g" r t q f w e v. " q t" k o r t q r g t" u k v g" r t g r c / t c v k q p" q t" o c k p v g p c p e g }

V Q " V J G" G Z V G P V" R G T O K V V G F" D [ " N C Y. " V J K U" Y C T T C P V [ " C P F" T G O G F K G U" U G V" H Q T V J" C D Q X G" C T G" G Z E N W U K X G" C P F" K P" N K G W" Q H" C N N" Q V J G T" Y C T T C P V K G U. " T G O G F K G U" C P F" E Q P F K V K Q P U. " Y J G V J G T" Q T C N" Q T" Y T K V V G P. " U V C V W V Q T [ . " G Z R T G U U. " Q T" K O R N K G F } " C U" R G T O K V V G F" D [ " C R R N K E C D N G" N C Y. " G P F T W P" U R G E K H K E C N N [ " F K U E N C K O U" V J G" K O R N K G F" Y C T T C P V K G U" Q H" O G T E J C P V C D K N K V [ " Q T" H K V P G U U" H Q T" C" R C T V K E W N C T" R W T R Q U G }

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ukqpu"ctg" o qpkvqtgf"htq o " i tqwpf"uvcvkqpu"nqecvfg"ctqwpf"vjg"y qtnf"cpf"ectghwmn{ " o gcuwtgf"tgnvcxg"vq" IRU"vk o g0"Vjg"tguwvu"qh"vjgug" o gcuwtg o gpvu"hqt"gcej"ucvgnkvg"ctg"vjgp"wrnqcf"gf"vq"vjcv"ucvgnkvg"uq" vjcv"vjg{" o c{"dg"kpqtrqtcvfg"kpqv"vjg"fcvc"eqpvckpgf"kp"kvu"vtcpu o kuukqpu0"Vjg"tgegkxgt"ecp"wug"vjku" fcvc"vq"tgnvcg"vjg"vk o g/qh/cttkxcn"qh"vjg"tgegkxgf"vtcpu o kuukqpu"htq o "vjcv"ucvgnkvg"vq" IRU"vk o g0

Cnn"qh"vjku" o gcpu"vjcv"fwtkpi"pqt o cn"qrgtcvkqp."vjg"uqwtg"qh"vjg"vk o kpi"kphqt o cvkqp"dgkpi"vtcpu o kvwgf" htq o "gcej"qh"vjg"ucvgnkvgu"ku" fktgevn{"vtcegcdng"vq"WVE0" Fwg"vq"vjg"pcvwtg"qh"vjg" IRU"urtgcf/urges/ vtw o " o qfwncvkqp"uejg o g."vjku"vk o kpi"kphqt o cvkqp" o c{"dg"gzvtcevgf"d{"c"y gnm/fgukipgfi"tgegkxgt"ykvj"c" r tgekukqp"qh"chgy"pcpqugeqpfu0"Vjg" IRU"Uwdu{uvg o "kp"vjg"Uqpq o c"fqgu"lwuv"vjcv0

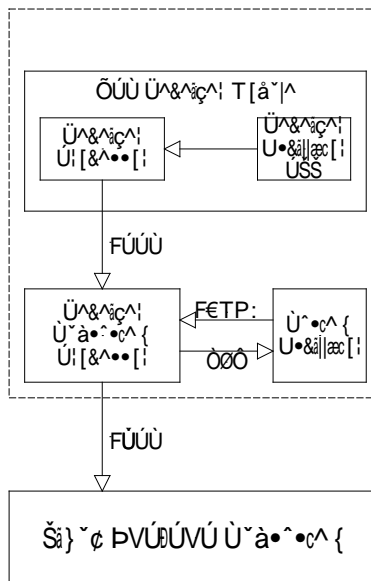
### GPS Receivers

IRU/dcugf"vk o kpi"u{uvg o u"ur rqtvkpi"etkvekn"kphtcuvtwevwtg"eqwnf"dg"xwnpgtcdng"vq" o cnhwpevkqp"fwg" vq"y gcm"uki pcnu."lc o o kpi."urqqŁpi"qt"ceekfgpvcn" IRU"eqpytan"u{uvg o "gttqtu0"Rtqrktgvct{"cni qtkvj o u" kp"Uqpq o c"rgthqt o "cfxcpegf"kpvg i tkv{"ej gemu"vq"Łnvg"tcpfq o "cpf"rgtukvpgp"gttqtu"vq"vjg" IRU"uwd/ htc o g"fcvc0"

GpfTwp"fgxgnqrgf"c"vk o kpi"qrvk o k|gf" IRU"tgegkxgt"htq"cf flvkqpcn"tgukngpe{"ceewtce{"cpf"tgnkcdknkv{0" Vjg"GpfTwp" IRU"tgegkxgt"uvtkevn{"eq o rnkgu"vq"vjg"KU/ IRU/422"urgekŁecvkqp0"cpf"dgicp"ujkr rkp i "kp" Uqpq o c"kp"Lwpg"42390" IRU"tgegkxgt"urgekŁecvkqp"ctg"nkuvgf"kp" 0

## Time Synchronization Components

Vjg"Uqpq o c"ku"eq o rqugf"qh"c" Inqdcn"Rqukvkqkpi"U{uvg o "\*"IRU+"Uwdu{uvg o "eqpvckkpi"vjg"GpfTwp" IRU"tgegkxgt"cpf"u{uvg o "queknvcvt0"Vjg" IRU"Uwdu{uvg o "ku"kpvg i tcvgf"ykvj"chcpnguu."eqpxgevqp/ eqqngf"304" I J |"ERW"ykvj"v y q"kpvg i tcvgf"Gvjgtpgv"rtqv"vjcv"rtqxfkfg"PVR"\*cpf"qrvkqpcn{"RVR+0" Vjku"ku"ecmgf"vjg"Nkpwz|PVR"Uwdu{uvg o 0"Vjg"ftc y kpi"dgng y"ujq y u"Uqpq o c"u"vk o g"u{pej tqpk|cvkqp" eq o rqpgev0



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## Where to Use It

Ukpeg"uki pcnu"htq o "vjg" IRU"ucvgnkvgu"ctg"cxckncdng"cv"cn"nqecvkqpu"qp"vjg"inqdg."{qw"oc{"fgrnq{"vjg"  
Uqpq o c"xktvwenn{"cp{y jgtg0""J qy gxtg."{qw"o wuv"dg"cdng"vq"kpucnn"cp"cpvgppc"gvjgt"qp"vjg"tqqhvqr"qt"  
kp"c"ykpfaqy"uq"vjcv"ucvgnkvg"vtcpu o kuukqpu"oc{"dg"tgegkxgf"cv"ngcu"ugxgtcn"vk o gu"fwtkpi"vjg"fc{0""Hqt"  
o qtg"kphqt o cvkqp"ugg" 0

Qpeg"u{pe j tqpk |gf."vjg"Uqpq o c"ecp"o ckpvc"ceegrvc"pgv y qtm"u{pe j tqpk |cvkqp"ceewtce{"hqt"  
cdqww"cf{"ykvjqww"IRU"tgegrvkqp."d{"f{y jggkpi"qp"kvu"uvcpfctf"vg o rgtcvwtg"eq o rgpucvgt"et{uvcn"  
quekncvqt"\*VEZQ+0""Vjg"VEZQ"gpwtgu"46/jqwt"jqnfqxtg"rgtkqf"ykvjqww"c"IRU"uki pcn0""Hqt"nqpi gt"  
jqnfqxtg"rgtkqfu"qh"57"fc{u"qt"o qtg."cp"quekncvqt"wr i tcf g"oc{"dg"kpucnngf"kp"qwt"Uqpq o c0

## Client / Slave Software

Vjg"Uqpq o c"jcu"dgpp"fgukipgf"vq"qrgtcvg"kp"eqplwpevkqp"ykvj"gzkuvki"rwdnke"fq o ckp"PVRIUPVR"enk/  
gpv"uqhv y ctg"cpf"oc{"dg"wugf"kp"cp{"pgv y qtm"gpxtqpo gpv"vjcv"ku"wukpi"VERIKR"rtqvqeqnu0""Cnvjqwi j"  
enkpp"uqhv y ctg"ku"cxckncdng"ht"cm"rncvht o u."hqt"vjg"o quv"rtgekug"cr rncecvkqpu."vjg"Wpkz/nkmg"qrgtcvki"  
u{uvg o u"ctg"dguv"uwr r qtvgtf0""Hqt"o qtg"kphqt o cvkqp"ugg"

"cpf"

0""Vjgtg"ku"cf fkvkqpcn"kphqt o cvkqp"cdqww"

PVR"Enkpp"uqhv y ctg"cv"v jku"nkpm<

" gpfwtpvge j pqi i kguleq o lrtqfwewulpvr/vk o g/ugtxgtulpvr/enkpp/uqhv y ctg

Hqt"RVRlKGGG/37: : "cr rncecvkqpu."vjg"Uqpq o c"ecp"kpvgtqrgtcvg"ykvj"c"xctkgy{"qh"Uncxg"uqhv y ctg"cpf"  
jctf y ctg0""Hqt"o qtg"kphqt o cvkqp"qp"RVR"Uncxg"Uqhv y ctg" i q"vq"v jku"nkpm<

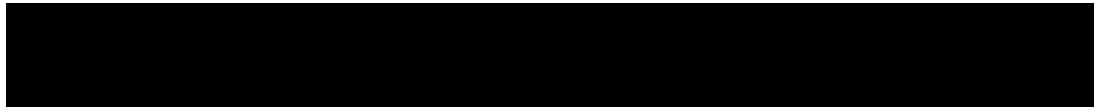
" gpfwtpvge j pqi i kguleq o lrtqfwewuli tcpf o cuvgt/enqemulr vr/uncxgu

Vjku"rcig"kpvgpvkqpcm{"nghv"dncpm0



Sonoma Physical  
Description

U{pe"NGF" "	"	Vjku"co dgt"NGF" fcu jgu"vq"kp fkecvg"u {pej tqpk  cvkqp"uvcvwu0
Cnct o"NGF"	"	Vjku"tgf"NGF"knw okpcvgu"dtkg f { "cv"rq ygt/wr."cpf"vjgtgchvgt"y jgpgxgt
" " "	"	c"ugtkquw"hcwnv"eqp fkvkqp"gzkuvu0





## Installing the Sonoma

FCC NOTICE



kh{qwt"pgv y qtm"fggu" wug" F J ER" hqt" j quv" eqpŁ i wtcvkqp." cpf" {qw" ctg" kp" c" j wtt" { "vq" i g v" {qwt" Uqpq o c" wr" cpf" twppkpi." {qw" o c" { "rtqeggf" vq" "vq" o cmg" uwtg" v j cv" v j g" p g v y qtm" rctc o g vgtu" y gtg" ugv" wr" eqttgevn" {0"" Qv jgt y kug." kv" ku" tgeq o o gp f g f" v j cv" {qw" tgc f" v j g" hqmq y kpi" ugevkqpu" qp" v j g" wug" qh" v j g" TU/454" ugtkcn" KlQ" r qtv" p q y." ukpeg" v j g" { "y knn" j gnr" {qw" kp" fg d w i i kpi" cp" { "r tq d ng o u" v j cv" {qw" o c" { "gpeqwpvgt" y kv j" v j g" c w v q o c vke" eqpŁ i wtcvkqp" xkc" F J ER}

kh{qwt"pgv y qtm"fggu" pqv" wug" F J ER." {qw" y knn" pggf" vq" eqpŁ i wtg" {qwt" Gv j gtpgv" kpvgthcegu" wukpi" "gkv jgt" v j g" htqp v/ rcp gn" mg { r c f" qt" v j g" TU/454" ugtkcn" KlQ" r qtv" V j g" hqmq y kpi" ugevkqpu" eqpvckp" dtkgh" f g uetkr/ vkqpu" qp" j q y" vq" f q" v j cv}

### Configuring Ethernet with the Front-Panel Keypad

EqpŁ i wtkpi" {qwt" Gv j gtpgv" kpvgthcegu" y kv j" v j g" htqp v/ rcp gn" mg { r c f" ku" swkv g" uk o r ng" Chvgt" v j g" wpkv" j cu" r q y gtg f" qp." r tguu" v j g" GP VGT" mg { "qpeg" qt" v y keg" wpvkn" {qw" ugg" c" fkurnc" { "ecmgf" Ockp" Ogpw" P q y" r tguu" v j g" TK I J V" cttq y" mg { "wpvkn" v j g" P g v y qtm" ugngevkqp" ku" j ki j nk i j v g f" V j g p" j ki j nk i j v" gkv jgt" P g v/ y qtm" 6" qt" P g v y qtm" 8" cpf" r tguu" GP VGT" ci ckp" P q y" {qw" ecp" e j qqug" y j ke j" r qtv" vq" ugv" wr" /" gkv jgt" f u i . 1" qt" f u i 2" [qw" y knn" v j g p" dg" cdng" vq" uvctv" o q f kh" {kpi" v j g" KR" c f f tguu." i cvg y c" { "cpf" p g v o cum" d" { " r tguu kpi" v j g" G F K V" mg { 0"" V j g" u g s w g p e g" qh" f k u r n c" {u" y knn" i w k f g" {qw" v j t q w i j" v j g" u g v w r" r t q e g u u" R t g u u" v j g" J G N R" mg { "cv" cp" { "vk" o g" vq" xkg y" eqpvgzv/ ugpukvxg" j gnr" kphqt o cvkqp" Y j g p" {qw" ctg" Łpkujgf" e j qqug" v j g" T G D Q Q V" o g p w" kv g o" cpf" kpkvkv g" c" u" {uvg o" tgdqqv" }

### Configuring Ethernet with the Serial Port

Vq" eqpŁ i wtg" {qwt" Gv j gtpgv" kpvgthcegu" y kv j" v j g" ugtkcn" r qtv." chvgt" nq i i kpi" kp" cu" v j g" tq q" wugt." {qw" o wuw" twp" c" uk o r ng" uetkrv" ecmgf" ofudpogj h" V j ku" uetkrv" y knn" r tq o r v" {qw" hqt" v j g" pggf g f" kphqt o cvkqp" cpf" r gthqt o" uq o g" u" {pvcz" e j gemkpi" qp" {qwt" kpr wvu" V j g p" v knn" etgcvg" qt" o q f kh" { "v j g" c r r tq r tkcv g" Łngu" pggf g f" vq" eqpŁ i wtg" v j g" Gv j gtpgv" kpvgthcegu" V j g" hqmq y kpi" ugevkqpu" y knn" i w k f g" {qw" kp" ugvkpi" wr" eq o / o wpkcvkqpu" y kv j" v j g" Uqpq o c" wukpi" kvu" TU/454" ugtkcn" KlQ" r qtv}

#### Connect the RS-232 Serial I/O Port

Vq" vguv" ugtkcn" eq o o wpkcvkqpu" y kv j" v j g" Uqpq o c" {qw" y knn" pggf" gkv jgt" c" XV322" eq o r cvkdng" vgt o kpcn" qt" c" vgt o kpcn" g o wncvkqp" r tq i tc o" twppkpi" qp" {qwt" eq o r wvgt" Y g" y knn" tghgt" vq" gkv jgt" qh" v j g u g" cu" o vgt o k/ pcn" hqt" v j g" tg o ckp fgt" qh" v j ku" kpuvtwevkqp}

30" Fkueqppgev" r q y gt" htq o" v j g" Uqpq o c}

40" Eqppgev" qpg" gp f" qh" v j g" FD; H/vq/ FD; H" pwnn" o q f g o" c f c r vgt" ecdng" vq" v j g" ugtkcn" KlQ" l cem" qp" v j g" Uqpq o c}

50" Eqppgev" v j g" qv jgt" gp f" qh" v j g" FD; H/vq/ FD; H" pwnn" o q f g o" c f c r vgt" ecdng" vq" v j g" vgt o kpcn" Kh" v j g" ugtkcn" KlQ" r qtv" qp" {qwt" vgt o kpcn" f qgu" p qv" j c x g" c" FD; O" eqppgevqt." {qw" o c" { "pggf" vq" wug" cp" c f c r vgt" Tghgt" vq" "hqt" f g v c k n n" qp" v j g" u k i p c n" y k t k p i 0"" Kh" {qw" ctg" wukpi" c" eq o r wvgt" hqt" {qwt" vgt o kpcn." t g o g o d g t" y j k e j" r q t v" {qw" ctg" wukpi" d g e c w u g" {qw" y knn" pggf" vq" m p q y" v j cv" kp" q t f g t" vq" u g v" w r" {qwt" vgt o kpcn" u q h v y c t g}

Test the Serial Port

```
[qw"o wuv"eqpŁi wtg" {qwt"vgt o kpcn"vq" wug"vjg"ugtkcn"klQ" rqtv" {qw" wugf"kp"
"cdqyg0" [qw"o wuv"cnuq"eqpŁi wtg" {qwt"vgt o kpcn"cu"ujqy p"dgnqy<
```

É" Dcwf" Tcvg<"3;422

É" Fcvc" Dkvu<" :

É" Rctkv{<"Pqpg

É" Uvqr" Dkvu<"3

É" Jcpfujcmkpi"l"Hnqy"Eqpvtqn<"QHH"\*dqvj"jctfyctg"cpf"uqhvyctg+

É" Vgt o kpcn"G o wncvkqp"\*kh"cp{+<"XV322"\*qt"uk o knet+"qt"Nkpwz

Chvgt"eqpŁi wtkpi"vjgug"rctc o gvgtu"kp" {qwt"vgt o kpcn."cr rn{"r qygt"vq"vjg"Uqpq o c0"Chvgt"cdqww"42"



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+++++
+++++Tpopnb`E23!HQT!JQW50JQW7!Ofuxpsl!Dpogjhvsbu jpo!+++++
+++++
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!!Ui jt!tds jqu!xjmm!dpogjhvsf!uif!UDQ0JQW50JQW7!ofuxpsl!qbsbnfufst!gps!zpv s!!+
+!!!Tpopnb`E23!HQT/!!Xf!xjmm!gjstu!dpogjhvsf!JQW5!boe!uifo!JQW7/!!Zpvs!!!!!!!!!!+
+!!!Tpopnb`E23!HQT!ibt!uxp!fui fsofu!joufsgbdf t-!dbmmfe!fui1!boe!fui2/!!Gps!!!!+
+!!!fbdi!pg!JQW5!boe!JQW7-!xf!xjmm!gjstu!dpogjhvsf!fui1!boe!uifo!fui2/!!!!!!!!!!+
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!!Zpv!dbo!dipptf!up!lffq!uif!fyjtu joh!dpogjhvsbu jpo!pg!fjuifs!joufsgbdf!boe!+
+!!!sfdpogjhvsf!uif!pui fs/!!Zpv!dbo!bmt p!dipptf!up! vodpogjhvsf!fjuifs!pg!!!!+
+!!!uif!uxp!joufsgbdf t!jg!cpui!bsf!opu!offefe!jo!zpv s!bqmqjdbu jpo/!!!!!!!!!!+
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!!Zpv!xjmm!cf!bcmf!up!sfdpogjhvsf!zpv s!tztufn!bu!boz!ujnf!cz!uzqjoh;!!!!!!+
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!!ofudpogjh!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!!Uif!tfuujoht!zpv!nblf!opx!xjmm!opu!ublf!fgg fdu!voujm!zpv!sfcp pu!zpv s!!!!!!+
+!!!Tpopnb`E23!HQT-!tp!jg!zpv!nblf!b!n j tublf-!kvtu!sf.svo!ui jt!tds jqu!cfgpsf!!+
+!!!sfcp pu joh/!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!!Zpv!xjmm!cf!qspnqufe!up!foufs!zpv s!JQW50JQW7!ofuxpsl!qbsbnfufst!opx/!!!!!!+
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
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Dpogjhvsf!JQW5!gps!fjuifs!fui1!ps!fui2@
!!)Botxf s!zft!up!dpoujovf!po!boe!sfdpogjhvsf!fjuifs!fui1!ps!fui2!gps!JQW5/*
!!)Botxf s!op!up! vodpogjhvsf !cpui!fui1!boe!fui2!gps!JQW5/!!Pomz!uif
!!!JQW5!mppqcbd1!joufsgbdf!xjmm!cf!tfuvq/*!)\z^ft-!\o^p*;

```

Chvgt"eqpLiwtkpi" {qwt"Gvjgtpgv"kpvgthcegu." {qw"ujqwnf"ujwvfqyp"vjg"Uppqoc"cpf"tgdqqv"kv"d {"kuwkp i" vjku"eqo ocpf"cv"vjg"rtqo rvc

Tpopnb!E23!HQT) sppuATpopnb`E23;!\*.\*?!sfcp pu

### Verify Network Configuration

kh" {qw"ctg"wukpi"vjg" TU/454"ugtkcn"klQ"rqtv"vq"eqo o wpkcev g"ykvj"vjg"Uppqoc." {qw"ykn"dg"cdng"vq"ugg"

kh{qw"ctg"pqv"wukpi" F J ER"vjg"KR"cfftguu"ujqyp"ujqwnf" ovej"vjg"uvcvke"KR"cfftguu"y jkej" {qw"
gpvgtgf"fwtkpi"vjg"ofudpogjh"rtqegfwtg"kh"uq."nqi"kp"cu"otqqv"ö"cv"vjg"nqikp"rtqo"rv"cpf"ejgem"vjg"
qvjgt"eqpLiwtcvkqp"rtcogvgtu"wukpi"jgd pogjh<

Tpopnb!E23!HQT) sppuAiptu; ;\* . ? ! jgd pogjh

fui1!!!!!!Mjo1!fodbq;Fuifsofu!!IXbees!11;1f;gf;12;11;2d
!!!!!!!!!!jofu!bees;2:3/279/2/231!!Cdbtu;2:3/279/2/366!!Nbt1;366/366/366/1
!!!!!!!!!!VQ!CSPBEDBTU!SVOOJOH!NVMUJDBTU!!NUV;2611!!Nfusjd;2
!!!!!!!!!!SY!qbdlfut;:7:5!fsspst;1!espqqfe;:81!pwfssvot;1!gsbnf;1
!!!!!!!!!!UY!qbdlfut;56:!fsspst;1!espqqfe;1!pwfssvot;1!dbssjfs;1
!!!!!!!!!!dpmmjtjpot;1!uyrvfvfmfo;2111
!!!!!!!!!!SY!czuft;93:916!)921/4!LjC\*!!UY!czuft;61353!)5:/1!LjC\*
!!!!!!!!!!Joufssvqu;22

fui2!!!!!!Mjo1!fodbq;Fuifsofu!!IXbees!11;1f;gf;12;11;2e
!!!!!!!!!!jofu!bees;2:3/279/6/2!!Cdbtu;2:3/279/6/366!!Nbt1;366/366/366/1
!!!!!!!!!!VQ!CSPBEDBTU!SVOOJOH!NVMUJDBTU!!NUV;2611!!Nfusjd;2
!!!!!!!!!!SY!qbdlfut;21254!fsspst;1!espqqfe;:81!pwfssvot;1!gsbnf;1
!!!!!!!!!!UY!qbdlfut;1!fsspst;1!espqqfe;1!pwfssvot;1!dbssjfs;1
!!!!!!!!!!dpmmjtjpot;1!uyrvfvfmfo;2111
!!!!!!!!!!SY!czuft;992192!)971/5!LjC\*!!UY!czuft;1!)1/1!C\*
!!!!!!!!!!Joufssvqu;26

mp!!!!!!Mjo1!fodbq;Mpdmb!Mppqcbd1
!!!!!!!!!!jofu!bees;238/1/1/2!!Nbt1;366/1/1/1
!!!!!!!!!!jofu7!bees;!; ;20239!Tdpqf;Iptu
!!!!!!!!!!VQ!MPPQCBDL!SVOOJOH!!NUV;27547!!Nfusjd;2
!!!!!!!!!!SY!qbdlfut;6919!fsspst;1!espqqfe;1!pwfssvot;1!gsbnf;1
!!!!!!!!!!UY!qbdlfut;6919!fsspst;1!espqqfe;1!pwfssvot;1!dbssjfs;1
!!!!!!!!!!dpmmjtjpot;1!uyrvfvfmfo;1
!!!!!!!!!!SY!czuft;839289!)822/2!LjC\*!!UY!czuft;839289!)822/2!LjC\*

Re{ "rctvkewnet"cvgpykqp"vq"vjg"ugvvpki"u"ujqyp"hqt" fui1"cpf" fui2."kp"rctvkewnet"vjg"Nbt1<"ugvvpki."
y jkej"ujqwnf" ovej"vjcv"y jkej"ku"cr rtqr tkcvg"hqt" {qwt"pgvy qtm" Pqy"ejgem"vjg"tg o c k p k p i " e q p L i w t c /
vkqp"rtcogvgtu"wukpi"spvuf<

Tpopnb!E23!HQT) sppuAiptu; ;\* . ? ! spvuf

Lfsofm!JQ!spvujoh!ubcmf
Eftujobujpo!!!!!!Hbufxbz!!!!!!!!!!Hfonbt1!!!!!!!!!!Gmbht!Nfusjd!Sfg!!!!!!Vtf!Jgbd f
efgbvmu!!!!!!!!!!2:3/279/2/2!!!!!!!!!!1/1/1/1!!!!!!!!!!VH!!!!!!2!!!!!!!!!!1!!!!!!!!!!1!fui1
mppqcbd1!!!!!!!!!!+!!!!!!!!!!!!!!!!!!!!!!!!!!366/1/1/1!!!!!!!!!!V!!!!!!!!!!1!!!!!!!!!!1!!!!!!!!!!1!mp
mpdbmofu!!!!!!!!!!+!!!!!!!!!!!!!!!!!!!!!!!!!!366/366/366/1!!!!!!V!!!!!!!!!!1!!!!!!!!!!1!!!!!!!!!!1!fui1
2:3/279/6/1!!!!!!!!!!+!!!!!!!!!!!!!!!!!!!!!!!!!!366/366/366/1!!!!!!V!!!!!!!!!!1!!!!!!!!!!1!!!!!!!!!!1!fui2

Jgtg{qw"ctg"kpvgtguvf"kp"vjg"fgcwnv"icvgy c{ "cfftguu"Kv"ujqwnf" ovej"vjg"cr rtqr tkcvg"qpg"hqt" {qwt"
pgvy qtm"Kh"uq."vjgp"vjg"Gvjgtpgv"kpvgthceg"qh" {qwt"Uappq o c" jcu"dgpp"uweeguuhwnm{ "eqpLiwtgf"vq"qrgt/
cvg"qp" {qwt"pgvy qtm"cpf" {qw"ctg"tgcf{ "vq"ejgem"qrgtckvq"qh"vjg"Uappq o c"qxgt"vjg"pgvy qtm"Kh"pqv."
{qw"ujqwnf"tgejgem" {qwt"eqpLiwtcvkqp"cpflqt"tgrgc v"vjg"ofudpogjh"rtqegfwtg)

kh{qw"jcxg"eqpLiwtgf" c"pcogugtxgt\*u+"hqt" {qwt"pgvy qtm." {qw"oc"ejgem"vjcv"d{ "kuuwpki"vjku"eqo/
ocpf<

Tpopnb!E23!HQT) sppuAiptu; ;\* . ? ! dbu!0fud0sftpmw/dpog
tfbsdi!zpvse/epnbjo
obnftfswfs!2:3/279/2/2
obnftfswfs!2:3/279/2/3

Y jkej "fku rnc {u"vjg"eqpvpgpvu"qh"vjg"lgvel tguqxndleqph"Łng"eqpvckpkpi "vjg"fq o ckp"pc o g" {qw"gpvtgfg"rtgkx/  
qwu n {"wukpi "ofudpogjh."cpf"vjg"pc o gugtugt"KR"cf f tguu\*gu+"vq"wg"hqt"vjcv"fq o ckp}

### Check Network Operation

Y kvj {"qwt"Uppq o c"pgv y qtm"rtc o gygtu"rtqrtn {"eqpŁi wtgf." {qw"ctg"tgc f {"vq"vguv"vjg"ugvwr" wukpi "  
qjoh"htq o "c"ugtugt"qt" y qtmuvckqp"vjcv"ku"cdng"vq"ceeguu"vjg"pgv y qtm"eqppgevgf"vq"vjg"Uppq o c" Cn/  
vgtpcvkxgn {" {qw"eqwnf"qjoh"ppg"qh" {qwt"ugtugt"qt" y qtmuvckqpu"htq o "vjg"Uppq o c"rtq o rv"vq"vguv"vjg"  
ugvwr}

Qpeg {"qw"jcxg"uweeguuhwn {"guvcdnku jgf"pgv y qtm"eq o o wpkcvkqpu" y kvj"vjg"Uppq o c." {qw" o c {"rgthqt o "  
cnn" o ckpvpcpeg"cpf" o qpkvqtkpi "cevkxkvku"xc"ufmofu"cpf"guq" Vjg"Uppq o c"rtqxfgu"dvj"enkpv"cpf"  
ugtugt"qrgtcvkqp" wukpi "ufmofu" Hqt"ugewtkv {"tgcuppu."qpn {"enkpv"qrgtcvkqp"ku"uw r rqtvgf" wukpi !guq"  
 [qw" o c {"cnuq" o qpkvt"vjg"Uppq o c"xc"vjg" J VVRU"kpvgthceg"\*ugg" +}

Ugewtkv {"eqpuekqu" wugtu" y knn" y cpv"vq"wg"ttt."vjg"ugewtg"ujgmn"tg rnceg o gpv"hqt"ufmofu."cu"vjg"nqi"kp"  
 o gcpu" Vjg"eq o rcpkp" wvknkv {"tdd"rtqxfgu" c"ugewtg"tg rnceg o gpv"hqt"guq"cu" c" o gcpu"qh"vtcpuhgttkpi "  
 Łngu"vq"cpf"htq o "vjg"Uppq o c" Dqvj"qh"vjgug"rtqvqeqnu"ctg"uw r rqtvgf"kp"vjg"Uppq o c"xc"vjg"QrgpUUJ "  
 k o rng o gpvcvkqpu" hqt"Nkpwz" Tghg"vq" "hqt" o qtg" kphqt o cvkqp"cdqvw"vjg"  
ugewtg"ujgmn"rtqvqeqn}

### Using Telnet

Y jgp"guvcdnku jkpi "c"ufmofu"eqppgevkqp" y kvj {"qwt"Uppq o c."nqi i kpi "kp" fktgevn {"cu"tqqv"ku"pqv"rgt o kv/  
vgf" Vjku"ku" c"ugewtkv {" o gcuwtg"vjcv" o cmgu"kv"unki jvn {" o qtg" fkhŁewnvq" i ckp"ceeguu" d {"uk o rn {"vt {"kpi "  
rcuu y qtfu."ukpeg"kv"ku"cnuq"pgeguuct {"vq"mpqy"vjg"pc o g"qh" c"wgut" Y jgp {"qw"kpvcvq" c"ufmofu"uguukqp"  
 y kvj"vjg"Uppq o c."vjku"dcppgt" y knn"dg" fku rnc {gf<

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+++++
+!!!!!!Xfmdpnf!up!Tpopnb`E23!HQT!ufmofu!dipotpmf!po;!!iptu/zpvs/epnbjo
+++++
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iptu!mphjo;

Jgtg {"qw" o c {"nqi"kp"cu"öpv rwugt" y kvj "rcuu y qtf"öRtcgekuö" Y jgp"nqi i g f"kp"cu"öpv rwugtö." {qw" o c {"  
ejgem"uvcvw" kphqt o cvkqp"cpf" xky"nqi "Łngu"dwv {"qw" y knn"pqv"dg"cdng"vq" o qfkh {"cp {"u {"uvg o "ugwkp i u"qt"  
xky"ugewtg"Łngu" Chvg"eqttgevn {"gpvgtkpi "vjg"rcuu y qtf"cv"vjku"rtq o rv.

Qbttxpse;

vjg"uki p"qp" o guuci g"ku"ujq y p"kv"kf gpvkŁgu"vjg" jquv"u {"uvg o "cu"Uppq o c" IRU"cpf"ujq y u"vjg"uqh v y ctg"  
rctv"pw o dgt."xgtukqp"cpf"dwknf"fcvg<

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Tpopnb`E23!HQT!7121.1176.111!w!2/11!Tbu!Kbo!2: !25;28;55!VUD!3124
Tpopnb`E23!HQT!)sppuAiptu;!*.*?
```

Vjku"ncuv"nkpg"ku"vjg"uvcpfctf"Uppq o c" IRU"rtq o rv" Chvg"eqpŁi wtkpi "vjg"wpkv." {qw"ujqwnf"ejcpi g"vjg"  
rcuu y qtfu" wukpi "vjg"Nkpwz"qbttxe"eq o o cpf"kuuwgf"htq o "vjg"rtq o rv}

Vq" i ckp"tqqv"ceeguu." {qw" o wuv"pqy"kuuwg"vjg"öuwr g t" wugtö"eq o o cpf"cv"vjg"rtq o rv<



Vjku"rcig"kpvgpvkqpcnn{"nghv"dncpm0







Foufs!b!lfz!ovncfs!)2.76645\*!ps!1!up!rvju;!!3

Foufs!uif!lfz!)2.42!BTDJJ!dibsbdufst\*;!!Tpopnb

Xsjujoh!lfz!ovncfs;!3!boe!Lfz;!Tpopnb!up!ouq/lfzt

Foufs!b!lfz!ovncfs!)2.76645\*!ps!1!up!rvju;!!1

...OUQ!Bvuijoujdbujpo!Dpogjhvsbujpo

Ep!zpv!xbou!bvuijoujdbujpo!fobcmfe!vtjoh!tpnf!ps!bmm!pg!uif!lfzt!jo  
uif!ouq/lfzt!gjmf@!)\z^ft-!\o^p\*!!z

Zpv!xjmm!cf!qspnqufe!gps!uif!lfz!ovncfst!)2!.!76645\*-!uibu!zpv!xbou!OUQ!up  
usvtu /!!Uif!lfz!ovncfst!zpv!foufs!nvtu!fyjtu!jo!zpv!ouq/lfzt!gjmf/!!Jg!zpv  
ep!opu!xbou!up!vtf!tpnf!pg!uif!lfzt!jo!zpv!ouq/lfzt!gjmf-!ep!opu!foufs!uifn  
ifs/!!OUQ!xjmm!usfbu!uiptf!lfzt!bt! vousvtufe /

Dmjfout!uibu!vtf!boz!pg!uif! usvtufe !lfzt!jo!uifjs!OUQ!qpmjoh!qbdlfut!xjmm  
sfdjwf!bvuijoujdbufe!sfqmjft!gspn!uif!Tpopnb`E23/!!Xifo!zpv!ibwf!foufsfe  
bmm!pg!uif! usvtufe!lfzt !uibu!zpv!offe-!foufs!{fsp!bu!uif!ofyu!qspnqu!gps!b  
lfz!ovncfs/

Foufs!b!usvtufe!lfz!ovncfs!)2.76645\*!ps!1!up!rvju;!!2

Foufs!b!usvtufe!lfz!ovncfs!)2.76645\*!ps!1!up!rvju;!!3

Foufs!b!usvtufe!lfz!ovncfs!)2.76645\*!ps!1!up!rvju;!!1

...OUQ!Cspbedbtu0Nvmujdbtu!Dpogjhvsbujpo

Xpvme!zpv!mjlf!up!fobcmf!cspbedbtu0nvmujdbtu!tfswfs!pqfsbujpo@!)\z^ft-!\o^p\*!!z

Tfu!uif!ofuxpsl!cspbedbtu0nvmujdbtu!beesftt!gps!uif!Tpopnb`E23  
up!vtf/!!Gps!cspbedbtu!npef!po!JQW5!ofuxpslt-!uijt!beesftt!jt  
uif!bmm!2 t!beesftt!po!uif!tvc.ofu/

Fybnqmf;!222/223/224/366

Po!JQW7!ofuxpslt-!uifsf!jt!npsf!uibo!pof!xbz!up  
efgjof!b!sbohf!pg!nvmujdbtu!beesfttft;

Fybnqmf;!gg16;;2!)bmm!opeft!po!uif!mpdbm!tjuf\*  
Fybnqmf;!gg13;;2!)bmm!opeft!po!uif!mpdbm!mjol\*

Uifsf!bsf!tqfdjgjd!nvmujdbtu!beesfttft!bttjhofe!gps!OUQ!Pqfsbujpo;

Gps!JQW5!nvmujdbtu!pqfsbujpo-!ju!jt!uijt!tqfdjgjd!beesftt.?!335/1/2/2  
Gps!JQW7!nvmujdbtu!pqfsbujpo-!ju!jt!uijt!tqfdjgjd!tjuf!tdpqf!beesftt.?!gg16;;212

Foufs!JQ!beesftt!gps!OUQ!cspbedbtu0nvmujdbtu!pqfsbujpo  
)bbb/cc/ddd/eee!ps!bbbb;;cccc!\*;!!335/1/2/2

Zpv!ibwf!tfmfdufe!nvmujdbtu!pqfsbujpo/!!Foufs!uif!UUM!wbmvf!uibu!jt  
offefe!gps!nvmujdbtu!qbdlfut!po!zpv!ofuxpsl!)2-!43-!75-!7-!239-!271-!2:3-!335\*;!43

Ju!jt!ijhimz!sfdpnnfoefe!uibu!bvuijoujdbujpo!cf!vtfe!jg!zpv!bsf!vtjoh!OUQ  
jo!cspbedbtu0nvmujdbtu!npef/!!Puijsxjtf!dmjfout!nbz!fbtjnz!cf! tqppgfe !cz  
b!gblf!OUQ!tfswfs/!!Zpv!dbo!tqfdjgz!bo!NE6!lfz!ovncfs!uibu!uif!Tpopnb`E23  
xjmm!vtf!jo!jut!cspbedbtu0nvmujdbtu!qbdlfut/!!Uif!dmjfout!po!zpv!ofuxpsl!nvtu  
cf!dpogjhvsfe!up!vtf!uif!tbnf!lfz/

Xpvmelzpv!mjlf!up!tqfdjgz!bo!NE6!lfz!ovncfs!up!vtf!xjui  
cspbedbtu0nvmujdbtu!npef@!) \z^ft-! \o^p\*!!z

Foufs!uif!NE6!lfz!ovncfs!up!vtf!) 2.76645\*;!!3

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+++++  
+!!+  
+!!Uif!Tpopnb`E23!Ofuxpsl!Ujnf!Qspupdpm!dpogjhvsbu jpo!ibt!cffo!vqebufe/!!!!!!!!+  
+!!+  
+!!!!!!!!!!!!!!!!!!Qmfbtfsf.cppu!opx!gps!uif!dibohft!up!ublf!fggfdu/!!!!!!!!!!!!!!!!!!!!!!!!+  
+!!+  
+++++  
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+++++

!  
!!  
Configuring the Sonoma as a Stratum 2 Server

Qrgtcvki "Uppq o c"cu"Uvtcvw o "3"Ugtxgt"ku"vjg"tgeq o o gpfgf" o qfg0" J qy xgt."vjgtg"ctg/vk o gu"y jgp"  
Uvtcvw o "4"qrgtcvki"ku"i qqf"uvtcvgi {<

" 30"Y jgp" {qw"y cpv" c"dcemwr"uqwtg"qh"vk o g0"Kp"vjku"ecug."Uppq o c"y knn"qrgtcvg"cu"Uvtcvw o "3"  
Ugtxgt"cu"nqi"cu"kv"ku"nqemgf"vq"vjg" I RU"uki pcn0"Kh"kv"nqugu"vjg"uki pcn."vjgp"Uppq o c"y knn"uvtcv"vq"ftkhv"  
cyc{ "htq o "drgthgev0"vk o g0" Gxgpwcn{."y jgp"kv"jcu"ftkhvf"32" o knnkugeqpfu."kv"tgej"vjg"wpnqemgf"eqp/  
fkvqp"cpf"uvqr"ugtxki"vk o g"qp" {qwt"pgvy qtm0"Kh" {qw"jcxg"Uppq o c"eqpLi wtgf"ht"Uvtcvw o "4"qrgtc/  
vkqp."vjgp"kv"y knn"eqpvkpwg"ugtxki"vk o g."wukpi"cpqvjgt"Vk o g"Ugtxgt"cu"kvu"tghgtpeg0"Kh"Uppq o c"ku"ncvgt"  
cdng"vq"ceswktg"nqem"qp"vjg" I RU"uki pcn"ci ckp."kv"y knn"u y kvej"dcem"vq"Uvtcvw o "3"qrgtcvki

" 40"Y jgp" {qw"y cpv" {qwt"Uppq o c"vq"ugtxg"ceewtcvg"vk o g."dwv" {qw"fqpp0"y cpv"vq"uwg"vjg"cpvgppc"ht"  
uq o g"tgcuqp+0"Kp"vjku"ecug."Uppq o c"ecp"qrgtcvg"uqngn{ "cu"Uvtcvw o "4"ugtxgt."y kvj"pq"cpvgppc"eqp/  
pgevfg0

Ukpeg"vjgtg"ctg"kpwo gtcndg"yc{u"vq"eqpLi wtg" {qwt"pgvy qtm"y kvj"Uvtcvw o "4"ugtxgtu."urgekLe"kpwtwe/  
vkqpu"ht"j qy"vq"fq"vjcv"ctg"dg{ qpf"vjg"ueqrg"qh"vjku" o cpwcn0" I gpgtcn"kpvtwevkqpu"qp"j qy"vq"gfkv"vjg"  
pvr0eqph"Ln g"ctg"dgnqy0

Edit ntp.conf File

[qw" o wuv"gfkv"vjg"pvr0eqph"Ln g"kp"qtfgt"vq"rqkp" {qwt"Uvtcvw o "4"ugtxgt"cv"Uvtcvw o "3"ugtxgt0"Gfkv"l gve/  
pvr0eqph"cpf"cff" {qwt"ugtxgt"nkp g\*u+0"\*Ugg" "ht"kpht o cvkqp"  
jtO

IMPORTANT

Pqy"ucxg"vjg"gfkgf"Lng"cpf"eqr{"kv"vq"vjg"pqp/xqncvknng"fcuj"rctvkvkqp"ykvj"vjku"eqo o c p f <

! dq! .q! 0fud0ouq/dpog! 0cppu0fud

Mask Alarm

Kp"Uvtcvw o "3"qrgtcvkqp"cp"cnct o "yknndg"kpfkcevgf" y jgp"vjgtg"ku"cnquu"qh"uki pcn"qt"kh"vjg"cpvgppc"ku"
pqv"eqppgevgf0"Hqt"Uvtcvw o "4"qrgtcvkqp" {qw" o c { "pqv" y cpv"vq"ugg"vjgug"cnct o u0" [qw"ecp" o cum"vjg o "
\*rtxgvp"vjg o "htq o "ujqykpi+"d{ "wukpi"vjg"eqpuqng" rqtv"\*ugtkcnpvgv y qtm+"eq o o c p f u" t f u t j h g m u n b t 1 "
cpf" t f u b o u g m u n b t 1 0 " Q t . " q p " v j g " h t q p v / r c p g n " m g { r c f l f k u r n c { " i q " v q " v j g " H c w n v u " u w d o g p w 0 " " N q q m " h q t "
UkiHnvOcum"cpf"CpvHnvOcum"cpf"ugv"vjg o "crrtrtkcvgn {0

Setting Up NTP Clients on Unix-like Platforms

Vq"eqpEiwtg" {qwt"Wpkz/nkmg"eqo rrwgt"vq"wug" {qwt"Uppq o c." {qw" o wuv"jcxg"uweeguuhwnn{ "eq o r n g v g f "
vjg"PVR"Ugtxgt"dcuke"kpucnncvkqp"rtqegfwtg"fguetkdgf"cdqxg0"Kv"ku"gzrgevgf"vjcv" {qw"ctg."qt"jcxg"
ceeguu"vq."c"ecrcdng"Wpkz!Nkpwz"u{uvgo"cf o kpkuvtcvqt"cpf"mpqy" o qtg"vjcp" c"nkvnng"cdqvw"kpucnncvp i "
fkuvtkdvwkqpu"htq o "uqwtg"eqfg0"Kpucnncvkqp" o wuv"dg"rgthqt o gf"d{ "c"wugt"ykvj"tqqv"rtkxknngf i gu"qp"vjg"
u{uvgo 0}

kh" {qw"jcxg"ceeguu"vq" c" wugpgv"pgyu"ugtxgt." o c p { " r t q d n g o u " o c { " d g " u q n x g f " d { " v j g " j g n r h w n " r g q r n g " y j j "
rctvkekrcvg"kp"vjg"Kpvgtpgv"pgyu" i tqwr" fgxqvgf"vq" PVR"cv"eqo r0rtqvqeqnu0vko g0pvr0

Vjtg" o gvjqfu"qh"wukpi"Uppq o c" ykvj" PVR"enkppvu"qp"Wpkz/nkmg"rncvhtq o u"yknndg"fguetkdgf<

Vjku"ku"vjg"uk o r n g u v . " c p f " y k n n " q r g t c v g " y k v j q w v " O F 7 " c w v j g p v k e c v k p 0 "



É" [qw"jcxg"kpucnngf"PVR"qp"{qwt'enkgpv"eq o rwwgtl)

É" [qw"jcxg"uweeguuhwnn{" rghqt o gf"vjg" "qp"{qwt'enkgpv"  
eq o rwwgtl)

Create the ntp.keys File

[qw" o wuv"etgcvg" c"Lnq"pc o gf"pvr0mgfu"kp"vjg"lgye" fktgevt {0""Kv" o wuv"dg" c"eqr {"qh"vjg"qpg"tgukfki"kp"  
vjg"lgye" fktgevt {"qh"{qwt"Uqpq o c0"" [qw"ecp"u**fmo**fu"kpq" {qwt"Uqpq o c"cpf"uvctv"cp"guq"uguukqp"ykvj"  
{qwt'enkgpv"eq o rwwgt"vq"ugpf"vjg"Uqpq o cø"





**tfswfs!2:3/279/2/231**

qt"vjg"cwvjgpkvcvgf"xgtukqp"cffgf"kp" <

**tfswfs!2:3/279/2/231!lfz!2**

Configure NTP Client for Multicast

[qw"o wuv"gfkv"vjg"pvrleqpl"Ln"y jkej"ouqe."vjg"PVR"fcg o qp."nqqmu"hqt"d{ "fghcwnv"kp"vjg"vjg"lgye" fktgevqt{0"Cpf"cff"vjgug"nkpgu"hqt"o wnvkecu<

**nvmujdbtudmjfou!335/1/2/2**

qt"hqt"KRx8<

**nvmujdbtudmjfou!gg16;;212**

kh"{qw"ctg"pqv"wukpi"OF7"cwvjgpkvcvkqp."{qw"y qwnf"cff"vjgug"nkpgu<

**ejtbcmf!bvui**

**nvmujdbtudmjfou!335/1/2/2**

qt"hqt"KRx8<

**ejtbcmf!bvui**

**nvmujdbtudmjfou!gg16;;212**

[qw"o c{"tgoqxg"vjg"nkpg"cffgf"rtgxkqwun{"kp"Wpkz/nkmg"Rncvht

"En

"Ugvwr



## Security

```
Hqt"Wpkz/nkmg"rncvhtq o u" {qw"ecp"eqpŁi wtg" {qwt"PVR"enkgpvu"ht"ugewtg"OF7"cwvjgpvkecvkqp0""Ugg"
0"" [qw"ecp"cnuq"tguvtkev"PVR"swgt {"ce/
eguu"/"ugg"dgnq y0
"
```

### Restrict NTP Query Access

```
Vjg"Pgv y qtm"Vk o g"Rtqvceqn"*PVR+"k o r ng o g pvcvkqp"kp"Uqpq o c"ku"dwknv"htq o "vjg"tghgtgpeg"fkuvtkdwwkqp"
c<
```

```
" pyvkog0qti lfqypnqcfu l
```

```
D {"hcevqt {"fghcwnv."tg o qvg"eqpvtqn"cpf" swgt {"qh"vjg"PVR"fcg o qp"ouqe"ku"fkucdngf0""Swgt {/qpn {"
qr gtcvkqp"ku"uw r rqtvgf"qp n {"htq o "rtqeguugu"twppkpi"qp"Uqpq o c"kvugnh."k0g0"htq o "vjg"nqecnjqv0""Vjku"
tguvtkevu"ceeguu"vq"ouqe"htq o "tg o qvg"jquvu"wukpi" gkvjgt"qh"vjg"v y q" PVR"eq o rcpkqp"vwknkvkgu"ouqr"cpf"
ouqed0
```

```
Eqpvtqn"xkc"vjgug"v y q"vwknkvkgu"ku"fkucdngf"kp"vjg"lgvelpvr0eqph"Łng"kp"v y q" y c {u0""Hktuv."OF7"cwvjgpvkec/
vkqp"mg {u"ctg"pq"fgŁpgf"ht"eqpvtqn"qr gtcvkqp"xkc" c"tgswguvmg"qt"eqpvtqmmg"fgencctcvkqp0""Ugeqpf."
vjku"fghcwnv"cfftguu"tguvtkevqp"nkp"ku"rtgugpv"kp"vjg"Łng<
```

```
sftusjdu!efgbvmu!opnpejgz!opr vfsz!opqffs
sftusjdu!238/1/1/2!opnpejgz
sftusjdu!1;;2!opnpejgz
```

```
Vjg"Łtuv"nkp"gnk o kpcvgu"eqpvtqn"cpf" swgt {"ceeguu"htq o "CNN"jquvu0""Vjg"ugeqpf"cpf"vjktf"nkp"fkucdng"
vjg"nqecnjqv"htq o " o cmkpi"cp {" o qfkŁecvkqpu"vq"vjg"ouqe"fcg o qp."dwv"swgt {"ceeguu"ku"pq"chhgevgf"
d {"vjku"tguvtkevqp0""Vjgug"nkp"gu" o wuv"pq"dg"tg o qxgf."cu"vjg {"ctg"pgeguuct {"ht"xctkqu" o qpkvqtqi"
rtqeguugu"twppkpi"qp"Uqpq o c"vq"hwpevkqp"rtgrgn {0
```

```
Mpqyngf icdng"PVR"wugtu" y j q" y qwnf"nkmg"vq"ewuvq o k |g"vjg"ugewtkv {"curgevu"qh"vjg"eqpŁi wtcvkqp"qh"
vjg"PVR"fcg o qp"kp"Uqpq o c"ujqwnf" gfkv"vjg"lgvelpvr0eqph"Łng"fktevn {"cpf"vjgp"eqr {"kv"vq"vjg"ldqqvlgeve"
fktgevt {0""Dg"uwtg"vq"tgvcv"vjg"qypgtujkr"cpf" rgt o kuukqpu"qh"vjg"qtk i kpcn"Łng"d {"wukpi"dq! q" y jgp"
rgthqt o kpi"vjg"eqr {0
```

**CAUTION**

If you are planning to make changes to the   file, you must NOT restrict query access from the local host to the NTP daemon. Various system monitoring processes running on the system require this access.

```
Cp"gzc o r ng"hqmq y u" y jke j"ujq y u"j q y"vq"cnny" swgt {"ceeguu"htq o "c"urgekŁe"tg o qvg"jqv" y kvj"KR"cf/
ftguu"3;4038:03032" y jkng"cnuq"cnny kpi"rtqeguugu"twppkpi"qp"Uqpq o c"vq"jcxg"swgt {"ceeguu"cu" y gmn<
```

```
sftusjdu!efgbvmu!opr vfsz!opnpejgz!opqffs
sftusjdu!238/1/1/2!opnpejgz
sftusjdu!1;;2!opnpejgz
sftusjdu!2:3/279/2/21!opnpejgz
```

Vjku"rcig"kpvgpvkqpcm{"nghv"dncpm0



## Two Gigabit Ports

```
Vjg"RVR"fcg o qp"uvcvwu"cpf"eqpŁi wtcvkqp"ku"uwr rqtvgf"htq o "vyq"RVR"eq o rcpkqp"wwknkvkgu"quqtubuy!
cpf"quqdpogjhy." y jgtg"z"ku"pgvy qtm"rqtv"2"*fui1*"qt"3"*fui2*0""Vjg"hqmqy kpi "vcdng"ujqy u"vjg"
Uqpq o c"wwknkvkgu"vjcv"rgtvckp"vq"RVR<"
```

RVR	quqe1 quqe2	quqtubu1 quqtubu2	quqdpogjh1 quqdpogjh2

```
RVR"ecp"dg"gpcdnfg"qp"qpg"qt"dqvj"pgvy qtm"rqtvu"*fui1"cpf"fui2+0""Kh"RVR"ku"gpcdnfg"qp"qpn{"qpg"
rqtv."vjgp"fui1"ku"vjg"pgvy qtm"rqtv"kf gpkŁgt"cpf" {qw"y qwnf"wug"quqtubu1"cpf"quqdpogjh1"htq"
RVR"uvcvwu"cpf"eqpŁi wtcvkqp0""Kh"RVR"ku"gpcdnfg"qp"dqvj"rqtvu."vjgp"dqvj"fui1"cpf"fui2"y knm"dg"wugf0
```

## PTP Configuration and Status

```
Vjg"fghcwnv"RVR"eqpŁi wtcvkqp"ugwkp i u"kp"vjg"Uqpq o c"ctg"ujqy p"dgnqy0""Kh" {qw"pggf"vq" o qfkh{"vjgug"
ugwkp i u"vjgp" {qw"y knm"pggf"vq"tgeqpŁi wtg"vjg"RVR"Uwdu{uvgo0"" [qw"o c{"rgthqt o"vjg"eqpŁi wtcvkqp"
htq o "gkvjgt"c"ufmofu"qt"tti
```

## PTP Configuration Using the Network or Serial Port

Vjg"quqdpoqjh1"qt"quqdpoqjh2"eq o o c p f"uvctvu"cp"kpvgtcexg"ujgnn"uetkrv"vjcv"yknn"cnqy" {qw"vq" eqpŁiwtg"vjg"RVR"Uwdu{uvgo"qh"vjg"Uqpq o c 0" [qw"yknn"dg"rtq o rvgf"vq"ugv"RVR"rtc o gygtu"cu"hn/ nqy u<

```
" GVJ"Rqtv<" " " 2"qt"3
" U{pe"kpvgtxcn"*Rgt"Ugeqpf+<" 3."4."6." : ."38."54."86."34:
" Cppqwpeg"kpvgtxcn"*Ugeqpfu+<" 3."4."6." : ."qt"38"
" Rtkqtkv{3<" " " 2/477
" Rtkqtkv{4<" " " 2/477
" Fgnc{"Ogejcpku o <" "" " G4G"qt"R4R
" Fq o ckp<" " " 2/477
" RVR"Vko g"Oqfg<" " " WVE"qt"RVR
" RVR"VVN<" " " 3/477
" Vtcpu o kuukqp"Oqfg<" " " Owvkecu"qt" J {dtkf
```

Qpg"Łng"ku" o qfkŁgf"hqt"gej" rqtv 0" Gkvjgtlgvelrvr20eqph"hqt" fui1"qt"lgvelrvr30eqph"hqt" fui2 0" Vjgug" ctg"ppq/xqncvkng"Łngu"uvqtgf"kp"vjg"HNCUJ"fkum"ldqqvlgve" fktgevt{0" [qw" o wuv"tgdqqv"vjg"Uqpq o c" chvgt" twppki"vjku"uetkrv"hqt"vjg"ejcpi gu"vq"vcmg"ghhgev 0

Vjg"hnqnykpi"ku" c"vtcpuetkrv"qh"vjg"swguvqp"cpf"cpu ygt"eqpŁiwtcvkqp"wkknv{"rtqkkfgf"d{"quqdpo. gjh1!ps!quqdpoqjh2 0" Vjg"wugt/gpvgtgf"rtc o gygtu"ctg"ujqyp"kp" c"nctigt" hqp v 0

```

...QUQ!Qsjpsjuz3!Dpogjhvsbujpo
Tfu!uif!QUQ!Qsjpsjuz3!wbmvf!)1.366*!239

...QUQ!Efmbz!Nfdibojtn!F3F!ps!Q3Q
Tfu!uif!QUQ!Efmbz!Nfdibojtn!)F3F!ps!Q3Q*!Q3Q

...QUQ!Epnbj!Dpogjhvsbujpo
Tfu!uif!QUQ!Epnbj!wbmvf!)1.366*!1

...QUQ!Ujnf!Npef!Dpogjhvsbujpo
Tfu!uif!QUQ!Ujnf!Npef!)VUD!ps!QUQ*!QUQ

...QUQ!UUM!Dpogjhvsbujpo
Tfu!uif!QUQ!UUM!wbmvf!)2.366*!2

Tfu!uif!QUQ!Usbotnjttjpo!Npef!)Nvmujdbtu!ps!Izcsje*!Nvmujdbtu

```

```

+++++
+++++
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!Uif!Qsfdjtjpo!Ujnf!Qspupdpm!JFFF.2699!W3!dpogjhvsbujpo!ibt!cffo!vqebufe/!!!!+
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+!!!!!!!!!!!!!!!!!!Qmfbtf!sf.cppu!opx!gps!uif!dibohft!up!ublf!fggfdu/!!!!!!!!!!!!+
+!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!+
+++++
+++++

```

Pqy"tgdaqv"vjg"u{uvg o "d{"kuwkpi "vjku"eq o o cpf"cv"vjg"ujgmn"rtq o rv<  
 sfcppu

### PTP Status Using the Network or Serial Port

Vjg"quqtubu1"qt"quqtubu2"eq o o cpf"cmqyu" {qw"vq"swgt {"vjg"uvcvwu"qh"vjg"RVR"Uwdu {uvg o 0"Hqn/  
 nqy kpi "ku"vjg"tgurqpug"vq"vjku"eq o o cpf<

W!!TJ!!BJ!!Q2!!Q3!!EN!!EPN!!NPEF!!UUM!!DMBT!!TDBMF!!TUBUF!!DMLJE!!VUD!VUDW!!DB!!M6!!M72!!UU!!GU!UN

Yjgtg<

- X" " ku"vjg"KGGG/37: : "xgtukqp"4"hqt"vjg"422: "uvcpfctf0
- UK" ku"vjg"RVR"u{pe"kpvgtxcn" "gkvjgt"3."314."316."31: ."3138."3154."3186."qt"3134: "ugeqpfu0
- CK" ku"vjg"RVR"cppqwpeg"kpvgtxcn."gkvjgt"3."4."6: : "qt"38"ugeqpfu0
- R3" ku"vjg"RVR"rtkqtkv {"3"kp"c"tcpig"htq o "2"vq"4770
- R4" ku"vjg"RVR"rtkqtkv {"4"kp"c"tcpig"htq o "2"vq"4770
- FO" ku"vjg"RVR"fnc {" o gejc pku o ". "gkvjgt"G4G"qt"R4R0









## UTC Time

```
Y jgp"vjg"RVR"Vko g"Oqfg"ku"ugv"vq"WVE."vjgp"vjgtg"ykm"dg"c"qpg"ugeqpf"lwo r"kp"vko g"y jgp"c"ngcr"
ugeqpf"kpugtvpq"qeewtu0""Kh"vjg"RVR"uncxg"fqgu"pqv"ceeqp"v"ht"vjku."kv"y km"cnuq"lwo r0""Cxqkf"vjku"d{
wukpi"RVR"Vko g"Oqfg0
```

## Multiport PTP

```
Y jgp"qpn{"qpg"RVR"qr vkqp"ku"gpdcngf"kv"y km"dg"eqpLi wtf"ht"fu1"RVR"fq o ckp"20""Kh"c"ugeqpf"RVR"
qr vkqp"ku"gpdcngf"vjgp"kv"y km"dg"eqpLi wtf"ht"fu2"RVR"fq o ckp"30""Vjku"eqpLi wtcvkqp"y km"cnngy"
RVR"vq"twp"cu"o cuvgt"qp"dqvj"rqtvu0
```

```
Kh"vjg"RVR"fq o ckp"ku"eqpLi wtf"cu"vjg"uc o g"xcnwg"ht"dqvj"rqtvu"*ht"gzco rng."RVR"fq o ckp"2"qp"
fu1"cpf"RVR"fq o ckp"2"qp"fu2+"vjgp"fu1"Rqtv"Uvcvg"y km"dg"o cuvgt"cpf"fu2"Rqtv"Uvcvg"y km"dg"
nkuvgpkpi0
```

Disable the  
PTP Protocol

```
Vjg"kpuvtwevkqpu"dgnqy"cuuw o g"vjcv"vjg"RVR"Qrvkqp"jcu"dggp"kpucnngf"qp"Rqtv"2"*fu1+"qh"{qwt"Uq/
pq o c0""Vq"ejgem."ugg"vjg"ugevkqp"vkvnfg" "cv"vjg"dgi kppkpi"qh"vjku"ejcrvt0
```

```
Vq"fkucdng"vjg"Rtgekukqp"Vko g"Rtqvqeqn"qp"Rqtv"2"kuuwg"vjg"hqmqy kpi"eq o o cpf<
```

```
! dinpe!.y!0fud0sd/e0sd/quqe1
```

```
EqR{"vjg"telrvrf2"Lng""vq"vjg"pqp/xqncvknng"HNCUJ"ctgc"nkmg"vjku<
```

```
! dq!.q!0fud0sd/e0sd/quqe1!0cppu0fud0sd/e
```

```
Vjgp<
```

```
! sfcppu
```

```
Qpeg"RVR"jcu"dggp"fkucdngf."vjg"wugt"kpvgthceg"y km"pq"nqpi gt"ujqy"vjg"gzkuvgpeg"qh"RVR0"
```

## Re-Enable PTP

```
Vq"tg/gpcdng"RVR"qp"Rqtv"2."tgo qxg"vjg"telrvrf2"Lng"htq o"vjg"lgvel telf"fkgtvqt{"cu"ujqyp"dgnqy<
```

```
! sn!0cppu0fud0sd/e0sd/quqe1
```

```
Vjgp<
```

```
! sfcppu
```

## NOTE

If PTP is also installed on Port 1, then follow the instructions above using .



Fktgev"tqqv"nqikpu"ctg"qpn{"rgt o kwgf"qp"vjg"nqecn"TU/454"eqpuqng"qt"xkc"UUJ0

Vjg"ugewtg"eqr{"wvknkv{."tdq."gnk o kpcvgu"vjg"pggf"vq"wug"vjg"kpugewtg"HVR"rtqvqeqn"hqt"vtcpuhttkpi"  
rtqitc o "wrfcvgu"vq"vjg"Uppq o c0

VVR"ceeguu"hqt"u{uvgo " o qpkvqtkpi"qpn{."ku"cmqygf"qpn{"xkc"UUN."uq"rcuuyqtfu"cpf"uguukqp"fcvc"  
ctg"gpct{rvgf"qp"vjg"yktg0"Ceeguu"xkc"JVVRU"oc{"dg"tguvtkevgf"qt"eq o rngvgn{"fkucdngf0"Ugg"  
"cpf" "dgnqy0

UPOR"ceeguu"hqt"u{uvgo " o qpkvqtkpi"qpn{."ku"eqpLiwtcdng"vq"rtqxxkf"vjg"ugewtkv{"qh"vjg"ncvguv"xgt/  
ukqp"5"kpvgtpgv"uvpcfctf"y jkej"uwr rqtvu"dqvj"xkgy/dcugf"ceeguu"eqpvtqn"cpf"wugt/dcugf"ugewtkv{"wukpi"  
o qfgtp"gpct{rvkqp"vgejpkswgu0"Rtgxkqwu"xgtukqpu"x3"cpf"x4e"uwr rqtvgf"ceeguu"eqpvtqn"guugpvkcm{"  
xkc"rcuuyqtfu"vtcpu o kwgf"qxgt"vjg"pgvy qtm"kp"rnckp"vgzv0"TGhgt"vq" cpf  
\*dgnqy+"hqt"fgvcknu0"UPOR"oc{"cnuq"dg"eq o rngvgn{"fkucdngf0"Ugg"  
"dgnqy0

Kpfxkfwcn"jqv"ceeguu"vq"rtqvqeqn"ugtxgt"fcg o qpu"jo/ufmofue-"tonqe"qt"ttie"ctg"eqpvtqngf"d{"  
fktgevxxgu"eqpvckpgf"kp"vjg"Lngu"lgveljqvuv0cmnqy"cpf"lgveljqvuv0fgpf. ! y jkej"ctg"eqpLiwtgf"wukpi"vjg"  
kpvgtcevxxg"uetkrv!bddfttdpogjh/!Ugg" "dgnqy0

Kpugewtg"rtqvqeqnu"nkmg"Vkog."Fc{vko g"cpf"Vgnpgv"oc{"dg"eq o rngvgn{"fkucdngf"d{"eqpLiwtcvkqp"qh"  
vjg"jofue"uwr gt/ugtxgt"fcg o qp"wukpi"vjg"kpvgtcevxxg"uetkrv"gp



Restrict Query Access - NTP

Vjg"Pgyqtm"Vkog"RtF c"Wu J







Ujqwnf" {qw"pggf"vq"tgrnceg" {qwt"mg{u"cv"cp{ "vk"og." {qw"ecp"lwuv"tg"ogxg"vjg"mg{u"htq"o"vjg"ldqqvlgvel  
uu.j" fktgevqt{ "cpf"vjgp"tgdqqv"vjg"Uppq"oc"l"C"pgy"ugv"qh"j"quv"mg{u"y"knncwvq"ocvkecnn{ "dg"i"gpgtcvgf0

Vq"eqpLi wtg"tqqv"nq"ikpu"vq" {qwt"Uppq"oc"xkc"rcuu"yqtfnguu."rwdnke"mg{ "cwvjgppvkecvkqp." {qw"o"uw"i"gp/  
gtcvg"c"rwdnkelr"tkxcvg"rckt"qh"UUJ4"mg{u"wukpi" {qwt"qyp"uu"j"mg{ "i"gpgtcvkpi" wvknkv{."qt" {qw"ecp" wug"vjg"  
tti. l fzhfo"vjcv"ku"tgukfgpv"qp"vjg"Uppq"oc"Lng"u{uvgo"l" [qw"o"uw"vjgp"cr"rgpf"vjg"rwdnke"mg{ "vq"vjg"  
ldqqvltqqvltuu"jlcwvjqtk/gfamgfu"Lng"kp"vjg"ppq/xqncvknq"HNCUJ"ctgc"qp" {qwt"Uppq"oc"l"Cv"dqqv"vk"og."  
vjg"Uppq"oc"y"knneqr{ "vjgug"vq"vjg"cevwn"y"qtmkp"i"ltqqvltuu"j" fktgevqt{ "qh"vjg"u{uvgo"tc"o"fkum"l"Vq" wug"  
vjku"ecrcdknkv{."vjg"eqttgurqpfkpi" rtkxcvg"mg{ "o"uw"tgukfg"kp"vjg"ltqqvltuu"j" fktgevqt{ "qh" {qwt"tg"ogvq"  
eq"orwvgt"cu"kfatic"qt"kfatic"l"Kh" {qw"ctg"wphe"oknct"y"kvj"vjku"rtqegu."tghgt"vq"vjg"o"cp"rcig"hqt"vjg"  
tti. l fzhfo" wvknkv{ "hqt"fgvcknu"kuuwg"nbo!tti. l fzhfo"cv"vjg"rtq"orv+l"v" \*Dg"ectghwn"vq"o"ckpvckp"vjg"  
rtqrgt"qypgtujkr"cpf"ceeguu"rgt"o"kuukqpu"qh"vjg"rtkxcvg"mg{ "d{ "wukpi"dq! .q! y"jgp"eqr{ kpi"vjg"Lng"l"  
kv"OWUV"dg"tgcfcng"qpn{ "d{ "tqqv"l"

Cfxcpegf" wugtu"y"ku"j"kpi"vq"o"qfkh{ "vjg"qxgtcnn"eqpLi wtcvkqp"qh"vjg"tti"e"fcg"o"qp"ujqwnf"gfkv"vjg"  
lgveluu"j"luuj"faeqphki"Lng"cpf"vjgp"eqr{ "kv"vq"vjg"ldqqvlgveluu"j" fktgevqt{ "qh"vjg"Uppq"oc"l" "Dg"ectghwn"vq"  
o"ckpvckp"vjg"rtqrgt"qypgtujkr"cpf"ceeguu"rgt"o"kuukqpu"d{ "wukpi"dq! .q" y"jgp"eqr{ kpi"vjg"Lng"l" "Cv"  
dqqv"vk"og."kv"y"knndg"eqrkgf"vq"vjg"lgveluu"j" fktgevqt{ "qh"vjg"u{uvgo"tc"o"fkum."vjgtgd{ "tgrncekpi"vjg"hce/  
vqt{ "fghcwnv"eqpLi wtcvkqp"Lng"l

"

HTTPS

Vjg"JVVRU"ugtxgt"kp"vjg"Uppq"oc"ku"dwknv"htq"o"vjg"uvcpfctf"Crccejg"xgtukqp"406032"fkuvtkdwwkqp"htq"o<

"" jwrf0crcejg0qti"

Kv" wugu"JVVRU" \*JVVR"qxgt"UUN+"y"kvj"o"qfaun"vjg"Crccejg"kpvgthceg"vq"QrgpUUN+l" Hqt"o"qtg"kphqt/  
o"cvkqp"cdqvv"vjku"rtqvqeqn."tghgt"vq<

" oqfuun0qti

PQVG<"Vq"fkucdng"vjg"JVVRU"rtqvqeqn"ugg" "cdqxg0"Vq"tguvkev"ce/  
eguu"ugg" "cdqxg0

JVVR"cpf"UUN" wug"Lngu"ht"vjg" fghcwnv"eqpLi wtcvkqp"nqecvfgf"kp"lgveljwvrf"l"Qh"vjgug." {qw"y"knncwv{rk/

de!0cppu0fud0iuuqe

pqfottm!sfr!.ofx!.y61:!.opeft!.pvu!tfswws/dsu!.lfzpvu!tfswws/lfz

Vjg"vyq"Łngu"ykm"dg"etgcvgf"kp"vjg"ldqqvlgveljvrrf"fktgevqt{0"" [qw"owuv"tgdqqv"vjg"Uppqoc"hqt"vjgo"  
vq"vcmg"ghhgev0""Cp"gzegmnpv"dqqm"yjkj"fguetkdgu"qrgtcvkqp"cpf"eqpŁiwtcvkqp"qh"vjg"xctkqwu"JVVRU"  
fktgevkgu"cpf"UUN"eqpŁiwtcvkqp"ku<

" Rtqhgukqpcn"Crcejg."Yckpytkijv."Ytqz"Rtguu."3;;;0"

NTP

[qw"ecp"eqpŁiwgt">{qwt"PVR"enkpvu"hqt"ugewtg"OF7"cwvjgpkcvkqp0""Ugg"

"qt"

0"" [qw"ecp"cnuq"tguvtkev"PVR"swgt{"ceegu0""Ugg"

kp"vjku"ejcrvgt0

Network Security  
Vulnerabilities

GpfTwp"cf ftguugu"oclt"pgvyqtm"ugewtkv{"xwnpgtcdknkvkgu"vjcv"chhgev"Uppqoc"cv"vjg"vqr"qh"vjku"ygd/  
rcig<

" gpfwtpvgejppqiqkgu0eqohlud0jvo

Vjku"Cr rnkecvkqp"Pqvg"fguetkdgu"dguv"rtcevkegu"vq"ugewtg">{qwt"vkog"ugtugt"cpf"okkicvg"ocp{"pgvyqtm"  
ugewtkv{"xwnpgtcdknkvkgu<

" gpfwtpvgejppqiqkgu0eqolrfhlCrrPqvgUgewtkv{0rfh



Enterprise Management  
Information Base (MIB)

kp"cf fkvkqp"vq"rtqxfkpi"vjg"UPOR"xctkcdngu"eqpvckpgf"kp"OKD/KK"cu"fguetkdgf"kp"THE/3435."GpfTwp"  
Vgejpqni kgu"jcu"ko r ng o gpvf"cp"gpvgrtkug"OKD"wukpi"vjg"u{pvcz"qh"vjg"UOK"xgtukqp"4"\*UOKx4+"cu"



After editing \_\_\_\_\_, you must copy it to the \_\_\_\_\_ directory and reboot the system. It is very important to retain the access mode for the file (readable only by \_\_\_\_\_), so be sure to use `chmod 400 _____`.

"

h"{qw"czg" [n"rtkpi"vq"wuh"





<u>Hkgnf%</u>	<u>Hkgnf" P c o g"</u>	"	<u>Hkgnf" Xcnwg</u>
3"	wu o Wugt"	"	wu o Wugt
4"	wu o Uvcwu"	"	]c"pw o dgt"* o quv"nkmg{"3+_
5"	wugtUvqtc i gV{ r g"	"	]c"pw o dgt"* o quv"nkmg{"5+_
6"	gpi kpgkF"	"	]2z"hqnnq y g f"d{ "c"pw o dgt"uvtkpi l j cu j_
7"	pc o g" "	"	]2z"hqnnq y g f"d{ "c"pw o dgt"uvtkpi l j cu j_
8"	ugePc o g"	"	]2z"hqnnq y g f"d{ "c"pw o dgt"uvtkpi l j cu j_
9"	enqpgHtq o "	"	]PWNN."wpnguu"wugt" y cu"etgcvgf"htq o "c"enqpg_
:	cwvjRtqvqeqn"	"	]c"fqwgf"pw o dgt"tgrtgugpvkpi <"OF7."UJC."õõ_
;	cwvjMg{ "	"	]2z"hqnnq y g f"d{ "c"pw o dgt"uvtkpi l j cu j_
32"	rtkxRtqvqeqn"	"	]c"fqwgf"pw o dgt"tgrtgugpvkpi <"FGU."CGU."õõ_
33"	rtkxMg{ "	"	]2z"hqnnq y g f"d{ "c"pw o dgt"uvtkpi l j cu j_
34"	wugtRwdnkeUvtkpi "	"	]2z"hqnnq y g f"d{ "c"pw o dgt"uvtkpi l j cu j_

tonqusbaq"tgswktgu"\*fgrgpfkpi "qp"vjg"ngxgn"qh"ugewtkv{ "+"vjg"wug"qh"Łgnfu"6."7." : . ; ."32."cpf"330"" [ qwt" UPOR" o cpc i g o gpv"uvcvkqp\*u+" y knn"pggf"vq"dg"eqpŁiwtgf"vq" j c p f n g " v j g u g " j c u j g f " x c n w g u 0

Cf fkvkqpcnn{."kp"lgvelupo rvtcruleqph" {qw" y knn"pggf"vq"ejcpi g"vjg"ugvvpki "hqt"X5"vq"QP0""Eqr { " upo rvtcruleqph"vq"ldqqvlgvel"chvgt" {qw" jcxg" o c f g " v j q u g " e j c p i g u " u q " u g v v k p i u " y k n n " d g " u c x g f " v j t q w i j " tgdqqvu" y kvj "er"/c"upo rvtcruleqph"ldqqvlgvelupo rvtcruleqph0

[qw"ujqwnf"ngcxg"X3X4E"ugv"vq"QP"wpvkn" {qw"xgtkh{ "vjcv" {qw"ecp"tgegkxg"UPORx5"pqvkŁecvkqulpk/ hqt o u 0 "" V j g p " { q w " e c p " e j c p i g " v j g " x c n w g " v q " Q H H 0

Example of usmUser Record

1			
[Redacted]			
9	10	11	12
authKey	privProtocol	p	
[Redacted]			

Vjg"ko c i g"cdqxs"ujqyu"cp"gzco r ng"qh"c"wu o Wugt"tgeqtf." y jgtg"vjg"Łgnfu"ctg<

<u>Hkgnf%</u>	<u>Gzc o r ng" Hkgnf" Xcnwg</u>
7" ( "8"	jcu j g f " h t q o " v j g " x c n w g " t q q v "
:	OF7
;" "	jcu j g f " h t q o " v j g " x c n w g " g p f t w p a 3
32"	FGU
33"	jcu j g f " h t q o " v j g " x c n w g " g p f t w p a 3

Disable or Restrict Access

Vq"flucdng"UPOR"ugg" 0""Vq"tgutkev"ceeguu"vq"  
 urgekŁe"jquvu"ugg" 0









`Fkurnc{"kpygpukv{"`





YIU/:6NcuvRqukvkqpHkz

Ncvkwfvg." " Vjgug"Łgnfu"ujqy"kpht o cvkqp"hqt"vjg" o quv"tgegpv"rqukvkqp"Łz0""Vjg"YIU/:6  
Nqpi kwfvg." " ncvkwfvg"cpf"nqpi kwfvg"kp"fgi tggg." o kpwvgu."ugeqpfu"hqt o cv"cpf"vjg"jgkijv"cdqyg"  
Jgkijv" " vjg"YIU/:6"tghgtgpeg"gnkruqkf"kp" o gvgtu"ku"ujqyp0""Tghgt"vq"  
0

IRU/WVE"Čn o cpce"Kphq

Vjgug"Łgnfu"ujqy"vjg"KEF/IRU/422"čn o cpce"rctc o gvgtu"y jkej"ctg"wugf"vq"tgncvg"IRU"vk o g"vq"WVE0"

NU."NUH" " Vjgug"Łgnfu"eqpvckp"vjg"ewttgpv"ngcr"ugeqpf"cpf"hwvwtg"ngcr"ugeqpf"xcnwgug0

Y PNUH."FP" Vjgug"Łgnfu"ujqy"vjg"IRU"yggm"pwo dgt"cpf"fc{"pwo dgt"qh"yggm"cv"vjg"gpf"qh"  
" " " " HO É X W X U H H F O G D L À p % ` 0 ` p @ À 0 p ° @ € δ % ! \$ L H

Vk o g" Fg xk c v k q p" " " " " " "	V j k u" L g n f" u j q y u" v j g" v k o g" f g x k c v k q p" * V F G X + " q h" v j g" q h h u g v" o g c u w t g o g p v u" k p" u g e q p f u 0" V j g" v c w" c u u q e k c v g f" y k v j" v j k u" o g c u w t g o g p v" k u" q p g" u g e q p f. " y j k e j" k u" v j g" w r f c v g" k p v g t x c n" q h" v j g" r q u k v k q p" L z g u" t g e g k x g f" h t q o" v j g" I R U" T g e g k x g t 0
Q u e k n n c v q t" " C i g k p i" T c v g"	V j k u" L g n f" u j q y u" v j g" t g i" t g u u k q p/ e q o r w v g f" u { u v g o" q u e k n n c v q t" c i g k p i" t c v g" r g t" f c { " * u g x g t c n/ j q w t u" f g n c { " d g h q t g" v j g" L t u v" o g c u w t g o g p v u" c t g" f k u r n c { g f + 0
E q p v t q n" N q q r" V C W" " " " " " "	V j k u" L g n f" u j q y u" v j g" u { u v g o" q u e k n n c v q t" e q p v t q n" n q q r" c x g t c i k p i" v k o g" e q p u v c p v. " k p u g e q p f u 0" K v o u" x c n w g" k u" c w v q o c v k e c m n { " c f l w u v g f" v q" o c k p v c k p" q r v k o w o" q h h u g v" c p f u v c d k n k v { 0
E q c u v" F w t c v k q p" " " " " " "	V j k u" u j q y u" v j g" p w o d g t" q h" u g e q p f u" v j g" I R U" U w d u { u v g o" j c u" d g g p" k p" e q c u v" o q f g. y j k n g" v j g" U q p q o c" k u" w p n q e m g f" v q" I R U 0" " E q c u v" o q f g" k u" c p q v j g t" v g t o" h q t" j q n f q x g t o q f g 0
G u v k o c v g f" V k o g" G t t q t" "	V j k u" k u" v j g" g u v k o c v g f" v k o g" g t t q t" q h" v j g" I R U" U w d u { u v g o" y j g p" k p" e q c u v l j q n f q x g t o q f g. " k p" u g e q p f u 0
K p v g t p c n" E j c u u k u" V g o r g t c v w t g"	K p v g t p c n" e j c u u k u" v g o r g t c v w t g" k p" A E 0" " C x c k n c d n g" y k v j" Q E Z Q" q t" T w d k f k w o q u e k n n c v q t u 0

Clock Page

V j k u" r c i g" u j q y u" v j g" e q p L i w t c v k q p" q h" v j g" U q p q o c" V k o g" U g t x g t" g z e g r v" h q t" c p { " q r v k q p c n" K l Q" y j k e j" k u" n k u v g f" q p" v j g" K l Q" r c i g 0" "

E n q e m" E q p L i w t c v k q p

Vk o g" O q f g" " " " " " " " " " " " " " " "	V j k u" L g n f" u j q y u" v j g" e w t t g p v" v k o g" o q f g" u g v k p i 0" " R q u u k d n g" u g v k p i u" c t g" W V E. " I R U" c p f" N q e c n 0" " U k p e g" P V R" c n y c { u" w u g u" W V E. " v j k u" u g v k p i" q p n { " c h h g e v u" v j g" h t q p v/ r c p g n" f k u r n c { " c p f" c p { " q r v k q p c n" V k o g" E q f g" q t" U g t k c n" V k o g" q w v r w v u 0" " H q t" g z c o r n g. " k h" v j k u" L g n f" u j q y u" N q e c n. " v j g p" v j g" v k o g" u j q y p" q p" v j g" h t q p v/ r c p g n" f k u r n c { " y k n n" d g" N q e c n" v k o g" d w v" P V R" y k n n" t g o c k p" c v" W V E" v k o g 0" " V q" e j c p i g" v j g" v k o g" o q f g" u g v k p i w u g" v j g" t z t u j n f n p e f d p o g j h" e q o o c p f" x k c" v j g" e q p u q n g" r q t v 0
Vk o g" \ q p g" " Q h h u g v" " " " "	V j k u" L g n f" u j q y u" v j g" q h h u g v" h t q o" W V E" c p f" k u" q p n { " x c n k f" y j g p" v j g" V k o g" O q f g" k u" N q e c n 0" " C" r q u k v k x g" V k o g" \ q p g" Q h h u g v" k o r n k g u" c" n q p i k v w f g" g c u v" q h" v j g" I t g g p y k e j o g t k f k c p 0" " V q" e j c p i g" v j g" v k o g"   q p g" w u g" v j g" t z t u j n f n p e f d p o g j h" e q o o c p f 0
F c { n k i j v" U c x k p i u" V k o g" "	V j k u" L g n f" y k n n" u j q y" y j g v j g t" F U V" e q p v t q n" k u" g p c d n g f" q t" p q v 0" F U V" L g n f u" c t g" q p n { " w u g f" y j g p" v j g" V k o g" O q f g" k u" N q e c n 0
F U V" U v c t v. " " F U V" G p f" " " " " " " " " " " " " "	V j g u g" L g n f u" y k n n" q p n { " f k u r n c { " k h" v j g" F c { n k i j v" U c x k p i u" V k o g" L g n f" c d q x g" u j q y u g p c d n g f 0" " K h" g p c d n g f. " v j g p" v j g u g" L g n f u" u j q y" y j g p" F U V" u v c t v u" c p f" g p f u" f w t k p i" v j g { g c t 0" " H q t" g z c o r n g. " k p" o q u v" q h" v j g" W 0 U 0 C 0" v j g" F U V" U v c t v" V k o g" k u" v j g" 4 p f" U w p f c { k p" O c t e j" c v" 4" c 0 o 0" " V j g" F U V" G p f" V k o g" k u" v j g" 3 u v" U w p f c { " k p" P q x g o d g t" c v" 4 c 0 o 0" " F U V" u g v k p i u" c t g" w u g f" y j g p" v j g" v k o g" o q f g" k u" N q e c n 0" " V q" e j c p i g" v j g" F U V u g v k p i u" w u g" v j g" t z t u j n f n p e f d p o g j h" e q o o c p f 0



Network: IPv6 Page

Vjku"rcig"ujqyu"kphqt o cvkqp"tgncvgf"vq"vjg"KRx8"pgv y qtm"rctc o gvgtu0""Hqt" o qtg"kphqt o cvkqp"qp"KRx8"  
ugg" 0

Network: DNS Page

Vjku"rcig"ujqyu"vjg"KR"cf ftguugu"qh"vjg"rtk o ct{"cpf"ugeqpfct{"fq o ckp"pc o g"ugtxgtu0

Network: MAC Address Page

Vjku"rcig"ujqyu"vjg"ogfk/ceeguu/eqpvtqn"\*OCE+"cf ftguu"hqt"dqv j"Gvjgtpgv"rqtvu"\*fui1"cpf" fui2+0

NTP Page

Vjg"PVR"Uvcvwu"rcig"ujqyu"cn"kphqt o cvkqp"tgncvgf"vq"PVR"qrgtcvkqp0"

PVR"Uvcvwu

Uvcvwu" " Vjg"uvtcvw o "Lgnf"jcu"ugxgtcn"rquukdng"xcnwgu<  
" " " Uvtcvw o "3<" Vjg"ugtxgt"ku"hwmm{"u{pej tqpk | gf"cpf"ceewtcvg0

Firmware: Firmware Status Page

Vjg"Łto yctg"Uvcvwu"rcig"ujqyu"rctv"pw o dgtu"cpf"tgxkukqpu"hqt"Uqppq o c"Łto yctg

Hkto yctg"Uvcvwu

Nkpwz"THU"RP." Vjgug"Łgnfu"ujqy"vjg"Nkpwz"tqqv"Łng"u{uvg o "rctv"pw o dgt."xgtukqp" ("fcvg)  
Nkpwz"THU"Xgtukqp

Nkpwz"Mgtpgn"RP." Vjgug"Łgnfu"ujqy"vjg"Nkpwz"mgtpgn"rctv"pw o dgt."xgtukqp" ("fcvg)  
Nkpwz"Mgtpgn"Xgtukqp

IRU"Uwdu{uvg o " Vjku"Łgnf"ujqyu"vjg"IRU"Uwdu{uvg o "Łto yctg"xgtukqp)  
Hkto yctg

IRU"Uwdu{uvg o " Vjku"Łgnf"ujqyu"vjg"IRU"Uwdu{uvg o "Hkgnf"Rtqi tco o cndng" I cvg" Cttc { " \*HR I C+  
HR I C" " xgtukqp

Firmware: Linux RFS Upgrade Page

Vjku"rcig"ku"wugf"hqt"wr itc fkp i"vjg"Nkpwz"THU"Łto yctg" [qw" o wuv"dg"nqi igf"kp"cu"đtqqvđ"kp"qtfgt"vq"  
jcxg"ceeguu"vq"vjku"rcig"Vjg"ncvguv"tgngcugf"xgtukqpu"qh"Uqppq o c"Łto yctg"ctg"htggn{"cxckncdng"qp"vjg"  
GpfTwp"Vgejppnqikgu"ygduky" Hqt"fgvckngf"kpht o cvkqp"qp"jqy"vq"rgthqt o "vjg"wr itc f"gvjgt"xkc"vjg"  
pgvyqtm"rqtv."vjg"ugtkcn"rqtv."qt"vjg"JVVRU"kpvgthceg"ugg" 0"

Firmware: Linux Kernel Upgrade

Vjku"rcig"ku"wugf"hqt"wr itc fkp i"vjg"Nkpwz"mgtpgn"Łto yctg" [qw" o wuv"dg"nqi igf"kp"cu"đtqqvđ"kp"qtfgt"  
vq"jcxg"ceeguu"vq"vjku"rcig"Vjg"ncvguv"tgngcugf"xgtukqpu"qh"Uqppq o c"Łto yctg"ctg"htggn{"cxckncdng"qp"  
vjg"GpfTwp"Vgejppnqikgu"ygduky" Hqt"fgvckngf"kpht o cvkqp"qp"jqy"vq"rgthqt o "vjg"wr itc f"gvjgt"xkc"  
vjg"pgvyqtm"rqtv."vjg"ugtkcn"rqtv."qt"vjg"JVVRU"kpvgthceg"ugg"  
0"

Firmware: GPS Subsystem Upgrade Page

Vjku"rcig"ku"wugf"hqt"wr itc fkp i"vjg"Łto yctg" [qw" o wuv"dg"nqi igf"kp"cu"đtqqvđ"kp"qtfgt"vq"jcxg"  
ceeguu"vq"vjgug"rcig"Vjg"ncvguv"tgngcugf"xgtukqpu"qh"Uqppq o c"Łto yctg"ctg"htggn{"cxckncdng"qp"vjg"  
GpfTwp"Vgejppnqikgu"ygduky" Hqt"fgvckngf"kpht o cvkqp"qp"jqy"vq"rgthqt o "vjg"wr itc f"gvjgt"xkc"vjg"  
pgvyqtm"rqtv."vjg"ugtkcn"rqtv."qt"vjg"JVVRU"kpvgthceg"ugg" 0"

Firmware: GPS Receiver Upgrade Page

Vjku"rcig"gzkuu"kp"wpkvu"ujkrrgf"chvgt"Ocl"4239"\*ykvj"vjg"GpfTwp"IRU" Tgegkxgt+0"Vjku"rcig"ku"wugf"  
hqt"wr itc fkp i"vjg"Łto yctg" [qw" o wuv"dg"nqi igf"kp"cu"đtqqvđ"kp"qtfgt"vq"jcxg"ceeguu"vq"vjgug"rcig"  
Vjg"ncvguv"tgngcugf"xgtukqpu"qh"Uqppq o c"Łto yctg"ctg"htggn{"cxckncdng"qp"vjg"GpfTwp"Vgejppnqikgu"  
ygduky" Hqt"fgvckngf"kpht o cvkqp"qp"jqy"vq"rgthqt o "vjg"wr itc f"gvjgt"xkc"vjg"pgvyqtm"rqtv."vjg"ug/  
tkcn"rqtv."qt"vjg"JVVRU"kpvgthceg"ugg" 0"

Firmware: Reboot Page

Vjku"rcig"ykm"cmqy" {qw"vq"rgthqt o "c"uqhvyctg"tgdqqv"qh"dqvj"vjg"Nkpwz"Uwdu{uvgo "cpf"vjg"IRU"  
Uwdu{uvgo0""Vjku"ku"pqt o cm{ "wugf"chvgt"c"Łt o yctg"wr itc fg"dww"ecp"dg"fqpg"cp{vkog" {qw"y kuj"vq"  
tgugv"vjg"Uqpqoc0

Disable or  
Restrict Access

Vq"fkucdng"JVVRU."ugg"  
urgekŁe"jquvu"ugg"

0

0""Vq"tguvtkev"ceeguu"vq"



NTP

D{"fghcwnv."ouqe"ku"hcevqt{/eqpŁiwtgf"vq"nkuvgp"qp"dqvj"KRx6"cpf"KRx8"cf f tguugu"qp"cnk"kpvgthcegu0""  
Vjku"oc{"dg"ejcpi g f" d{"gfkvkpi"l g v e l p v r 0 e q p h" c p f" c f f k p i" v j g" f g u k t g f" j o u f s g b d f" f k t g e v k x g u" v q"  
cejkxg"vjg"fguktgf"dgjcxkqt."cpf"vjgp"eqr {kpi"kv"vq"l d q q v l g v e 0""Hqt"gzco r ng."c f f k p i" v j k u" n k p g <

**joufsgbdf!jhopsf!jqw7**

ykmn"ecwug"pvr f"vq"pqv"dkpf"vq"cp{"KRx8"cf f tguugu0""Tghgt"vq"vjg"PV R" f q e w o g p v c v k p p" h q t" f g v c k n u" q p" v j g"  
**joufsgbdf**"fktgevkg0)

IPv4-Only Protocols

Vjgtg"ctg"ugxgtcn"rtqvceqnu"twppkpi"qp"vjg"Uqpqoc"y jkej"ctg"pqv"KRx8"ecrcdng<"ufmofu"\*enkpp"cpf"  
ugtxgt+."guq"cpf"eidqde0""Fwg"vq"vjgkt"kpvtkpuke"kpugewtkv{"ufmofu"cpf"guq"ctg"tcrkfn{"dgkpi"fg r t g /  
ecv g f." c p f" r t q d c d n {" j c x g" n k v v n g" d w u k p g u u" t w p p k p i" q x g t" c p" K R x 8" p g v y q t m 0"" V j g" c f f t g u u" c w v q e q p Ł i w t c v k q p"  
ecrcdknkvgu"qh"KRx8"cnqpi"ykvj"vjg"Pgki jdqt" Fkueqxt{"Rtqvceqn"\*PFR+"ocmg"vjg"FER"rtqvceqn"nguu"  
k o r q t v c p v" k p" K R x 8" p g v y q t m u 0"" V j g" q r v k q p c n" R V R l K G G G / 3 7 : : " r t q v c e q n" k u" c n u q" p q v" c x c k n c d n g" q p" K R x 8 0





Available User Commands

ceeguaeppŁi	kpygtcevkxg"uetkrv"vjcv"iwkfgu"{qw"kp"eqpŁiwtkpi" <b>ufmofu."tti"cpf"tonqe"ceeguu"vq"vjg"Uqpq o c"vjcv"ku"nk o kvgf"</b>



„pdt„ o dtg „



„sd o o ch t0



cpuio (Optional)

Ugg" "hqt"kphqt o cvkqp"qp"vjku"eq o o cpf0

cpuioconfig (Optional)

Ugg" "hqt"kphqt o cvkqp"qp"vjku"eq o o cpf0

cpustat

Vjku"eq o o cpf"ujqyu"ci tqwr"qh"mg{ "xcnwg"u"hqt" o qpkvqtkpi "vjg"jgc"nvj"qh"vjg"Nkpwz"ERW"cpf"qrgtcv/ kpi"u{uvgo "uvcvwu0""Vjg"hqt o cv"ku<

! ZZZZNNEE/II;NN;TT!MMM&!GSFF1C! ,UU/UD

Yjgtg<

[ [ [ [ " ku"vjg"{gct"qh"vjg"WVE"vk o guvc o r"qh"vjg"o quv"tgegpv"wr fcvg0

OOFF" ku"vjg"o qp"vj"cpf"fc{/qh/o qp"vj"qh"vjg"WVE"vk o guvc o r"qh"vjg"o quv"tgegpv"wr fcvg0

J J<OO<UU""ku"vjg"j qwt." o kpvvg"cpf"ugeqp"qh"vjg"WVE"vk o guvc o r"qh"vjg"o quv"tgegpv"wr fcvg0

NNN " " ku"vjg"rgtegpvc i g"qh" o czk o w o "nqcf"cu"tgwtpgf"wukpi "vjg"Nkpwz"wtubu"eq o o cpf0

HTGGmD" ku"vjg"cxckncdng"htgg" o g o qt { "kp"mknqd { vgu"cu"tgwtpgf"wukpi "vjg"Nkpwz"wtubu"eq o o cpf0

-VWVE" ku"vjg"vg o rgtcvwtg"kp"fgi tgg"egpki tcf"qh"vjg"Nkpwz"ERW"fk"vg o rgtcvwtg0

Eq o o cpf<" dqvutubu  
" Uppq o c"tgrn{<" 31281227/33;35;11!!34&!4311671C!! ,78/ :D

faultstat

Vjku"eq o o cpf"tgwtpu"vjg"uw o o ct { "qh"cmn"u { uvgo "hcwnv"uvcv"u"kp"c"wu"gt/htkppfn { "hqt o cv0""Kv" fgeqfgu"vjg" hcwnv"uvcvwu"y qtf"\*HNVU+"tgwtpgf"kp"vjg"hgttubu"eq o o cpf"cpf"fkurnc { u"vjg"tguwnv"kp"c"vcdwnc"t"hqt o " ykvj"xgtdqug"fguetkrvkqp0""\*Hqt"wpkvu"ujkrrgf"chvgt"Ocl"4239"vjgtg"ykn"dg"cf"fkvqpcn"hcwnvu"hqt"vjg" IRU" Tgegkxg0+""Hqt"fgvcknu"qp"vjg"xctkqwu"hcwnvu"ugg" 0

" Eq o o cpf<" gbvmutubu  
" Uppq o c"tgrn{<" Tztufn!Gbvmu!Tubvvt;  
! ! ! Tztufn!Ptdjmbups!EBD!.....?!PL  
! ! ! HQT!Tjhobm!.....?!PL  
! ! ! GQHB!Dpogjhvsbu jpo!.....?!PL  
! ! ! GMBTI!Xsjuft!.....?!PL  
!!! ! HQT!Sfdjwfs!Dpnnvojdbu jpo!.....?!PL  
!!! ! HQT!Sfgfsfodf!Ujnf!.....?!PL  
!!! ! Tvctztufn!Dpnnvojdbu jpo!.....?!PL  
!!! ! HQT!Boufoob!.....?!PL  
!!! ! Tztufn!Ptdjmbups!QMM!Vompdlfe.....?!PL  
!!! ! Tztufn!Qpxfs0Dpogjhvsbu jpo!.....?!PL















TEXFEPV"ku" c"eqwpv"qh"vjg"pw o dgt"qh" PVR"rcemgvu"tgegkxgf"ukpeg"uvctvwr"qh"vjg" PVR"fcg o qp0"  
 " " Vjku"ku" c"54/dkv"eqwpvgt"uq"kv" y kmn" y tcr"dcem"vq" |gtq"chvgt"6.4;6.;89.4;7"rcemgvu0  
 " "

UGPVEPV"ku" c"eqwpv"qh"vjg"pw o dgt"qh" PVR"rcemgvu"ugpv"ukpeg"uvctvwr"qh"vjg" PVR"fcg o qp0" "  
 " " Vjku"ku" c"54/dkv"eqwpvgt"uq"kv" y kmn" y tcr"dcem"vq" |gtq"chvgt"6.4;6.;89.4;7"rcemgvu0  
 " "

UGPVluge" ku"vjg"ewttgpv"tcvg"qh" PVR"rcemgvu"dgkpi"ugpv"rgt"ugeqpf0  
 " "

FTQREPV"ku" c"eqwpv"qh"vjg"pw o dgt"qh" PVR"rcemgvu"ftqr rrgf"ukpeg"uvctvwr"qh"vjg" PVR"fcg o qp0"  
 " " Vjku"ku" c"54/dkv"eqwpvgt"uq"kv" y kmn" y tcr"dcem"vq" |gtq"chvgt"6.4;6.;89.4;7"rcemgvu0  
 " "

Dgnqy"ku"cp"gzco rng"qh" c"v{ rkecn"tgurqpug"vq"vjku"eq o o cpf<

" Eq o o cpf<" ouqtubu  
 " Uppq o c"tgrn{<  
 " 31281228/11;13;51!.1/111111162!23:238:99!23:12618:!!26:5/50tfd!!!!!!26

oscctrlstat

Vjku"eq o o cpf"fkurnc{u"vjg"ewttgpv"xcnwgu"qh"vjg"u{uvgo"quekncvqt"eqpvtqn"rctc o gvgtu0"Vjgug"rctc o /  
 gvgtu"ctg"tgnvcgf"vq"vjg"fkuekrnkpgf"u{uvgo"quekncvqt0"Vjg"eq o o cpf"htq o cvu"vjg"fcvc"cpf"rtkpvu"vjku"  
 Łzgf/ngpivj"uvtkpi"jcxkpi"vjgug"Łgnfu<

! ZZZZNNEE/II;NN;TT!MLTUBU!DPBTU!FTUFSS!NFBTFSS!UJNFEFW!BHFSBUF!UBV!FGDEBD!UFNQ

Yjgtg<

[ [ [ [ " ku"vjg" {gct"qh"vjg"WVE"vk o guvc o r"qh"vjg" o quv"tgegpv"wr fcvg"tgegkxgf"htq o "vjg"  
 " " " IRU"Uwdu{uvgo0

O O F F " ku"vjg" o qp v j " c p f " f c { / q h / o q p v j " q h " v j g " W V E " v k o g u v c o r " q h " v j g " o q u v " t g e g p v " w r f c v g "  
 " " " t g e g k x g f " h t q o " v j g " I R U " U w d u { u v g o 0

J J < O O < U U " " ku"vjg"j qwt." o k p w v g " c p f " u g e q p f " q h " v j g " W V E " v k o g u v c o r " q h " v j g " o q u v " t g e g p v " w r f c v g "  
 " " " t g e g k x g f " h t q o " v j g " I R U " U w d u { u v g o 0

N M U V C V " " ku"vjg" IRU"Uwdu{uvgo"eqpvtqn"uvcvwu."gkvjgt"Y T O "\*y c t o k p i " w r + . "  
 " " " C E S " \* c e s w k t k p i + . " N M I " \* n q e m k p i + " q t " N M F " \* n q e m g f + 0

E Q C U V " " ku"vjg"pw o dgt"qh"ugeqpfu"vjg" IRU"Uwdu{uvgo"jcu"dggp"kp"eqcuv" o qfg"  
 " " " \*w p n q e m g f " v q " I R U + 0

G U V G T T " " ku"vjg"guvk o cvgf"vk o g"gttqt"qh"vjg" IRU"Uwdu{uvgo"y jgp"kp"eqcuv" o qfg."kp"  
 " " " u g e q p f u 0

O G C U G T T " " ku"vjg"ncuv" o gcuwtgf"vk o g"qhugv"qh"vjg" IRU"Uwdu{uvgo"vq" IRU"y jkng"nqemgf."kp"  
 " " " u g e q p f u 0



rcvrserialnumber

*Vjku"eqo o cpf"ku"pqv"cxckncdng"kp"wpkvu"ujkr rgf"dghqtg"Lwpg"42390*

## setantflmask

```
Vjku"eqo o cpf"cmnyu"{qw"vq"gpdcng"qt" o cum"vjg" IRU"cpvgppc"hcwnv0""Rctc o gvg"htq"vjku"eqo o cpf"ku"
gkvjgt"OCUMGF"qt"GPCDNGF0""Ugvykpi"vjku"eqo o cpf"vq"OCUMGF"yknn"rtgxp"vjg"cpvgppc"hcwnv"
htqo"etgcvkpi"cp"cncto"eqpfkvpq0""Uqog"kpucmncvkqpu"oc{"pggf"vq" o cum"vjku"hcwnv"fwg"vq"ur gekcn"
cpvgppc"ukvwcvkqpu"nkmg"urnkvgtu"qt"FE"dnqemu"vjcv"eqphwug"vjg"cpvgppc"fgvgevq"ektewk0""Vjg"hcevqt{"
fghcwnv"ugvykpi"ku"GPCDNGF0
```

```
" Eqo o cpf<"      tfubougmunbt1!NBTLFE
" Uppqoc"tgrn{<"  Boufoob!Gvmu!Nbt1!t fu!up!NBTLFE
```

## setcaldelay

```
Vjku"eqo o cpf"uvtvu"cp"kpvgtcevkxg"wwkknv{"vjcv"cmnyu"{qw"vq"ejcpig"vjg"enqem"ecndtcvkqp"fgnc{0""Vjku"
ugvykpi"ku"wugf"vq"cfxcpeg"qt"tgvtf"vjg"enqem"kp"qtfgt"vq"eqo rgpucvg"htq"cpvgppc"ecdng"ngpi"vj"qt"qvjgt"
gzvgtpcn"jctf yctg"qt"ecdnp i0""Cmnycdng"tcpig"ku"0722.222"pcpqugeqpfu0
```

```
" Eqo o cpf<"      tfudbme fmbz
" Uppqoc"tgrn{<"  Kpvgtcevkxg"wwkknv{"ku"uvtvgf0
```

## setgpsdynmode

```
Vjku"eqo o cpf"ceegrvu"cu"kp ing"ctiwo"gpv<""QP"qt"QHH"vq"cmnyu"{qw"vq"ugv"vjg"f{pc o ke" o qfg"qh"
qrgtcvkqp"qh"vjg" IRU"Uwdu{uvgo 0""D{"fghcwnv."vjg"wpkv"ku"eqpŁiwtgf"htq"uvcvke"qrgtcvkqp."uq"vjku"ugvykpi"
ku"QHH"Kk"vjg"Uppqoc"yknn"dg" o qwpvgf"qp"c" o qxkpi" rncvhtqo."nkmg"cu"jkr."vjgp"vjku"ugvykpi" o wuv"dg"
ejcpig"vq"QP0""Vjg"ejcpig"vcngu"rnceg"ko o gfkcvgn{"cpf"ku"uvqtgf"pqp/xqncvkngn{0
```

```
Kv"ku"ko rqtvcpv"vjcv"vjg"f{pc o ke" o qfg"dg"ugv"QHH" y jgp"vjg"kpvtwo"gpv"ku"kp"cu"uvcvke"kpucmncvkqpu"Vjku"
ku"vjg"hcevqt{/fghcwnv"ugvykpi0""Ugvy"vjg"f{pc o ke" o qfg"vq"QP"qpn{
```





```
" Eqo o cpf<"      tztptduzqf
" Uqqqoc"tgrn{<"  Jotubmmfe!Ptdjmmbups!jt!UDYP/
```

sysrootfs

```
Vjku"eqo o cpf"tgwvtpu"vjg"ewttgpn{"nqcfgf"Nkpwz"tqqv"Lng"u{uvgo."gkvjgt"2"qt"3."y jgtg"2"ku"vjg"hce/
vqt{/kpuvcmgf"tqqv"Lng"u{uvgo"cpf"3"ku"vjg"wr itcfgf"tqqv"Lng"u{uvgo
```

```
" Eqo o cpf<"      tztspugt
" Uqqqoc"tgrn{<"  CPPUFE!SPPU!GJMF!TZTUFN!JNBHF!>!2!)Vqhsbef*
```

sysstat

```
Vjku"eqo o cpf"cnnyu{"qw"vq"swgt{"vjg"uvcvwu"qh"vjg"PVR"Uwdu{uvgo"0"Kv"tgvtkgxgu"kphtq o cvkqp"htq o "
vjg"PVR"fcg o qp"vq"fgvgt o kpg"vjg"ewttgpn"u{pej tqpk|cvkqp"uvcvwu"qh"vjg"PVR"Uwdu{uvgo"0"Kv"vjgp"
tgvtkgxgu"vjg"ncuv"nkp"kp"vjg"nqi"Lng"lxtlnqilrtcgeku2lo qpkvqt"eqpvtqmgf"d{"vjg"PVR"fcg o qp"tghgtgpeg"
enqem"ftxgt"vjcv"eqo o wpkecvgu"ykvj"vjg"IRU"Uwdu{uvgo"0"Vjku"nqi"Lng"ku"wr fcvgf"gxgt{"38"ugeqpfu"
wpfgt"pqt o cn"qrgtcvkqp"0"Kv"rctugu"cpf"htq o cvu"vjg"fcvc"eqpvckpgf"vjg"tgp"cpf"rtkpvu"vjku"Łzgf/ngpi"vj"
*igpgtcnn{."ukpeg"i tqun{"wpu{pej tqpk|gf"uvcvgu"eqwnf"ecwug"vjg"Łqcvkpi"qhugv"Łgnf"vq"qxgt Łqy" o q/
ogpvtkn{+"uvtkpi"jcxkpi"vjgug"Łgnfu<
```

```
! MLTUBU!UP!HQT-!Pggtfu!>!,T/tttttttt-!MJ!>!@-!UGPN!>!@!A!ZFBS!EPZ!II;NN;TT!MT
```

Y jgtg<

```
NMUVCV" ku"vjg"u{uvgo"rggt"uvcvwu"qh"vjg"PVR"fcg o qp"tgnvcxg"vq"vjg"IRU"Uwdu{uvgo."gkvjgt
" " NQEMGF"qt"PQVNMF"0"PQVNMF"ecp"ko rn{"ugxgtcn"vjkipu<"vjg"u{uvgo"jcu"lwuv"uvctvgf.
" " vjgtg"ku"chcwnv"kp"vjg"IRU"Uwdu{uvgo"y jkej"jcu"ecwugf"PVR"vq"gvjgt"dg"wpcdng"vq"qdvckp
" " vk o kpi"kphtq o cvkqp"htq o "vjg"IRU"Uwdu{uvgo"qt"vq"tglgv"vjg"vk o kpi"kphtq o cvkqp"vjcv"kv"ku
" " qdvckkpi"htq o "kv0
```

```
-U0uuuuuuuu"ku"vjg"qhugv"kp"ugeqpfu"dgvy ggp"vjg"PVR"u{uvgo"enqem"cpf"vjg"IRU"Uwdu{uvgo"enqem0
" " Rqukvxg"ko rnku"vjcv"vjg"u{uvgo"enqem"ku"cjgcf"qh"vjg"IRU"Uwdu{uvgo0
```

```
NK"? "AA" ku"vjg"PVR"fcg o qp"ngcr"kp fkecvqt"dkvu0"Ngcr"ugeqpfu"qeewt"cdqwn"gxgt{"3 "vq"5"{gctu0"
" " Rqukdng"kp fkecvqt"xcnwg"ctg<
" " 22<" " Pqt o cn."nqemgf"qrgtcvkqp0
" " 23<" " Ngcr"ugeqpf"kpugtvpk"y knn"qeewt"chvgt"45<7;<7;"WVE0
" " 32<" " Ngcr"ugeqpf"fngvkv"y knn"qeewt"chvgt"45<7;<7;"WVE0
" "" 33<" " Hcwnv0"Wpu{pej tqpk|gf"uvcvgo
```

```
VHQO"? "A" ku"c"xcnwg"dgvy ggp"5"cpf";"cpf"kp fkecvgu"enqem"ceewtce{0
" " C"fgvckngf"gz rncpvkqp"qh"VHQO"ku"kp" 0
" "
```

```
[ GCT" ku"vjg"{gct"qh"vjg"WVE"vk o guvc o r"qh"vjg"o quv"tgegpv"wr fcvg"tgegxgf"htq o "vjg"IRU"Uwd
" " u{uvgo0
```

```
FQ[" ku"vjg"fc{/qh/{gct"qh"vjg"WVE"vk o guvc o r"qh"vjg"o quv"tgegpv"wr fcvg"tgegxgf"htq o "vjg"
" " IRU"Uwdu{uvgo0
```

J J<O O<UU""ku"vjg"j qwt." o k p w v g " c p f " u g e q p f " q v " v j g " W V E " v k o g u v c o r " q h " v j g " o q u v " t g e g p v " w r f c v g " t g e g k x g f ""  
" " h t q o " v j g " I R U " U w d u { u v g o 0

NU" ku"vjg"ewttgpv"pw o dgt"qh"ngcr"ugeqpfu"fkhhgtgpeg"dgv y ggp"vjg"WVE"cpf" I R U " v k o g u e c n g u  
" " \* 3 : " c v " v j g " v k o g " q h " v j k u " y t k v k p i + 0

Dgnqy"ku"cp"gzco r ng"qh"c"v{ rkecn"tgurqpug"vq"vjku"eq o o cpf<

" Eq o o c p f < " t z t t u b u

" U q p q o c " t g r n { <

!



**upgradkernel**

```
Vjku"wkknkv{"cnnqyu"{qw"vq"wr i tcf g"vjg"Nkpwz"mgtpgn0""Kv"ku"twp"chvgt"vjg"mgtpgn0 i /"Lng"jcu"dggp"eqrkf"
vq"vjg"lvor"fkgtgevt{"qp"vjg"u{uvgo0""Kv"rgthqtou"cp"gtcug"qh"vjg"wr i tcf g"mgtpgn"rctvkvqp"cpf"vjgp"
ytkvgu"vjg"lvor"mgtpgn0 i /"Lng"vq"kv0""Tghgt"vq"
" hqt"fgvckngf"kphqt o cvkqp0
```

```
" Eqo o cpf<" vqhsbef1fsofm
" Uppqoc"tgrn{<" Ujqyu"rtqitguu"kpfkcevqt0
```

**upgradercvr**

```
Vjku"wkknkv{"ku"pqv"cxckncdng"kp"wpkvu"ujkr rgf" dghqtg"Lwpg"42390""Kv"cnnqyu"{qw"vq"wr i tcf g"vjg"GpfTwp"
IRU" Tgegkxgt"Lt o yctg0""Ugg" "hqt" kphqt o cvkqp"qp"GpfTwp0u"
IRU" Tgegkxgt0""
```

```
Rtkqt"vq"gzgewvki"vjku"eqo o cpf."{qw"o wuv"eqr {"vjg"pgy"dkpct{"Lt o yctg"Lng"vq"lvor"ltext0dkp0""
```

```
Vjg"wkknkv{"uvctvu"vjg"Z/o qfg o "Lng"vtcpuhgt."cpf"vjgp"fkurnc{u"rtqitguu"vq"vjg"eqpuqng0""Ugg"
" hqt" o qtg" kphqt o cvkqp0
```

```
" Eqo o cpf<" vqhsbefsdws
" Uppqoc"tgrn{<" Writcf g"rtqitguu"ku"ujqyp0
```

**upgradercvrfpga**

```
Vjku"wkknkv{"ku"pqv"cxckncdng"kp"wpkvu"ujkr rgf" dghqtg"Lwpg"42390""Kv"cnnqyu"{qw"vq"wr i tcf g"vjg"Hkgnf/Rtq/
itc o o cdng" I cvg" Cttc{ "HR I C+"tgukf gpv"qp"vjg"GpfTwp" IRU" Tgegkxgt0""Ugg"
" hqt" kphqt o cvkqp"qp"GpfTwp0u" IRU" Tgegkxgt0""
```

```
Rtkqt"vq"gzgewvki"vjku"eqo o cpf."{qw"o wuv"eqr {"vjg"pgy"dkpct{"HR I C"Lng"vq"lvor"ltexthri c0dkp0""
```

```
Vjg"wkknkv{"uvctvu"vjg"Z/o qfg o "Lng"vtcpuhgt."cpf"vjgp"fkurnc{u"rtqitguu"vq"vjg"eqpuqng0""Ugg"
" hqt" o qtg" kphqt o cvkqp0
```

```
" Eqo o cpf<" vqhsbefsdwsgqhb
" Uppqoc"tgrn{<" Writcf g"rtqitguu"ku"ujqy
```

**upgraderootfs**

```
Vjku"wkknkv{"cnnqyu"{qw"vq"wr i tcf g"vjg"Nkpwz"tqqv"Lng"u{uvgo0""Kv"ku"twp"chvgt"vjg"tqqvhu0 i /"Lng"jcu"dggp"
eqrkf"vq"vjg"lvor"fkgtgevt{"qp"vjg"u{uvgo0""Kv"rgthqtou"cp"gtcug"qh"vjg"wr i tcf g"tqqv"Lng"u{uvgo"rctvk/
vkqp"cpf"vjgp"ytkvgu"vjg"lvor"lqqvhu0 i /"Lng"vq"kv0""Tghgt"vq"
" hqt"fgvckngf"kphqt o cvkqp00
```

```
" Eqo o cpf<" vqhsbefspugt
" Uppqoc"tgrn{<" Ujqyu"rtqitguu"kpfkcevqt0
```

upgradesubsys



get\_sw\_opts

Vjku"eq o o cpf"ku"fqew o gpygf"jgtg"hq"eq o ringvgpguu0""Vjg"jotubmmfe`tx`pqujpot"eq o o cpf"  
cdqyg"ku"owej"gcukgt"vq"wug0""Vjg"lfp`tx`pqujpot"eq o o cpf"tgywtpu"54/dkv"xcnwg"ykvj"gcej"dkv"kfpgpvk/



---

OPTIONS







Qt."{qw"ecp"wug"vjku"eququg"rqt"eq o o cpf<

```
" Eq o o cpf<"      dqvjpb
" Uppqoc"tgrn{<"  DQV!JOP!D! .!PQFO!DPMMFDUPS!BMSN!PVUQVU!jt!Jotubmmfc
```

### Direct Digital Synthesizer (DDS)

Vjg"FFU"Qrvkqp"rtqkfgu"wugt/ugngevcdng"rwnug"tcvgu"htq o "3" J |"vq"32" O J |."rtqitc o ocdng"kp"3"RRU"uvgru."kpenwfkpi"30766"ORRU"qt"4026:"ORRU0"Vjg"ugngevgf"rwnug"tcvg"ku"rjcug"nqemgf"vq"vjg"u{uvgo"quekncvqt"cpf"ku"pqv"cnkipgf"ykvj"u{uvgo"vkog0"

Vjg"FFU"ku"co"ou{uvgo"ukipcn0"Vjku"ogcpu"vjcv"vjgtg"ku"qpg"FFU"ukipcn"vjcv"chhgevu"vjg"yjqng"u{u/vgo0"kp"qvjgt"yqtfu."kh"{qwt"Uppqoc"jcu"o wnvkrng"FFU"qwrwvu"cpf"{qw"ejcpi g"vjg"rwnug"tcvg."vjgp"cn"FFU"qwrwvu"ykn'dg"chhgevgf0"

Vjg"rwnug"tcvg"ku"2" J |"y jgp"ujkr rgf"htq o "vjg"hcevqt{"dwv"ecp""dg"ejcpi gf"\*ugg"dgnq y +0"Hqt"fgvcknu"qp"vjg"FFU"ukipcn"fgLpkvkqp"ugg" 0

### View the DDS Connector

Qp"vjg"htqp/rcpgn"fkurnc{"vtcxgtug"vq"vjg"Ockp"Ogpw"cpf"vjgp"vq"ERWaklQ0"Vjku"fkurnc{"nkuvu"cp{"eqppgevqt"qp"vjg"ERW"Oqfwng"vjcv"jcu"cp"qrvkqpcn"klQ"ukipcn0"Eqppgevqtu"ctg"kfgpvkLgf"cu"C."D"qt"E0"Ugngev"vjg"rctvkewnct"eqppgevqt"\*klQ/C."klQ/D"qt"klQ/E+"vq"ugg"y jkej"ukipcn"ku"kpucvncngf0"

Qt."{qw"ecp"wug"vjku"eququg"rqt"eq o o cpf<

```
" Eq o o cpf<"      dqvjpb
" Uppqoc"tgrn{<"  DQV!JOP!D! Š!EJSF DU!EJHJUBM!TZOU!EJHJUBM!EJS!PVUQVU!jt!Jotubmmfc
```



" >UQJ@FFF<J J<OO<UUS>ET@>NH@

>UQJ@" ku"vjg"CUEKK"Uvctv/qh/ J gcfgt"ejctcevg"2z23+  
FFF" ku"vjg"fc{/qh/{gct  
<" " ku"vjg"eqnqp"ejctcevg"2z5C+  
J J" ku"vjg"jqwt"qh"vjg"fc{  
OO" ku"vjg"okpwwg"qh"vjg"jqwt  
UU" ku"vjg"ugeqpf"qh"vjg"okpwwg  
S" " kF Rg"O gQ wcnkv{"kp fkeAvf" @ fPoc{"dg"gvjgt<  
" " >urceg@" CUEKK"urceg"ejctcevg"2z42+"y jkej"kp fkecvgu"nqemgf  
" " A" " CUEKK"swgukqp"octm"2z5H+"y jkej"kp fkecvgu"  
" " " " vjg"w fkecvgu"no O O

OPTIONS

EndRunX (Extended) Format

Vjg"GpfTwpZ" hqt o cv"ku" kfgpvkecn"vq"vjg"GpfTwp" hqt o cv" ykvj"vjg"cf fkvkqp"qh"v yq"Łgnfu"/"vjg"ewt/
tgpv"ngcr"ugeqpf"ugvvpkiu"cpf"vjg"hwvwtg"ngcr"ugeqpf"ugvvpkiu0"Vjg"hqnnq ykpi"uvtkpi"ku"ugpv"qpeg"gcej"
ugeqpf<

" V" [ [ [ [ "FFF" J J<OO<UU" | \ \ "o"EE"HH>ET@>NH@

V" " ku"vjg"Vko g"Hkiwtg"qh"Ogtkv"ejctcevt"fguetkdgf"lp" 0
" " Vjku"ku"vjg"qp/vk o g"ejctcevt."vtcpu o kvvgf" fwtkpi"vjg"Łtuv" o knnkugeqpf"qh"gcej"ugeqpf0
[ [ [ [ " ku"vjg" {gct
FFF" ku"vjg"fc{/qh/{gct
<" " ku"vjg"eqnqp"ejctcevt"\*2z5C+
J J" ku"vjg"jqwt"qh"vjg"fc{
OO" ku"vjg" o kpwvg"qh"vjg"jqwt
UU" ku"vjg"ugeqpf"qh"vjg" o kpwvg
|" " ku"vjg"uki p"qh"vjg"qhugv"vq"WVE." - "k o rnkgu"vk o g"ku"cjgcf"qh"WVE0
\ \ " ku"vjg" o ci pkvwfg"qh"vjg"qhugv"vq"WVE"kp"wpkvu"qh" jcnh/jqwtu0
" " Pqp/|gtq"qpn{ "y jgp"vjg"Vko g o qfg"ku"Nqecn0
o" " ku"vjg"Vko g o qfg"ejctcevt"cpf"ku"qpg"qh<
" " I"?" IRU
" " N"?"Nqecn
" " W"?"WVE
EE" ku"vjg"ewttgpv"ngcr"ugeqpfu"xcnwg0"
HH" ku"vjg"hwvwtg"ngcr"ugeqpfu"y jkej" y km"ujqy" c"ngcr"ugeqpf"rgpfkpi"46"jqwtu"kp"cfxcpeg0
>ET@" ku"vjg"CUEKK"ecttkci g"tgwtp"ejctcevt"\*2z2F+
>NH@" ku"vjg"CUEKK"nkpghggf"ejctcevt"\*2z2C+

NENA Format

PGPC"ku"vjg"Pcvkqpcn"G o gti gpe{ "Pw o dgt"Cuuqekcvkqp0"Vjku"qti cpk|cvkqp"jcu"cfqrvvgf"ugxgtcn"CUEKK"
vk o g"eqfg" hqt o cvu" hqt" wug"kp"RUCRu"\*Rwdnke"Uchgv{ "Cpu y gtkpi"Rqkpvu+"cpf"vjg{ "ctg"urgekŁgf"kp"vjg"
PGPC"RUCR"Ocvgt"Enqem"Uvcpfctf."Kuuwg"60"Vjgug"CUEKK"vk o g"eqfg" hqt o cvu"ctg"PGPC"Hqt o cv"2"
\*PGPC2+."PGPC"Hqt o cv"3"\*PGPC3+."cpf"PGPC"Hqt o cv": "\*PGPC ; +<

>ET@>NH@S``FFF` J J<OO<UU` fV\ ?ZZ>ET@>NH@

S" " ku"vjg"vko g"swcnkv{ "kpfkecvqt"cpf" o c{ "dg"gvjgt<
" " >urceg@"CUEKK"urceg"ejctcevt"\*2z42+" y jkej" kpfkecvgu"nqemgf0
" " A"CUEKK"swgukqp" o ctm"\*2z5H+" y jkej" kpfkecvgu"vjg"wpu{pej tqpk|gf"eqpfkvkqp0
`" " ku"vjg"urceg"ejctcevt"\*2z42+0
FFF" ku"vjg"fc{/qh/{gct"\*223/588+
<" " ku"vjg"eqnqp"ejctcevt"\*2z5C+
J J" ku"vjg"jqwt/qh/vjg/fc{ "\*22/45+
OO" ku"vjg" o kpwvg/qh/vjg/jqwt"\*22/7 ; +
UU" ku"vjg"ugeqpf/qh/vjg/ o kpwvg"\*22/82+
f" " ku"vjg"FUV" kpfkecvqt"\*U.K.F.Q+0
V\ ?ZZ" ku"vjg"vko g" |qpg" y jgtg"ZZ"ku"22"vj tqwi j"45

```
>ET@"    ku"vjg"CUEKK"ecttkci g"tgwtp"ejctcevgt"*2z2F+0"
"      "    Vjg"Łtuv">ET@"ku"vjg"qp/vk o g"ejctcevgf0
>NH@"    ku"vjg"CUEKK"nkpghggf"ejctcevgt"*2z2C+0
```

```
>ET@>NH@S` Y Y Y ` F F O O O [ [ ` J J < O O < U U > E T @ > N H @
```

```
S " "    ku"vjg"vk o g"swcnkv{"kpfkecvqt"cpf" o c{"dg"gvjgt<
"      "    >urceg@"CUEKK"urceg"ejctcevgt"*2z42+"y jkej"kp fkecvgu"nqemgf0
"      "    A"CUEKK"swgvkqp" o ctm"*2z5H+"y jkej"kp fkecvgu"vjg"wpu{pej tqpk | gf"eqp fkvkqp0
` " "    ku"vjg"urceg"ejctcevgt"*2z42+0
Y Y Y "  ku"vjg"fc{/qh/yggm"*OQP."VWG."YGF."VJW."HTK."UCV
FF"      ku"vjg"fc{/qh/oqpvj"*3/53+
O O O "  ku"vjg" o qp v j "*LCP."HGD."OCT."CRT."OC[."LWP."LWN."CWI."UGR."QEV."PQX"FGEG+
[ [ "    ku"vjg"v y q / f k i k v " { g c t
< " "    ku"vjg"eqnqp"ejctcevgt"*2z5C+
J J "    ku"vjg"j q w t / q h / v j g / f c { " * 2 2 / 4 5 +
O O "    ku"vjg" o k p w v g / q h / v j g / j q w t " * 2 2 / 7 ; +
U U "    ku"vjg"ugeqpf/qh/vjg/ o k p w v g " * 2 2 / 8 2 +
>ET@"    ku"vjg"CUEKK"ecttkci g"tgwtp"ejctcevgt"*2z2F+0"
"      "    Vjg"Łtuv">ET@"ku"vjg"qp/vk o g"ejctcevgf0
>NH@"    ku"vjg"CUEKK"nkpghggf"ejctcevgt"*2z2C+
```

```
>ET@>NH@S`` [ [ [ [ F F F ` J J < O O < U U ` F - \ \ > E T @ > N H @
```

```
S " "    ku"vjg"vk o g"swcnkv{"kpfkecvqt"cpf" o c{"dg"gvjgt<
"      "    >urceg@"CUEKK"urceg"ejctcevgt"*2z42+"y jkej"kp fkecvgu"nqemgf0
"      "    A"CUEKK"swgvkqp" o ctm"*2z5H+"y jkej"kp fkecvgu"vjg"wpu{pej tqpk | gf"eqp fkvkqp0
` " "    ku"vjg"urceg"ejctcevgt"*2z42+0
[ [ [ [ "  ku"vjg"hqwt/fkikv" { g c t
F F F "    ku"vjg"fc{/qh/{gct"*223/588+
< " "    ku"vjg"eqnqp"ejctcevgt"*2z5C+
J J "    ku"vjg"j q w t / q h / v j g / f c { " * 2 2 / 4 5 +
O O "    ku"vjg" o k p w v g / q h / v j g / j q w t " * 2 2 / 7 ; +
U U "    ku"vjg"ugeqpf/qh/vjg/ o k p w v g " * 2 2 / 8 2 +
f " "    ku"vjg"FUVPkpfkecvqt"*U.K.F.Q+0
- \ \ "    - "qt"/"vk o g | qp g " q h h u g v " t g n c v k x g " v q " W V E " * 2 2 / 3 4 +
>ET@"    ku"vjg"CUEKK"ecttkci g"tgwtp"ejctcevgt"*2z2F+0"
"      "    Vjg"Łtuv">ET@"ku"vjg"qp/vk o g"ejctcevgf0
>NH@"    ku"vjg"CUEKK"nkpghggf"ejctcevgt"*2z2C+0
```

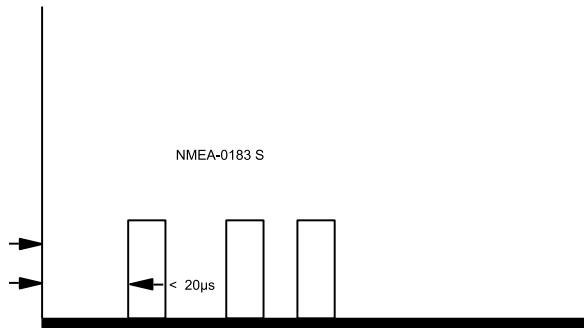
#### NMEA Format

```
Vjg" Pcvkqpcn" Octkpg"Gngevtqpkcu"Cuuqekcvkqp"*P OGC+"jcu"fgxgnqrgf" c"urgekŁecvkqp"vjcv"fgŁpgu"vjg"
kpv gthceg" d g v y g g p " x c t k q w u " r k g e g u " q h " o c t k p g " g n g e v t q p k e " g s w k r o g p v 0 " " V j k u " u v c p f c t f " f g Ł p g u " o ů g p v g p e g u 0 "
```



v jcv"eqpvckp" I RU"rqukvkqp."pcxki cvkqp."vk o g."cpf"qv jgt"kpht o cvkqp0""Ugpgvpegu"vj cv"jcxg"dggp"ko rng/  
ogpvgf"kp"vjg"Uqpq o c"eqphqt o "vq" P OGC/23 : 5"UrgekŁecvkqp"Xgtukqp"50230""

[qwt"Uqpq o c"ecp"qwrwv"qpg."vyq."qt"vj tgg"qh"vjgug"ugpvpegu"rgt"ugeqpf0""Vjg"Łtuv"ej ctcevgt"\*õ&õ+"qh"  
vjg"Łtuv"ugpvpegu"ku"vjg"õqp/vk o gõ"ej ctcevgt0""Qpeg"vjg"wpkv"ku"hqemgf"vq" I RU."vjg"õqp/vk o gõ"ej ctce/  
vgt"uvctu"vtcpu o kvkpi "ykvjkp"vjg"Łtuv"42" o ketqugeqpfu"qh"gej "ugeqpf0""Gcej"ugpvpegu"ku"vtcpu o kvkpf"  
ykvjkp"722" o knnkugeqpfu"chvgt"vjg"3RRU" rwnug0"Ugg"fkci tc o "dgnqy0



Hkgnf"33" g o r v { "Łgnf" J g k i j v " q h " i g q k f " \* o g c p " u g c " n g x g n +  
 Hkgnf"34" g o r v { "Łgnf" W p k v u " q h " i g q k f c n " u g r c t c v k q p  
 Hkgnf"35" g o r v { "Łgnf" V k o g " k p " u g e q p f u " u k p e g " n c u v " F I R U " w r f c v g  
 Hkgnf"36" g o r v { "Łgnf" F I R U " u v c v k q p " K F " p w o d g t  
 E j g e m u w o " , 94  
 O u i " G p f " > E T @ > N H @

V j g " I N N " u g p v g p e g " k f g p v k Ł g u " v j g " r q u k v k p " Ł z . " v k o g " q h " r q u k v k p " Ł z . " c p f " u v c v w u 0 " " G z c o r n g u " c t g " d g n q y <

& I R I N N . . . . . X . P , 86 > E T @ > N H @

& I R I N N . 5 : 49 0 2 5 2 . P . 34466 0 242 . Y . 395645 0 22 . C . C , 56 > E T @ > N H @

O u i " K F " & I R I N N  
 Hkgnf"3" 5 : 49 0 2 5 2 " N c v k w f g " k p " f f o o 0 o o o  
 Hkgnf"4" P " " F k t g e v k q p " q h " n c v k w f g " \* P ? p q t v j . " U ? u q w v j +  
 Hkgnf"5" 34466 0 242 " N q p i k w f g " k p " f f f o o 0 o o o  
 Hkgnf"6" Y " " F k t g e v k q p " q h " n q p i k w f g " \* Y ? y g u v . " G ? g c u v +  
 Hkgnf"7" 395645 0 22 " W V E " v k o g " q h " Ł z " \* j j o o u u 0 u u +  
 Hkgnf"8" C " " C ? f e v c " x c n k f . " X ? f e v c " p q v " x c n k f  
 Hkgnf"9" C " " C ? c w v q p q o q w u " o q f g . " P ? f e v c " p q v " x c n k f  
 E j g e m u w o " , 56  
 O u i " G p f " > E T @ > N H @

V j g " I U C " u g p v g p e g " k f g p v k Ł g u " v j g " I R U " r q u k v k p " Ł z " o q f g . " v j g " U c v g n k v g " X g j k e n g u " \* U X u + " w u g f " h q t " p c x k /  
 i c v k q p . " c p f " v j g " F k n w v k q p " q h " R t g e k u k q p " \* F Q R + " x c n w g u 0 " " F Q R " k u " c p " k p f k e c v k q p " q h " v j g " g h h g e v " q h " u c v g n k v g "  
 i g q o g v t { " q p " v j g " c e e w t c e { " q h " v j g " Ł z 0 " " C p " g z c o r n g " k u " d g n q y <

& I R I U C . C . 3 . . . . . , 3G > E T @ > N H @

& I R I U C . C . 5 . 3 : . 5 . 44 . 8 . ;



Hkgnf";" C" " C?cwwppq o qwu" o qfg."P ? fcv"pqv"xcnkf  
 Ejgemuw o" ,96  
 Oui"Gpf" >ET@>NH@

Vjg" \ FC"ugpvgepeg"kf gpvkLgu"vjg"vk o g"cuuqekcvgf" y kvj"vjg"ewttgpv"3RRU" rwnug0"Gcej"ugpvgepeg"ku"  
 vtcpu o kvvgf" y kvj kp"722" o knnkugeqpfu"chvgt"vjg"3RRU" rwnug"ku"qwwrww"cpf"vgmu"vjg"vk o g"qh"vjg" rwnug"vjcv"  
 lwuw"qeewttgf0"kh"vjg"Uqpq o c"ku"wpu {pej tqpk |gf"vjgp"vjku"ugpvgepeg" y knn"dg"eq o rqugf"qh"pwnn"Lgnfu0"  
 Gzc o rngu"ctg"dgnqy<

& IR \ FC.....,6:>ET@>NH@  
 & IR \ FC.39787:022.42.27.422:.29.22,8;>ET@>NH@

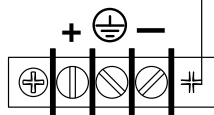
Oui"KF" & IR \ FC  
 Hkgnf"3" 39787:022" WVE"vk o g"cv"3RRU"\*jj o o uu0uu+ "  
 Hkgnf"4" 42" " Fc{ "23"vq"53+  
 Hkgnf"5" 27" " Oqpvj"\*23"vq"34+  
 Hkgnf"6" 422:" " [gct"\*3; :2"vq"429;+  
 Hkgnf"7" 29" " Nqecn"vk o g" |qpg" j qwt."qhhugv"htq o "WVE"\*/"hqt"gcuv"nqpi kwvfg+  
 Hkgnf"8" 22" " Nqecn"vk o g" |qpg" o kpwwgu."qhhugv"htq o "WVE  
 Ejgemuw o" ,8;  
 Oui"Gpf" >ET@>NH@

## Power Supply Options

[qwt"Uqpq o c"ecp"dg"eqpLi wtgf" y kvj"ugxgtcn"qr vkqpcn" r qygt"uwr rn{ "kprwvu" y jkej"ctg"nkuvgf"kp"  
 0" Fwcn/tgfwfcpv" r qygt"uwr rnkgu"ctg"cuq"cxckncdng0"

### DC Power Input

Vjg"FE" r qygt" kprwv" wugu" c"5/rqukvqp"vgt o kpcn"dnqem"cpf"tgrncegu"vjg"uvcpcfctf"CE" r qygt" kprwv"  
 lcem0



**SHOCK / ENERGY HAZARD**

Install in Restricted Access Location.

Use 10-14 AWG copper wire only.

Terminal block screw torque: 9 lb-in (1 nÇM).

Branch circuit must have circuit breaker, 15A or less.

Power must be sourced via two pole disconnect device.

Install terminal block cover after wiring.

**Dual-Redundant Power Supplies**

Cp{"eq o dkpcvkqp"qh"Wpkxgtucn"CE"cpflqt"FE"uwr rnkgu"ku"cxckncdng0""Rtk o ct {"cpf"ugeqpfct {" rqygt" uwr rnkgu"ctg"eqppgevgf"kp" c"fwcn/tgfwfcpv"eqpŁiwtcvkqp" ykvj" jkvnguu"cwvq o cvke" rtk o ct { /vq/ugeqpfct {" cpf"ugeqpfct { /vq/rtk o ct {"uykvejxqgtf0

C"hcwnv"fgvgevqt" o qpkvqtu"vjg"uvcvwu"qh"gcej"tgfwfcpv"rqygt"uwr rn{0""Y jgp" c"hcwnv"ku"fgvgevfgf"kv" yknn" vtkiigt" c"u{uvgo "cncf o 0""Y jgp"Uqpq o c"ku"eqpŁiwtgf" ykvj" Fwcn"Rqygt"Uwr rnkgu."cp"ncf o "yknn"ujqy"kh" vjg"rtk o ct {"qt"ugeqpfct {"uwr rn{ "fqgu"pqv"jcxg"rqygt"eqppgevgf0

**Masking Dual Power Supply Fault Alarms**

[qw"ecp" o cum"vjg"Rtk o ct {"cpf"Ugeqpfct {"Hcwnvu"vq"rtgxgpv"vjg" o "htq o "ecwukpi" c"u{uvgo "cncf o 0"" Ocumkpi" c"hcwnv" yknn"rtgxgpv"kv"htq o "ecwukpi" vjg"Cncf o "NGF"cpf"Cncf o "Qwvrwv"\*kh"cp {"+htq o "i qkpi" cevkg0""Ocumkpi" c"hcwnv" yknn" PQV"rtgxgpv"kv"htq o "ujqy kpi" qp"vjg"htqpv/rcpgn"U{uvgo "Hcwnvu"fkurnc {" qt"kp"vjg" **hqt tubu**"eq o o cpf0"

Vq" o cum"vjg"hcwnv."vtcxgtug"vq"vjg"Hcwnvu"Ogpw."vjgp"ugngev"Ry tHnv"Ocum0""Qt." {qw"ecp"wug"vjg"eqpuqng" eq o o cpf u" **qxsgmunbt1**"cpf" **tfuqxsgmunbt1**0""Rctc o gvgtu"ctg"gvjgt"Ocumgf"qt"Gpcdngf0""Ugvvki" vjku"eq o o cpf"vq"Ocumgf" yknn"rtgxgpv" c" r qygt"uwr rn {"hcwnv"htq o "etgcvkpi"cp"ncf o "eqpfkvkqp0""Vjg" hcevqt {" fghcwnv"ugvki"ku"Gpcdngf0

" Eq o o cpf<" **qxsgmunbt1**  
 " Uqpq o c"tgrn{<" **Qs jnbsz ! Qpxfs ! Joqv u ! Gbvmu ! Bmbsn ! jt ! NBT LFE**  
 ! ! ! **Tfdpoeb "**





## Display and Keypad Operation

Vjg"fkurnc{" o gpwu"ctg"qti cpk|gf"cu"ujqyp"dgnqy<

### Traversing the Display Structure

Chvgt"rqygt"kpvkcnk|cvkqp"vjg"y gneq o g" o guuc i g" y knn"cr r gctl""Rtguu"cp{"mg{"vq" i q"vq"vjg"Vk o glUvcvwu"fkurnc{." y jke j"ku" fguetkdgf"dgnqy0""Htq o"vjg"Vk o glUvcvwu"fkurnc{."rtguu"GPVGT"qt" FQY P"vq" i q"vq"vjg"Ockp"Ogpw0""Cu"knwuvtcvgf"kp"vjg"fk i t c o"cdq xg."ugxgten"uvcvwu"cpf"ugvwr"fkurnc{u"ctg"ceeguukdng"htq o"vjg"Ockp"Ogpw0""Vq" i q"fqyp y ctf"vj tqw i j"vjg"uvtwevwtg"wug"vjg"TK I J V"cpf"NGHV"cttq y"mg{u"vq"jki jnk i j v" c"ugngevkqp"cpf"vjgp"rtguu"GPVGT"qt" FQY P0""Vq" i q"dcem"wr"vj tqw i j"vjg"uvtwevwtg"rtguu"DCEM"qt"WR"vq"tgvwtp"vq"vjg"rtgxkquw"fkurnc{0"

### Editing

Vq" o



### Keypad EDIT Lockout

Cu'c'ugewtkv{"hgcvtg."{qw"ecp"fkucdng"cnn"gfkvkpi"rtqeguugu"fppg"vj tqwi j"vjg"htqpv/rcpgn"mg{rcf0""Fq"  
vjku"vq"rtxgpn"wpcwvjqt|gf"o qfkLecvkqp"qh"vjg"kpvtw o gpv0""Y jgp"vjg"GFKV"mg{"jcu"dggp"fkucdngf."c"  
yctkpi"o guuci g"yknn"cr rget"y jgpgxgt"c"wugt"vtkgu"vq"gfkv"c"rctc o gvg0""Vq"gpcdng"vjg"nqemqvw"hgcvwtg"  
wug"vjg"mpdlpvulq"eq o o cpf"cu"fguetkdgf"kp" 0""Vjg"  
nqemqvw"hgcvwtg"y knn"rtxgpn"gfkvkpi"qpn{."vjg"fkurnc{u"ctg"cnyc{u"cxckncdng"hqt"xkgykpi0

### Using Help

Rtguu"JGNR"cv"cp{"vk o g"vq"tgc f"vjg"eqpvgzv/ugpvkxg"jgnr"o guuci gu0""Wug"WR"cpf"FYYP"vq"uetqm"  
vj tqwi j"vjg"jgnr"o guuci g0""Rtguu"vjg"JGNR"mg{"c"ugeqpf"vk o g"vq"gzkv"Jgnr"\*qt"rtguu"DCEM+0

### Shortcut Menu

Vjg"Ujqtvevw"Ogpw"cnnyu"vjg"wugt"swkem"ceeguu"vq"rctvkewnc"fkurnc{u"htq o "vjg"Vko glUvcvwu"fkurnc{0"  
Vjg"fkurnc{u"cxckncdng"vj tqwi j"vjg"Ujqtvevw"Ogpw"ctg"vjg"Tgegkxgt"Uvcvwu."IRU"Thgtgpeg"Rqukvkqp."  
Hcwnvu."cpf"PVR"Uvcvwu0""Vq"ugngev"vjg"Ujqtvevw"Ogpw 'uu"J?Vq"ug u

Tgegkxgt"Uvcvwu<"" IRU"Uwdu{uvgo!Tgegkxgt"uvcvwu"cu"hqmqyu<  
" " " YTO<" " Yctowr"rgtkqf"hqt"wpkvu"ykvj"quekncvqt"wr itc fgu)  
" " " CES<" " Ceswtkpi0""Ugctejkpi"hqt"u"ukipcn0  
" " " NMI<" " Nqemkpi"vq"vjg"IRU"ukipcn0  
" " " NMF<" " Nqemgf0""Hwnn{"u{"pej tqpk|gf"vq"ukipcn0

U{uvgo"Uvcvwu<"" kpfkecvgu"gvjgt"QM"qt"fcujkpi"HCWNV0""C"hcwnv"uvcvwu"kpfkecvgu"vjcv"qpg"qt"o qtg  
" " " qh"vjg"dwknv/kp"hcwnv"ejgemkpi"rtqeguug"jkwfgyvevgf"cp"gttqt"eqpfkvkqp0""Ugg"  
" " " "kp"vjku"ejcrvgt"hqt"o qtg"phqtocvkqp0

Cp"cnvgtpcvg"Vko glUvcvwu"fkurc{"ecp"dg"xkgygf"d{"rtguukpi"vjg"tkijv"cttqy"mg{0"" [qw"ecp"iq"dcem"vq"  
vjg"qtkikpek " "

VHQO<"" " Vjku"ku"cxnwg"dgv y ggp"5"cpf";"cpf"kp fkecvgu"enqem"ceewtce{0  
 " " " C"fgvckngf"gz rncpcvkqp"qh"VHQO"ku"kp" 0

%"qh"UXu<" " Vjku"ujqyu"vjg"pwo dgt"qh"ewttgpn{"vtcemu"Ucvgnkv"Xgjkengu"htqo"2"vq"340

Cxi"ElPq<"" " Vjg"ecttkt/vq/pqkug"tcvkq"ku"cp"kp fkecvqt"qh"vjg"IRU"uki pcn"swcnk{0""Vjku  
 " " " pw o dgt"v{rkecn{"tcpigu"htqo"52"vq"67"fd"y jgp"vjg"kp uvtw o gpv"ku"nqemgf0

UX"KF%<"" " Vjku"Łgnf"nkuv"vjg"ucvgnkv"xgjkengu"vjcv"ctg"ewttgpn{"dgkpi"vtcemgf0

Receiver: Satellite Vehicle Information (SV\_Info)

Vjku"fkurnc{"ujqyu"vjg"ejcppgn"pwo dgt."UX"pwo dgt."c|k o wvj."gngxcvkqp"cpf"vjg"ecttkt/vq/pqkug"tcvkq"  
 \*ElPq+"hqt"cnm"34"ejcppgn"qh"vjg"34/ejcppgn"IRU"tgegkxgt0""UX"pwo dgt"2"ku"cp"kp xcnkf"pwo dgt"cpf"  
 kp fkecvgu"vjcv"pq"ucvgnkv"ku"dgkpi"vtcemgf"qp"vjcv"ejcppgn0""Xcnkf"UX"pwo dgtu"tcpig"htqo"3"vq"540"  
 C|k o wvj"cpf"ngxcvkqp"ctg"kp"fgitggu"cpf"ElPq"ku"kp"fd0

Receiver: Reference Position (Ref\_Pos)

Vjku"fkurnc{"ujqyu"vjg"ewttgpn"IRU"tghgtpeg"rqukvkqp"cpf"cnnyu{"qw"vq"gpvgt"crqukvkqp."kh"fguktgf0"  
 Vjg"IRU"tghgtpeg"rqukvkqp"ku"vjg"rqukvkqp"qh"vjg"IRU"cpvppc0"Ceewtcvg"rqukvkqp"ku"pgeguuct{"vq"  
 igpgtcvg"rtgekug"vkog"cpf"htgswgpe{"qwwrvvu0

Vjg"rqukvkqp"ku"ujqyp"cu"ncvkwfg."nqpi kwfg"cpf"ngxcvkqp0""Ncvkwfg"cpf"nqpi kwfg"ctg"ujqyp"cu"  
 jgokurjgtg\*"Pqtvj."Uqwj."Gcuv."Yguv+."fgitggu."okpwvgu"cpf"ugeqpfu0""Gngxcvkqp"ku"ujqyp"kp"ogvgtu"  
 cdqxs"vjg"YIU/:6"gnkrqukf0

Vjg"uqwteg"Łgnf"\*UTE+"kp fkecvgu"vjg"uqwteg"qh"vjg"rqukvkqp"kpht o cvkqp0""Rquukdn"xcnwg"ctg"ōwp/  
 mpqypō."ōcxgtcigō"cpf"ōwugtō0""Yjgp"Łtuv"kpucnngf."vjg"rqukvkqp"uqwteg"yknn"dg"ōwmpmpqypō0""Kv"  
 ejcpigu"vq"ōcxgtcigō"chvgt"vjg"tgegkxgt"jcu"eqorwvfg"vjg"Łtuv"5/fk"ogpukqpcn"rqukvkqp"Łz0""Vjg"rqu/  
 vkqp"eqpvkpwgu"vq"dg"cxgtcigf"ht"cdqww"46"jqwtu0""Eqorwvcvkqp"tgs wktgu"vjcv"c"okpkowo"qh"6"qt"  
 oqtg"ucvgnkv"dg"kp"xkgy0""

Ykvj"ctqhqvr"cpvppc"kpucnncvkqp"vjcv"jcu"cp"wpqduewtgf"xkgy"qh"vjg"um{g"o%o

```
" " rqukvkqp0""Qpeg"vjg"tgegkxgt"jcu"eqo rwwgf"c"pgy"ceewtcvg"tghgtgpeg"rqukvkqp"vjg"rqukvkqp
" " uqwteg"yknn"ejcpi g"htqo "öwmpmpqy pö"vq"öcxgtci gö0
```

```
Wugt< Ugngevkpi "öwugtö"yknn"cnny" {qw"vq"gpvgt"c"rqukvkqp0""Kv"ku"xgt { "k o rqtvcpv"vjcv"vjg"pgy
" " tghgtgpeg"rqukvkqp"dg"ceewtcvg0""Tghgt"vq"
hqt"fgvckngf"kpuvtwewkqpu"qp"jqy"vq"qdvckp"cp"ceewtcvg"tghgtgpeg
" " rqukvkqp"hqt" {qwt"nqecvkqp0
```

## Receiver: Last Fix Position (Last\_Fix)

```
Vjku"fkurnc { "rtqxfgu"vjg"ncuv"eqo rwwgf" I RU"rqukvkqp0""Y jgp"vtcemkpi "hqt"qt" o qtg"ucvgnkvgu."vjg"
I RU"Tgegkxgt"rtqxfgu"c"5F/rqukvkqp"Łz0""Y jgp"qpn { "vj tgg"ucvgnkvgu"ctg"kp"xkgy."vjku"yknn"ftqr"vq"
c"4F/rqukvkqp"Łz0""V jg"ncuv/Łz"rqukvkqp"ku"pqto cnn { "nguu"ceewtcvg"vjcp"vjg"tghgtgpeg"rqukvkqp."dww"kv"
fqgu"rtqxfgu"c"i qgf"kp fkecvkqp"vjcv"vjg"tgegkxgt"ku"y qtmkpi "rtqr gtn {0""Rqukvkqp"ku"rtqxfgf"kp"ncvkwf g."
nqpi kwf g"cpf"jgki jv0
```

## Receiver: UTC Information (UTC\_Info)

```
Vjku"fkurnc { "ujqyu"vjg"WVE"Kphqt o cvkqp"y jkej"kpenwfgu"ngcr"ugeqpfu"*NU+"cpf"hwvwtg"ngcr"ugeqpfu"
*NUH+"hqt"vjg"yggm"pw o dgt"*Y Panuh+"cpf"fc { "pw o dgt"*FP+"fkurnc { g f0""Kv"enuq"ujqyu"vjg"KEF/ I RU/
422"cn o cpce"rctc o gvgtu"y jkej"ctg"wugf"vq"ecnewncvkv"vjg"qhhugv"dgvy ggp"WVE"cpf" I RU"vk o gl0""V jgug"
kpenwfg"rctc o gvgtu"htq"fgvgt o kpkpi "ngcr"ugeqpfu"cpf"vjg"rctc o gvgtu"htq"ecnewncvkvpi "vjg"u o cnn"tgukfwcn"
qhhugv"dgvy ggp"vjg" I RU" o cuvgt"enqem"gpug o dng"cpf"WVE/WUPQ0""V jku"ncvgt"xcnwg"ku"v { rkecnn { "nguu"
vjcp"32"pcpqugeqpfu0""Rtguu" J GNR"vq"tgc f" o qtg"fgvckngf"Kphqt o cvkqp"qp"vjg"Łgnfu"ujqyp"kp"vjku"
fkurnc {0
```

## Receiver: Dynamic Mode (Dyn\_Mode)

```
Vjg" I RU" f { pc o ke" o qfg"ugvvpki "chhgevu"vjg"rqukvkqp"xcnwg"wugf"d { "vjg"u { uvgo "vq"fgtkxg"ceewtcvg"vk o g"
u { pej tqpk | cvkqp0""Kp" f { pc o ke" o qfg."vjg"cxgtci g"rqukvkqp"ku"fkurnc { g f"cu"vjg"ewttgpv"rqukvkqp."kp"qvjgt"
y qtfu"/"vjgtg"ku"pq"rqukvkqp"cxgtci kpi 0""
```

```
Kv"ku"k o rqtvcpv"vq"ugv"vjg" o qfg"vq"öQHH"*ucvke"kpucvncvkvqp+ö" y jgp"vjg"kpuvtw o gpv"ku"kp"c"ucvke"kpucvnc/
ncvkvqp0""V jku"ku"vjg"hcvtq { / fghcwnv"ugvvpki 0""Ugv"vjg" o qfg"vq"öQP"* f { pc o ke"kpucvncvkvqp+ö"QPN [ "kh"vjg"
kpuvtw o gpv"ku"kpucvncvkvqp"c" o qxkpi "rncvhtq o "*ujkrdqctf"qpn { +0
```

## Receiver: Oscillator Status (Osc\_Stat)

```
Vjku"fkurnc { "rtqxfgu"vjg"u { uvgo "quekncvqt"ucvuwu"Kphqt o cvkqp"y jkej"kpenwfgu"quekncvqt"v { rg"cpf"
nggevtqpk"htgswgpe { "eqpvtqn"ucvuwu0""V jg"quekncvqt"eqpvtqn" FCE"xcnwg"kp fkecvgu"vjg"htgswgpe { "eqpvtqn"
ugvvpki 0""V jg"u { uvgo "cwwq o cvkecnn { "ugvu"vjku"xcnwg"vq"tg o qxg"htgswgpe { "gttqtu0""Xcnwgu" o c { "tcpig"htq o"
2"vq"3.26: .7970""Xcnwgu"enqug"vq"vjg" o kpk o w o "qt" o czk o w o "y knn"ugv"vjg" FCE"hcwnv" İci"vjcv"yknn"cr r gct"
kp"vjg"hcwnv"ucvuwu"fkurnc {0""V jg"V k o glUvcvuwu"fkurnc { "y knn"enuq"kp fkecvg"c"hcwnv"eqpfkvkqp0
```

```
Vjg"quekncvqt"v { rg"kp fkecvgu"vjg"quekncvqt"vjcv"ku"kpucvncvkvqp0""Rqukdng"quekncvqt"v { rgu"ctg<
```

```
" Vg o rgtcvwtg/eqo rgpucvfg"et { uvcn"quekncvqt"*VEZQ+"
" Qxgp/eqpvtqmgf"quekncvqt"*QEZQ+
" Twdkfw o "quekncvqt"*Td+
```

Receiver: Calibrate

Ecnkdtcvg"ku"wugf"vq"ugv"vjg"cpvgppc"rtqrc"icvkqp"fgnc{0""Vjku"yknn"cfxcpeg"qt"tgvcft"vjg"enqem"kp"qtfgt"  
vq"eqttgev"hqt"cpvgppc"ecdng"ngpi"vj"qt"vq"eq"o"rgpucvg"hqt"vjg"kpjgtgpv"vk"o"qhhugvu"vjcv"oc{"gzkuv"ykvj"  
gzvgtpcn"jctfyctg"uwej"cu"fkvktkdwkqp"co"rnkLgtu."gve0""Ecnkdtcvkqp"tcpig"ku"0722.222"pcpqugeqpfu0

Faults Menu

Vjg"Hcwnvu"Ogpw"ku"ugngevgf"htq"o"vjg"Ockp"Ogpw"cpf"rtqxfgu"ceeguu"vq"xkgy"vjg"U{uvgo"Hcwnvu"cpf"  
vq"ugv"hcwnv"ocumu"hqt"vjg"Cpvgppc"Hcwnv"cpf"vjg"Ukicipu"Nquu"Hcwnv0

Faults: System

Cnn"u{uvgo"hcwnvu"ctg"ujqyp"qp"vjku"fkurnc{"cpf"vjgkt"ewttgppv"uvcvwu."gkvjgt"QM"qt"HCWNV0""Yjgp"c"  
hcwnv"eqpfkvpq"gzkuv"vjg"HNV"kpfkcevqt"yknn"fcuj0""

Vjgug"hcwnv"kpfkcevqtu"ctg"vjg"uc"og"cu"vjg"eqttgurqpfpki"dkv"rqukvkqpu"ujqyp"kp"vjg"hqt"tubu"hcwnv"  
uvcvwu"yqtf"\*HNVU+0""\*Ugg" "hqt"kphqt"ocvkqp"qp"hqt.  
tubu0""Wpwugf"dkv"rqukvkqpu"ujqy"qp"vjg"fkurnc{"cu":  
o

```

" HNUJ" IRU"Tgegkxgt"HNCUJ"Ytkvgu
" HRI C" IRU"Tgegkxgt"HRI C"EqpŁiwtcvkqp
" UKI" IRU"Uki pcn
" FCE" Tgegkxgt"Queknncvqt" FCE

" QUE" Tgegkxgt"Queknncvqt
" TGH" IRU"Tghgtgpeg"Vko g
" U [ P4" Nqecn"Queknncvqt"U{pvjguk|gt"Vwplpi
" U [ P3" Nqecn"Queknncvqt"U{pvjguk|gt

" RNN" Queknncvqt"RNN
" QRGp" Cpvppc"Qrgp
" UJTV" Cpvpc"Ujqtv
"

```

#### Faults: Antenna Fault Mask (AntFltMask)

```

Vjku"ugvvpki"cnmqyu" {qw"vq"rtgxgp"vjg"cpvppc"hcwnv"htqo"etgcvkpi"cp"cncto"eqpfkvkp0""Uqog"kpucnnc/
ncvkqpu"oc{"pggf"vq"ocum"vjku"hcwnv"fwg"vq"urgeken"cpvppc"ukvvcvkqpu"nkmg"urnkvgtu"qt"FE"dnqemu"vjcv"
eqphwug"vjg"cpvppc"fgvgevkqp"ektewkv0

```

#### Faults: Signal Loss Fault Mask (SigFltMask)

```

Vjku"ugvvpki"cnmqyu" {qw"vq"rtgxgp"v"uki pcn"nquu"hcwnv"htqo"etgcvkpi"cp"cncto"eqpfkvkp0""Uqog"kpucnnc/
vkqpu"oc{"pggf"vq"ocum"vjku"hcwnv"y jgp"qrgtcvkpi"vjg"PVr"ugtugt"cu"Uvtcvw"o"4"ugtugt0""

```

#### Optional Faults: Dual Power Input Fault Alarm Masks (PwrFltMask)

```

Vjku"ugvvpki"cnmqyu" {qw"vq"rtgxgp"v"r tk oct {"qt"ugeqpfct {"rqygt"uwr rn {"hcwnv"htqo"etgcvkpi"cp"cncto"
eqpfkvkp0""Ugg" "hqt"o qtg"kphqt/
ocvkqp0

```

#### Optional System I/O Menu (Sys\_I/O)

```

Vjg"U{uaKIQ"Ogpw"ku"wugf"hqt"xkgykpi"cpf"eqpŁiwtkpi"qrvkqpcn"u {uvgo/ykfg"qwwrvw"ukipcnu0""Ugg"
"hqt"o qtg"kphqtocvkqp0

```

#### Optional CPU Module I/O Menu (CPU\_I/O)

```

Vjg"ERWaKIQ"Ogpw"ku"wugf"hqt"xkgykpi"cpf"eqpŁiwtkpi"qrvkqpcn"ERW"Oqfwng"qwwrvw"ukipcnu0""Ugg"
"hqt"o qtg"kphqtocvkqp0

```

#### Network Menu

```

Vjg"Pgvy qtm"Ogpw"ku"ugngevgf"htqo"vjg"Ockp"Ogpw"cpf"rtqxfgu"ceeguu"vq"Pgvy qtm6."Pgvy qtm8."cpf"
TGDQQV"fkurnc {u"y jke j"ctg"fguetkdgf"dgngy0

```

Network: Network4

Vjku"fkurnc{"rtqxfgu"vjg"cdknkv{"vq"xkgy"cpf"oqfkh{"vjg"KRx6"pgvyqtm"ugvvpku"Vjg"rctcogvgtu"kpwnwfg"J{pcoke"Jquv"EqpLiwtcvkqp"Rtqvqeqn"FER+"KR"cfftgau."icvgyc{.pgv"ocum"cpf"fq"ockp"pcog"ugtxgt"FPU+"ugvvpku"Gpcdnng"FER"vq"cnmqy"cwvq"ocvke"u{uvgo"eqpLiwtcvkqp"qh"vjg"pgvyqtm"kpvgthceg"Yjgp"FER"ku"fkucdnng"vjg"wugt"owuv"rtqxfkg"cfftgau"kphqt"ockvqp}

Network: Network6

Vjku"fkurnc{"rtqxfgu"vjg"cdknkv{"vq"xkgy"cpf"oqfkh{"vjg"KRx8"pgvyqtm"ugvvpku"Vjg"rctcogvgtu"kpwnwfg"J{pcoke"Jquv"EqpLiwtcvkqp"Rtqvqeqn"FER+"KR"cfftgau."icvgyc{.pgv"ocum"cpf"fq"ockp"pcog"ugtxgt"FPU+"ugvvpku"Gpcdnng"FER"vq"cnmqy"cwvq"ocvke"u{uvgo"eqpLiwtcvkqp"qh"vjg"pgvyqtm"kpvgthceg"Yjgp"FER"ku"fkucdnng"vjg"wugt"owuv"rtqxfkg"cfftgau"kphqt"ockvqp}

Network: MAC Address (MAC\_Addr)

Vjku"fkurnc{"rtqxfgu"vjg"ogfkc"ceeguu"eqpvtqn"OCE+"cfftgau"htq"dqvj"pgvyqtm"rqtvu"fu1"cpf"fu2}

Network: REBOOT

Vjku"ku"cy{"vq"tgdaqv"vjg"Uqpqoc"cpf"ku"pgeguuct{"chvgt{"qwxg"Łpkujgf"eqpLiwtkpi"vjg"pgvyqtm"rctcogvgtu"Wpkn{"qw"fq"vjku."vjg"pgvyqtm"rctcogvgtu"vjcv"ctg"ujqyp"ykndg"vjg"cevkxg"ugvvpku."PQV"vjg"pgy"ugvvpku"Vjg"pgy"ugvvpku"ykndgeqog"cevkxg"chvgt{"qw"tgdaqv}

NTP Menu

Vjg"PVR"Ogpw"ku"ugngevgf"htqo"vjg"Ockp"Ogpw"cpf"rtqxfgu"ceeguu"vq"vjg"Uvcvwu."KIQ"Uvcvkukcu"cpf"Ugvr"fkurnc{"u"fguetkdg"dnqy<

NTP: Status

Vjku"fkurnc{"rtqxfgu"kphqt"ockvqp"cuuqekcvgf"ykvj"vjg"PVR"Uwdu{uvgo}

Uvtcvwo< Vjku"uvtcvwo"Łgnf"jcu"vjtggrquukdnng"xcnwgw<  
 " " Uvtcvwo"3< Vjg"ugtxgt"ku"hwmm{"u{pejtqpk|gf"cpf"ceewtcvg}  
 " " Uvtcvwo"4< Vjg"ugtxgt"ku"u{pejtqpk|gf"vq"Uvtcvwo"3"ugtxgt  
 " " Uvtcvwo"z< Vjg"ugtxgt"ku"u{pejtqpk|gf"vq"Uvtcvwo"z/3"ugtxgt  
 " " Uvtcvwo"38< Vjg"ugtxgt"ku"wpu{pejtqpk|gf"0"PVRENKGPV"ykndpqv"wug"Uvtcvwo"38  
 " " " " "ugtxgt  
 Uqwtg< Vjg"u{pejtqpk|cvkqp"uqwtg"ku"pcogf"jgtg"0"htq"vjg"Uqpqoc"IRU"vjg"uqwtg"ku"IRU.  
 " " KR"cfftgau"qh"wrvtgc"uqwtg."qt"pqpg}

Qhhugv< Vjg"PVR"qhhugv"kpfkcevgu"vjg"ceewtce{"qh"vjg"PVR"u{uvgo"enqem"tgnckvkg"vq"vjg"IRU  
 " " Uwdu{uvgo"enqem"0"Kpkvcnn{"kh"vjg"qhhugv"dgvyggp"vjg"PVR"u{uvgo"enqem"cpf"vjg"IRU  
 " " Uwdu{uvgo"enqem"ku"nctig"vjg"fkurnc{"yknd"kpfkcev"ōpq"cxkncdnng"0"Chvgt"vjg"IRU  
 " " Uwdu{uvgo"nqemu."vjg"PVR"enqem"yknd"u{pejtqpk|gf"vq"vjg"IRU"Uwdu{uvgo"0"Qpeg"  
 " " u{pejtqpk|cvkqp"ku"eqo"rngvg."vjg"v{rkecn"qhhugvu"yknd"tcpig"qxgt"cr"rtqzk"ocvgn{"  
 " " -1/"3"oketqgeqpf}

NK"Dkvu< Ujgyu"vjg"uvcvwu"qh"vjg"ngcr"kpfkcevqt"dkvu"cu"ugpv"d{"vjg"Uqpqoc"vkog"ugtxgt"vq"vjg  
 " " enkgpvu"kp"vjg"PVR"tgrn{"rcengvu"0"Ngcr"ugeqpfu"qewt"cdqvw"gxgt{"3 "vq"5"{gctu"0"  
 " " Rquukdnng"kpfkcevqt"xcnwgw"ctg<

```
" " 22<" " Pqt o cn."hqemgf"qrgtcvkqp0
" " 23<" " Ngcr"ugeqpf"kpugtkqp"y knn"qeewt"chvgt"45<7 ; <7 ; "WVE0
" " 33<" " Hcwnv0""Wpu {pej tqpk |gf"uvcvg0
```

NTP: I/O Statistics (I/O\_Stats)

```
Vjku"fkurnc {"ujqyu"uq o g"mg {"kphqt o cvkqp"tgi ctfkpi "vjg"qrgtcvkqp"qh"vjg"PVR"fcg o qp0""Vjg"kphqt o c/
vkqp"kpenwfgu"vjg"vk o g"ukpeg"tgugv"cpf"vjg"eqwpu"qh"tgegxgf."ugpv"cpf"ftqr rfg"rcemgvu."cpf"vjg"ugpv"
rcemgv"tcvg0
```

NTP: Setup

```
Vjku"fkurnc {"rtqxfgu"ceeguu"vq"vjg"PVR"dtqcfecuv"cpf" o wnvkecuv"ugvvpki u"cpf"rtqxfgu" {qw"ykvj" c"
eqpxgpkgpv" o gcpu"qh"ejgemkpi "vjg"ewtgpv"eqpŁi wtcvkqp"cpf"cnny u"nk o kvgf"ugvwr0"" [qw" o c {"cnuq"
rgthqt o "c" o qtg"eq o rngvg"dtqcfecuvl o wnvkecuv"eqpŁi wtcvkqp"xc" c"u fmo f u"qt" t t i"uguukqp"qt"vjg"aqecn"
TU/454"eqpuqng"wukpi "vjg"ouq d p o g j h"vwnkv {0""Vjku"vwnkv {"rtqxfgu" c" o qtg"ugewtg" o gcpu"qh"ugvwr"cpf"
uq"ku" o qtg"eq o rngvg0""Kv" y knn"cnny y" {qw"vq"ugngev"mg {u"cpf"kf g p v k h {"vtwugf"mg {u0""
```

```
Vjku"fkurnc {"y knn"kp f k e c v g"v j c v"v j g" o q f g"ku"dtqcfecuv6."dtqcfecuv8." o wnvkecuv6." o wnvkecuv8"qt"fkucdngf0""
Kv"cnny yu"KRx6"qt"KRx8"eqpŁi wtcvkqp"qh"gvjgt"dtqcfecuv"qt" o wnvkecuv" o q f g"ykvj"ugngevqp"qh"vjg"dtqcf/
ecuv"cf f t g u u ." o wnvkecuv"vk o g/vq/nxg"*VVN+"cpf"vtwugf"mg {"hqt" O F 7"cwvj g p v k e c v k p p 0""Vjg"dtqcfecuvl
o wnvkecuv" o q f g" o c {"cnuq"dg"fkucdngf0
```

```
Dtqcfecuv"Oqfg" Kp"vjku" o qfg"vjg"dtqcfecuv"cf f t g u u"ku"fkurnc {g f 0""Kh" O F 7"cwvj g p v k e c v k p p"ku"
" " " ugngevgf"vjg"vtwugf"mg {"pw o dgt" y knn"cnny"dg"fkurnc {g f 0
```

```
O w n v k e c u v " O q f g " V j g " o w n v k e c u v " c f f t g u u " o w u v " d g " 4 4 6 0 2 0 3 0 3 " q t " h h 2 7 < < 3 2 3 0 " " O w n v k e c u v " o c { " c n u q " w u g "
" " " O F 7 " c w v j g p v k e c v k p p 0 " " K h " u g n g e v g f . " v j g " v t w u g f " m g { " p w o d g t " y k n n " c n u q " d g " f k u r n c { g f 0
```

```
Rtguu"GFKV"vq"ejcpig"vjg"dtqcfecuvl o wnvkecuv"ugvvpki u0""Gcej"qh"vjg"gfkv"ykpfyu"jcu"jgnr"kphqt/
o cvkqp"cxckncdng"vq"i w k f g {"q w " v j t q w i j " v j g " u g v w r " r t q e g u u 0 " " P q v g " v j c v " e j c p i k p i " v j e " P V R " o w n v k e c u v l
dtqcfecuv"ugvvpki u" f q g u " p q v " v c m g " g h h g e v " w p v k n " v j g " u { u v g o " t g d q q v u 0 " V j g " p g y " r c t c o g v g t u " c t g " n q c f g f " v q " v j g "
p v r 0 e q p h " L n g " k p " v j g " l d q q v l g v e l " f k t g e v t { 0 " " Q p n { " v j g " d t q c f e c u v " n k p g " k p " v j g " p v r 0 e q p h " L n g " k u " o q f k L g f 0 " " V j g "
Ł p c n " f k u r n c { " k p " v j g " g f k v " u g s w g p e g " t g s w k t g u " e q p Ł t o c v k q p " q h " { q w t " k p v g p v " v q " e j c p i g " v j g " k p u v t w o g p v " u g v /
v k p i u 0 " " Q p e g " e q p Ł t o c v k q p " v c m g u " r n c e g . " v j g " k p u v t w o g p v " y k n n " t g d q q v 0
```

Optional PTP Menu

```
Vjg"RVR"Ogpw"ku"wugf"ht"eqpvtqn"cpf"uvcvwu"qh"vjg"RVRlKGGG/37 : : "qrvkqp0""Ugg"
ht" o qtg"kphqt o cvkqp0
```

Clock Menu

```
Vjg"Enqem"Ogpw"rtqxfgu"ceeguu"vq"vjg"rctc o gvgtu"tgncygf"vq"vk o gmgrkpi0""Vjgug"ctg"Vk o ga Oqfg."
Vk o g a \ q p g . " J q w t a O q f g . " c p f " F U V 0 " " V j g u g " f k u r n c { u " c t g " c n n " f g u e t k d g f " d g n q y 0 " "
```



## Clock: Time Mode

Vk o g" o q f g" f g L p g u" v j g" v k o g" h q t o c v" w u g f" h q t" v j g" h t q p v/ r c p g n" v k o g" f k u r n c { " c p f. " k h" k p u v c m n g f. " v j g" q r v k q p c n" V k o g" E q f g" q t" U g t k c n" V k o g" q w v r w v 0" " V j g" v k o g" o q f g" f q g u" p q v" c h h g e v" v j g" P V R" q w v r w v. " y j k e j" k u" c n y c { u" W V E 0" " R q u i k d n g" x c n w g u" h q t" v j g" v k o g" o q f g" c t g" I R U. " W V E. " c p f" N q e c n" v k o g 0" " I R U" v k o g" k u" f g t k x g f" h t q o" v j g" I R U" u c v g n k v g" u { u v g o 0" " W V E" k u" I R U" v k o g" o k p w u" v j g" e w t t g p v" n g c r" u g e q p f" e q t t g e v k p p 0" " N q e c n" v k o g" k u" W V E" r n w u" v k o g" | q p g" q h h u g v" c p f" F U V 0" " V j g" v k o g" | q p g" c p f" F U V" f k u r n c { u" c t g" f g u e t k d g f" d g n q y 0

## Clock: Time Zone

V j g" v k o g" | q p g" k u" w u g f" k p" e c n e w n c v k p i" v j g" e w t t g p v" N q e c n" v k o g" y j g p" v j g" v k o g" o q f g" k u" u g v" v q" N q e c n" \* u g g" v k o g" o q f g" c d q x g + 0" " R t g u u" v j g" G F K V" m g { " v q" e j c p i" v j g" x c n w g 0" " G p v g t" c" p g i" c v k x g" q h h u g v" h q t" v k o g" | q p g u" y g u v" q h" v j g" I t g g p y k e j" o g t k f k c p. " c p f" c" r q u i k v k x g" q h h u g v" h q t" v k o g" | q p g u" v q" v j g" g c u v 0" " K h" g p c d n g f. " F U V" y k n n" c f f" c p" c f f k v k q p c n" j q w t 0

## Clock: Hour Mode

J q w t" o q f g" c h h g e v u" v j g" h t q p v/ r c p g n" v k o g" f k u r n c { " c p f" k u" c e v k x g" q p n { " y j g p" v j g" v k o g" o q f g" k u" u g v" v q" N q e c n" v k o g 0" " J q w t u/ f k u r n c { " u g n e v k q p u" c t g" g k v j g t" 3 4/ j q w t u" h q t o c v" \* 3/ 3 4" j q w t u" y k v j" C O I R O" k p f k e c v t+ " q t" 4 6/ j q w t" h q t o c v" \* 2/ 4 5" j q w t u+ 0

## Clock: Daylight Saving Time (DST)

F U V" k u" w u g f" k p" e c n e w n c v k p i" v j g" e w t t g p v" N q e c n" v k o g" y j g p" v j g" v k o g" o q f g" k u" u g v" v q" N q e c n 0" " Y j g p" v j g" v k o g" o q f g" k u" N q e c n" v j k u" f k u r n c { " y k n n" c m n q y" { q w" v q" g p c d n g" q t" f k u c d n g" F U V" d { " r t g u k p i" G F K V 0" " K h" F U V" k u" f k u c d n g f" v j g p" c p { " r t g x k q w u n { " u g v" u v c t v" c p f" u v q r" v k o g u" y k n n" d g" k i" p q t g f 0" " K h" F U V" k u" g p c d n g f" v j g p" v j g" u v c t v" c p f" u v q r" v k o g u" e c p" d g" u g v" d { " r t g u u k p i" v j g" c t t q y" m g { u" v q" u e t q m n" c p f" v j g p" G P V G T 0" " F U V" k u" c e v k x g" y k v j k p" v j g" u v c t v/ u v q r" k p v g t x c n" c p f" c f f u" q p g" j q w t" v q" v j g" N q e c n" v k o g 0" " K h" F U V" k u" c e v k x g" v j g" f k u r n c { " y k n n" u j q y" c p" c e v k x g" k p f k e c v q t 0

## Display Setup

V j k u" f k u r n c { " k u" u g n g e v g f" h t q o" v j g" O c k p" O g p w" c p f" e q p v c k p u" r t c t o g v g t u" t g n c v g f" v q" v j g" h w p e v k q p k p i" q h" v j g" h t q p v/ r c p g n" f k u r n c { 0" " V j g t g" c t g" v y q" r t c t o g v g t u" / / " c p" k p v g p u k v { " u g v k p i" c p f" c" u e t g g p u c x g t" u g v k p i 0" " V j g" k p v g p u k v { " u g v k p i" c m n q y u" { q w" v q" u g v" v j g" d t k i" j v p g u u" n g x g n" q h" v j g" X H F 0" " F k u r n c { " k p v g p u k v { " t c p i" g u" h t q o" " 3 4" ' " v q" 3 2 2" ' 0" " V j g" u e t g g p u c x g t" e c r c d k n k v { " c m n q y u" { q w" v q" k p e t g c u g" v j g" w u c d n g" n k h g" q h" v j g" f k u r n c { " d g { q p f" v j g" t c v g f" 3 2 2. 2 2 2" j q w t u 0" " Y j g p" v j g" u e t g g p u c x g t" e c r c d k n k v { " k u" g p c d n g f. " v j g" k p v g p u k v { " y k n n" d g" t g f w e g f" v q" j c n h" q h" k v u" p q t o c n" q r g t c v k p i" k p v g p u k v { " y j g p" v j g" w p k v" j c u" p q v" f g v g e v g f" c" m g { r t g u u" h q t" q p g" j q w t 0" " R t g u u" G F K V" v q" o q f k h { " v j g" k p v g p u k v { " c p f" u e t g g p u c x g t" u g v k p i u 0

## Firmware

V j g" H k t o y c t g" f k u r n c { " k u" u g n g e v g f" h t q o" v j g" O c k p" O g p w" c p f" r t q x k f g u" x g t u k a p" k p h q t o c v k q p" h q t" v j g" c r/ r n k e c v k p p" u q h v y c t g" t w p p k p i" q p" v j g" I R U" U w d u { u v g o" c p f" v j g" N k p w z" U w d u { u v g o" \* t q q v" L n g" u { u v g o" c p f" m g t/ p g n+ 0" " V j g" u g t k c n" p w o d g t" q h" v j g" U q p q o c" k u" u j q y p" h q t" w p k v u" u j k r r g f" c h v g t" L w n { " 4 2 3 7 0" " H q t" w p k v u" u j k r r g f" r t k q t" v q" v j c v. " v j g" u g t k c n" p w o d g t" o w u v" d g" q d v c k p g f" h t q o" c" n c d g n" q p" v j g" t g c t/ r c p g n 0" " W u g" W R" c p f" F Q Y P" v q" v q i" i n g" d g v y g g p" v j g" k p h q t o c v k q p" y k p f q y u 0

### About

Vjg"Cdqww"fkurnc{"ku"ugngevgf"htqo"vjg"Ockp"Ogpw"cpf"rtqxkfgu"eqpvcev"kphqtocvkqp"hqt"GpfTwp"  
Vgejppqni kgu0"Vjg"ygdukyg"cpf"vqnn/htgg"rjqpg"pwodgt"ctg"nkuvgf0



Vjku"rcig"kpvgpvkqpcnn{"nghv"dncpm0





## Upgrade via the Console Port

```
kp"qtfgt"vq"wr itc f g" xkc" vjg" eqpuqng" rqtv" *pgvy qtm" qt" ugtkc n+ {qw" y knm" pggf" vq" Ltuv" fqy pncf" vjg" cr rtq/
rtkcv g" Lt o yctg" k o c i g" htq o "qwt" y gdukv g" Vjg" Uqp q o c" Lt o yctg" eqpukuvu" qh" ugxtca" fkhgtgpv" dkpct {
Lngu0" [qw" o c { "qpn { "pggf" qpg" qt" v y q" qh" vjg o 0" Vjg" t g x k u k q p" j k u v q t { "qp" qwt" y gdukv g" y knm" v g m n" {qw" y j k e j
Lngu" pggf" vq" dg" wr itc f g f 0" Vjg" y gdukv g" nkpm" ku <
```

```
" g p f t w p v g e j p q n q i k g u l e q o l u w r r q t v l u q h v y c t g / w r i t c f g u l u q p q o c / i r u
```

## Performing the Linux RFS Upgrade

### NOTE TO LINUX GEEKS

There are two FLASH disk partitions which hold the compressed Linux root file system images. These partitions are raw FLASH blocks, have no file system and may not be mounted. They are accessed through low-level device drivers. To protect the factory root file system from accidental erasure or over-writing, the upgrade utilities you will be using will only access the upgrade root file system partition. When performing an upgrade, you will be erasing and then copying the new image to this device.

```
Hktuv {qw" pggf" vq" fqy pncf" vjg" Nkpwz" THU" Lt o yctg" htq o "vjg" Gp f Twp" y gdukv g" vq" c" rnceg" qp" {qwt"
pgvy qtm" y j k e j "ku" ceeguukdng" vq" vjg" Uqp q o c 0" Vjg" nkpm" vq" vjg" Uqp q o c" wr itc f g" r c i g" ku" u j q y p" cdqxg 0"
```

### CAUTION

Some browsers will automatically unzip the file when downloading from the website. Please make sure that the downloaded file size matches what the website says it should be. Upgrading the partition with a too-large file size will cause problems.

### Transfer File to Sonoma

```
[qw" o c { "vtcpuhgt" vjg" Lng" vq" {qwt" Uqp q o c" wukpi" gkvjgt" guq" qt" t d d 0" Kh" {qw" ctg" wukpi" "guq" "vtcpuhgt" vjg"
rtgkxkwun { "fqy pncf g f" Lng" wukpi" "dkpct { "vtcpuhgt" o q f g" htq o "vjg" t g o q v g" j q u v" vq" v j k u" u r g e k L e" Lng" qp"
{qwt" Uqp q o c < " l v o r l t q q v h u 0 i / 0" Vjg" t q q v" Lng" u { u v g o "k o c i g" y knm" dg" pc o g f" y kv j" vjg" u q h v y c t g" r c t v" p w o /
dgt" cpf" xgtukqp" nkm g < " 8232/2287/222a50220i / 0" Y j g p" h q n n q y k p i" v j g" k p u v t w e v k q p u" d g n q y. "u w d u k v w v g" v j g"
pc o g" qh" vjg" c e v w c n" t q q v" Lng" u { u v g o "k o c i g" v j c v" {qw" ctg" k p u v c n n k p i" h q t" 8232/2287/222a50220i / 0" Kuuwg"
vjgug" eq o o c p f u" htq o "vjg" eqpuqng" qh" {qwt" Uqp q o c <
```

```
guq!sfnpu f`iptuA A A | r g t h q t o " h v r" n q i k p" q p" t g o q v g" j q u v c
cjo" " " " " } u g v" v t c p u h g t" o q f g" v q" d k p c t { ;
hfu!7121.1176.111`4/11/h{!0unq0sppugt/h{! }vtcpuhgt"vjg"ing;
rvjuAAA AAA AAA AAA AAA A A | e n q u g" v j g" h v r" u g u u k q p" c h v g t" v t c p u h g t A c
```

kh{qw"ctg"wukpi"tdα."{qw"oc{"qrgp"ceqo ocpf"ykpfaqy"qp"vjg"tg oqvq"eq o rwwgt"cpf"ugewtgn{"



## Recovering from a Failed RFS Upgrade

```
Vq"tguvqtg" {qwt"Uqpq o c"vq" c"dqqvcdng"uvcvg"wukpi"vjg"hcveqt {"tqqv"Łng"u {uvg o ." {qw" o wuv" wug"vjg"ugtkcn"
KlQ"rqtv"cpf"tgdqqv"vjg"Uqpq o c"d {e {enkpi"vjg"rqygt0""Tghgt"vq"
"ht"ugvwr"fgvcknu0""Yjgp" {qw"jcxg"eqppgevfg"
{qwt"vgt o kpcn"vq"vjg"ugtkcn"KlQ"rqtv."crrn {"rqygt"vq"vjg"Uqpq o c0
```

```
Rc {"enqug"cvvgpvkqp"vq"vjg"vgt o kpcn"ykpfaqy"y jkng"vjg"wpkv"ku"tgdqqv"kp i 0""Chvgt"vjg"Nkpwz"dqqvncfgt"
fkurnc {u"vjg" o guucig
```

```
Efgbvmu!lfsofm;!GBDUPSZ
```

```
Up!pwfssjef!boe!cppu!uif!VQHSBEF!wfstjpo!pg!uif!lfsofm-!
```

```
uzqf!VQHSBEF!xjuijo!6!tfdpoet
```

```
/////
```

```
Cppujoh!xjui!GBDUPSZ!Lfssofm
```

```
Efgbvmu!Sppu!Gjmf!Tztufn;!VQHSBEF
```

```
Up!pwfssjef!boe!cppu!uif!GBDUPSZ!wfstjpo!pg!uif!Sppu!Gjmf!Tztufn-!
```

```
uzqf!GBDUPSZ!xjuijo!6!tfdpoet
```

```
{qw" o wuv"dgi kp"v {rkpi"ohcevt {"ö"ykvj kp"Łxg"ugeqpfu"vq"ngv"vjg"dqqvncfgt"mpqy"vjcv" {qw"ctg"i qkp i"vq"
qxgttkfg"vjg"fghcwnv"tqqv"Łng"u {uvg o 0""Chvgt" {qw"j kv">gpvgt@""vjg"dqqvncfgt"y knn"dqqv"vjg"hcveqt {"tqqv"
Łng"u {uvg o 0""Ycvej"vjg"tguv"qh"vjg"dqqv"rtqegu"vq" o cmg"uwtg"vjcv" {qw"jcxg"uweeguuhwnn {"tgeqxgtgf0""Kh"
vjg"u {uvg o "dqqv"pqt o cnn {"vjgp" {qw"u j qwnf"tguqnxg"vjg"rtqdn g o u"ykvj"vjg"rtgxxkwu"tqqv"Łng"u {uvg o "
wri tcf g"cpf"tg/rghqt o "kv0
```

## Performing the Linux Kernel Upgrade

```
Hktuv {qw"pggf"vq"fqy pncf"vjg"Nkpwz"mgtpgn"Łt o yctg"htq o "vjg"GpfTwp"y gdukvg"vq" c"rnceg"qp" {qwt"
pgvy qtm"y jkej"ku"ceeguukdn g"vq"vjg"Uqpq o c0""Vjg"nkpm"vq"vjg"Uqpq o c"wri tcf g"rcig"ku"ujqyp"cdqxgl0""
```

## Transfer File to Sonoma

```
[qw" o c {"vtcpuhgt"vjg"Łng"vq" {qwt"Uqpq o c"wukpi" gkvjgt"guq"qt"tdq0""Kh" {qw"ctg"wukpi"guq."vtcpuhgt"vjg"
rtgxxkwun {"fqy pncf g"Łng"wukpi"dkpct {"vtcpuhgt" o qfg"htq o "vjg"tg o qvg"jqv"vq"vjku"urgekŁe"Łng"qp"
{qwt"Uqpq o c<"lv o rlmgtpgn0 i /0""Vjg"mgtpgn"ko cig"y knn"dg"pc o gf"ykvj" c"uqhvyctg"rctv"pw o dgt"nkmg ħ
```

**vqhsbeflfsfm**

Pgzv."wrfcvg"vjg"fgbcwv"Łng"u{uvgo"rctvkvqp"d{"kuwkp"vjku"eqo"ocpf"vq"}qwt"Uqppoc"eqpuqng<

**vqebuf1fsfmgbh!2**

[qw"ujqwnf"ugg"vjku"nkg"fkurnc{gf<

**Efgbvmu!Lfsfm!opx!tfu!up;!VQHSBEF**

Hkpcmn{."tgdqqv"vjg"u{uvgo"d{"kuwkp"vjku"eqo"ocpf"cv"vjg"ujgmn"rtqorv<

**sfcppu**

Yckv"cdqvw";2"ugeqpfu"hqt"vjg"u{uvgo"vq"ujwvfqyp"cpf"tgdqqv"Vjgp"nq"kp"vq"vjg"Uqppoc"wukpi"  
**ufmofu"qt"tti**0"Kh"cmnjcu"iqpg"ygm."{qw"ujqwnf"dg"cdng"vq"nq"kp"vjg"uwcn"yc{0" [qw"ecp"ejgem"vjg"  
twppki"mgtpgn"xgtukqp"cv"cp{"vkog"d{"kuwkp

**lfsfmwfstjpo**

yjkej"yknn"ecwug"vjg"mgtpgn"xgtukqp"oguucig"vq"dg"fkurnc{gf0

[qw"ecp"cnuq"ejgem"vq"ugg"yjkej"mgtpgn"kog"vjg"u{uvgo"ku"ewtgpvn{"dqqv"wpfgt"d{"kuwkp"vjku"  
eqo"ocpf"cv"vjg"ujgmn"rtqorv<

**tzt1fsfm**

Yjkej"ujqwnf"ecwug"vjku"vq"dg"rtkpvf"vq"vjg"eqpuqng<

**CPPUFE!LFSOFM!JNBHF!>!2!)Vqhsbef\***

Kh"uq."cpf{"qwt"wpkv"uggou"vq"dg"qrgtcvki"pqtocmn{"qw"jcxg"uweeguuhwn{"eqorngvf"vjg"mgtpgn"  
writcf"0"Kh{"qwt"wpkv"fqgu"pqv"dqv"wr"uweeguuhwn{"cpf{"qw"ctg"pqv"cdng"vq"**ufmofu"qt"tti**"kp"vq"vjg"  
u{uvgo"chvgt";2"ugeqpfu."vjgp"vjgtg"jcu"dggp"uqog"mkpf"qh"rtqdng"ykvj"vjg"mgtpgn"writcf"0"Kv"ku"  
rqukdng"vjcv"vjg"Łng"fqypnqcf"y"cu"eqttwrv"qt"vjcv{"qw"htiqv"vq"ugv{"qwt"**guq**"fqypnqcf"Łng"oqfg"  
vq"dkpct{"yjgp"fqypnqcf"vjg"Łng//gkvjgt"htqo"vjg"GpfTwp"Vgejpnqikgu"ygdukvg"qt"yjgp"vtcpuhgt/  
tkpi"kv"vq"vjg"Uqppoc0

Recovering from a Failed Kernel Upgrade

Vq"tguvqtg" {qwt" uqo O o

```
{qw"o wuv"dg ikp"v{ rkp i "öhcevqt{ö" ykv jkp"Łxg"ugeqp fu"vq"ngv"vjg"dqqvncf fgt"mpqy"vjcv"{qw"ctg"i qkp i"vq"
qxggtkf g"vjg"fg hcnv"mgtpgn0"Chvgt" {qw"jkv">gpvgt@"vjg"dqqvncf fgt"y knn"dqqv"vjg"hcevqt{ "mgtpgn0" Ycvej"
vjg"tguv"qh"vjg"dqqv"rtqeguu"vq" o cmg"uwtg"vjcv" {qw"jcxg"uweeguuhwmn{ "tgeqxgtgf0"Kh"vjg"u{uvg o"dqqvu"
pqt o cmm{"vjgp" {qw"ujqwnf"tguqnxg"vjg"rtqdn g ou" ykvj"vjg"rtgxxkwu"mgtpgn"wr i tcf g"cpf"tg/rgthqt o"kv0
```

### Performing the GPS Subsystem Upgrade

```
Hktuv{qw"pggf"vq"fqy pncf"vjg" IRU"Uwdu{uvg o"Łt o yctg"htq o"vjg"GpfTwp"y gdukvq"vq" c"rnceg"qp"
{qwt"pgvy qtm"y jkej"ku"ceeguukdn g"vq"vjg"Uqpq o c0"Vjgtg"ctg"vyq"fkhhgtgpv"xgtukqpu"qh"vjg" IRU"Uwd/
u{uvg o"Łt o yctg0"Ocmg"uwtg" {qw"fqy pncf"vjg"cr rtrtc w"Łt o yctg"Łng"*ugg"pqvg"dgnqy +0"Vjg"nkpm"
vq"vjg"Uqpq o c"wr i tcf g"rc ig"ku"ujqyp"cdqxg0"
```

#### NOTE

Before proceeding, use the `hqtwfstjpo` command to check the firmware number of your GPS Subsystem. You will see a response similar to this:

```
G0X!7121.1182.111!Wfs!2/11!.!GQHB!7131.1123.111!Wfs!12!.!KBO!26!28;14;38!3127
Or
G0X!7121.1187.111!Wfs!3/31!.!GQHB!7131.1127.111!Wfs!13!.!BQS!14!22;6; ;26!3127
```

You will need to upgrade using the same firmware number    Bethe fi

rmw\_





[qw" o c {"vtcpuhgt"vjg"Łng"vq" { qwt"Uqpq o c"wukpi "gkvjgt"guq"qt"tdq0""Kh" {qw"ctg"wukpi "guq!vq"rgthqt o "  
vjg"wr i tcfg."vtcpuhgt"vjg"rtgkqwun {"fypnqcfgf"Łng"wukpi "dkpctf



**! bqspqpt!ouq**

Vjg"tgngxcpv"cxckncdng" o cp"rcigu"ctg"ujqyp<

**! ouq!\^!!!!!!!!!!!!!!!!!!!!)2\*!!.!lfzhfo!.!Dsfbuf!b!OUQ!iptu!lfz**  
**! ouqe!\^!!!!!!!!!!!!!!!!!!!!)2\*!!.!OUQ!ebfnpo!qsphsbn**  
**! ouqed!\^!!!!!!!!!!!!!!!!!!!!)2\*!!.!wfoeps.tqfdjgjd!OUQ!rvfsz!qsphsbn**  
**! ouqr!\^!!!!!!!!!!!!!!!!!!!!)2\*!!.!tuboebse!OUQ!rvfsz!qsphsbn**  
**! ouqtonqe!\^!!!!!!!!!!!!!!!!!!!!)2\*!!.!OUQ!TONQ!NJC!bhfou**  
**! touq!\^!!!!!!!!!!!!!!!!!!!!)2\*!!.!tuboebse!TOUQ!qsphsbn**

Pqy"{qw"ecp"kuuwg"kuuwg"nbo"eq o o cpfu"qp"gej"qh"vjgug" o cp"rcigu"vq"Łpf"y jcv"{qw"ctg"nqmkpi"hqt0

### Change Password

Vjku"eq o o cpf"ku"wgf"vq"ejcpi"vjg"rcuu y qtf"hqt"vjg"wg"vjcv"{qw"ctg"nqi igf"kp"cu0"Kv"chgevu"vjg" ugtkc"rqtv."UUJ."Vgnpgv"cpf"JVVRU0"

" **qbttxe**  
"

### List Active Processes

Vjku"eq o o cpf"fkurnc{u"cn"cevkxg"rtqeguugu"twppkpi"kp"vjg"u{uvgo0

" **qt!.f**

### NTP Monitoring and Troubleshooting

Vjg"hqmqy kpi"eq o o cpf"fkurnc{u"y jkej"PVR"enkpvu"ctg"tgcejkpi"vjg"PVR"fcgo qp"twppkpi"qp"vjg" Uqpq o c0"Kv"y knn"pqv"vt{"vq"nqqm"wr"j quv"pc o gu<

" **ouqr!.o!.d!nsvmjtu**

C"wughwn"eq o o cpf"hqt"swgt{kpi"PVR"uvcwv"ku"vjg"hqmqy kpi<

" **ouqr!.qffst**

Vq"swgt{"c"tgo qvg"vk o g"ugtxgt"\*kh"vjg"tgo qvg"vk o gugtxgt"y knn"ceegr"vjg"swgt{+}{v}{rg<

" **ouqr!.qffst!=iptuobnf@**

C"vcdng"qh"kpht o cvkqp"y knn"dg"fkurnc{gf0"Hqt"fgvcknu"qp"y jcv"gej"qh"vjg"vcdng"eqnw o pu" o gcpu"v}{rg<

" **nbo!ouqr**

Vq"ugg"y jcv"xgtukqp"qh"vjg"PVR"fcgo qp."pvr f."ku"qrgtcvkpi"v}{rg<

" **ouqe!..wfstjpo**



## Text Editors

```
Vjgtg"ctg"vjtg"vgzv"gfkvqtu"tgukf"gpv"qp"vjg"Uqpqoc"Łng"u{uvgo<"fejū.kpf"cpf"fmwjt0""Cnn"qh"vjgug"
oc{"dg"wughwn"y jgp"pggfkpi"vq"gfku"u{uvgo"eqpŁiwtcvkq"Łngu"qt"vq"xkgy"cpf"ugcte j"ykvj"kp"u{uvgo"
nqi"Łngu0"
```

```
fejū" ku"cxgt{"uko"rng"gfkvqt"ykvj"Yqtfuvt"mg{"eqo"ocpfu"vjcv"ycu"qtki"kpenn{"fgxgnqrgf"htq"
gzvtg"ogn{"og"oqt{/nk"okvgf"gpxtqpo"gpvu."uwej"cu"lqrr{"dqv"fkumu"cpf"godgffgf"Nkpwz"cr"rnkpegu0"
Y jgp"GpfTwp"Vgej"pqni"kgu0"Łtuv"i"gpgtcvkq"Nkpwz/dcugf"godgffgf"pgv"yqtm"vko"g"ugt"xtgu"ygtg"kp/
vtqfwegf."vjg{"hgn"kpq"vjku"ecvgi"qt{"cpf"vjg"fejū"vgzv"gfkvqt"ycu"cr"rtqr"tkcvgl0""Pqy"kv"ku"kpenn"fgf"qp"
vjg"Uqpqoc"Łng"u{uvgo"htq"ngice{"tgc"uqpu."ukpeg"kv"jcu"dggp"vjg"fgbcwn"gfkvqt"htq"cnm"Łtuv"cpf"ugeqpf"
i"gpgtcvkq"GpfTwp"Vgej"pqni"kgu"rtqf"wevu0""C"ocp"rci"qht"fejū"ku"tgukf"gpv"qp"vjg"u{uvgo"0""Y jgp"
kv"ku"Łtuv"uvctvgf."cpf"{"qw"fkf"pqv"ixg"kv"c"Łng"pc"og"vq"gfku"qp"vjg"eqo"ocpf"nkpg."kv"ujqyu"cu"uvctv/wr"
uetggp"ykvj"kvu"eqo"ocpf"u{pvcz."Dwv"qpeg"{"qw"jcxg"qrgpgf"c"Łng"vq"gfku."qpnkpg"jgnr"ku"pqv"cxckncdng0"
kv"ku"uvctvgf"d{"kuwkp"i"vjg"eqo"ocpf"fejū!\gjm f .up .fejū^."qrvkqpcnn{"ykvj"c"Łng"pc"og"vq"gfku0"
```

```
kpf" ku"vjg"oqfgtp"tgrncego"gpv"htq"fejū"qp"vjg"Uqpqoc0""Kv"ku"c"hwnn/hgcwvtgf"gfkvqt"ykvj"
u{pvcz"jki"jnkij"vkpi"cpf"ku"cnuq"dcugf"qp"vjg"Yqtfuvt"eqo"ocpfu0""Kv"ku"wgut"htkqpf"n{"ykvj"gcu{"vq"Łpf"
jgnr"htq"kvu"mg{"eqo"ocpfu."cpf"eqo"rngvg"ocp"rci"qf"qew"ogpvcvkq"p0""Kv"ku"vjg"tgeqo"ogpfgf"gfkvqt"htq"
cnm"rwt"rqug"wg"kp"eqpŁiwtkpi"cpf"o"qpkvqtkpi"vjg"Uqpqoc"vko"g"ugt"xtg0""Kv"ku"uvctvgf"d{"uko"rn{"kuwkp"i"
vjg"eqo"ocpf"kp f ! \gjm f .up .fejū^."qrvkqpcnn{"ykvj"c"Łng"pc"og"vq"gfku0"
```

```
fmwjt" ku"c"hwnn/hgcwvtgf"wj"enqpg"y"jkej"ku"rtqxf"fgf"kp"vjg"Uqpqoc"Łng"u{uvgo"htq"o"cuqej"kvke""
Wpkz"fkj"ctfu0""Kv"ku"pqv"vjg"ngcu"dkv"wgut"htkqpf"n{"vq"cp{"qpg"ncemkpi"gzr"gtkqpeg"ykvj"vgzv"o"qfg"cr/
rnkecvkqpu0""Kh"{"qw"fqpv"mpqy"y"jcv"wj"ku."cxqkf"wkupi"vjku"gfkvqt#"Kv"ku"uvctvgf"d{"uko"rn{"kuwkp"i"vjg"
eqo"ocpf"wj!\gjm f .up .fejū^."qrvkqpcnn{"ykvj"c"Łng"pc"og"vq"gfku0"
```

## Change Log-In Banners

```
Vjgtg"ctg"vjtg"fkhhgtgpv"nqi/kp"dcppgtu"kp"vjg"Uqpqoc"/"vjg"ugt"kc"n"rqtv"dcppgt."vjg"Vgnpgv"dcppgt."cpf"
vjg"UUJ"dcppgt0""[qw"owuv"dg"nqigf"kp"cu"vjg"ōtqqvō"wgut"kp"qtf"gt"vq"gfku"vjg"telnqecn"Łng"cpf"ejcpi"g"
vjg"nqi/kp"dcppgtu0""Rgthqt"o"vjg"hqmqy"kp i <
```

```
" fejū!0fud0sd/e0sd/mpdbm
```

```
Ejcpig"vjg"dcppgtu"cu"cr"rtqr"tkcvgl0""Chvgt"ucxkpi"vjg"Łng."eqr{"kv"vq"ldqqvlgve"nkmg"vjku<
```

```
" dq! .q!0fud0sd/e0sd/mpdbm!0cppu0fud0sd/e
```

```
Vjgp"tgdqq"htq"{"qwt"ejcpi"gu"vq"vcmg"ghhge"v0
```

```
""
```









## PTP Software License

Vjg"RVRlKGGG/37: : "qrvkqp"cu"ko rno gpgvf"kp"vjg"Uqpqoc"ku"eqxgtgf"d{"rcvgpvu"cpf"eqr{tkijvu0  
Hqt"rcvgpvu"vjcv"rgtvckp"vq"vjg"Uvf"Pq"37: : "ugg"vjg"KGGG"Uvcpfctfu"Cuuqekcvkqp0

Kphqtocvkqp"cdqww"vjg"RVR"Rtqlgev."ngf"d{"Mgpfcmm"Eqttgmm."ecp"dg"hqwpf"cv<""  
rvrfl0uqwteghqti g0pgv

Vjg"fkuvtkdwwkqp"cpf"wucig"qh"vjg"RVR"uqhvycg"ku"cnmqygf."cu"nqpi"cu"vjg"hqnnqykipi"eqr{tkijv"pqvkeg"  
ku"kpenwfgf"kp"qwt"fqewogpvcvkqp0"Vjg"eqr{tkijv"pqvkeg"crnkgu"vq"cnm"Łngu"ykej"eqorqug"vjg"RVRf0"  
Vjku"pqvkeg"crnkgu"cu"kh"vjg"vgzv"ycu"gzrnkekn{"kpenwfgf"kp"gcej"Łng0

Eqr{tkijv"\*e+4227/422: "Mgpfcmm"Eqttgmm."CkfcP"Yknkcou

Rgtokkuqkp"vq"wug."eqr{. "oqfkh{"cpflqt"fkuvtkdww"vjku"uqhvycg"hqt"cp{"rwtreq"ykvj"qt"ykvjqw"hg"  
ku"jgtgd{"itcpvgf."rtqkfgf"vjcv"vjg"cdqxcg"eqr{tkijv"pqvkeg"cpf"vjku"rgtokkuqkp"pqvkeg"crngct"kp"cnm"  
eqrkgu0

VJG"UQHVYCTG"KU"RTQXKFGF"õ \_ O q # U / n O



## GPS Antenna Kit

Vjg"vk o g"ugtxgt"v { rkecn { "ujkru" ykvj "cp" qrvkqpcn" IRU" Cpvppc" Mk v" y jke j "kpenwfgu" 72" hggv" \*37" o gvtu+ " qh" cpvgppc" ecdng" " Vjku" c o qwpv" qh" ecdng" ku" uwhŁekgpv" hqt" vjg" o clqtkv { "qh" IRU" cpvgppc" kpuvcnncvkqu" " Nqpi gt" ecdng" twpu" ecp" cnuq" dg" ceeq o o qfcvgf" " Dgnqy" ku" c" nkuv" qh" vjg" kvg o u" kp" c" v { rkecn" IRU" Cpvppc" Mk v<

É" IRU" Cpvppc

É" Oqwpvki "Rkrg

É" Jqug" Enc o ru

É" 72" hggv" qh" T I / 7 ; W \* Dgnfgp" ; 326+ " EcdnglVPE" O cng

kp" Lwpg" 4239. " GpfTwp" e jcpigf" vjg" IRU" cpvgppc" o qfgn" vjcv" ujkrgf" ykvj" vjg" vk o g" ugtxgt" " C" ftcy kpi" qh" vjg" IRU" tqqh/vqr" kpuvcnncvkq" hqt" vjg" v y q" fkhgtgpv" cpvgppc" ku" ujqyp" cv" vjg" gpf" qh" vjku" crgpfkz" kp" Hkiwtgu" 3C" cpf" 3D" " Eq o rnvng" IRU" Tqqh/Vqr" kpuvcnncvkq" I wkfgu" ctg" jgtg<"

Hqt" cpvgppc" ujkrgf" chvt" Oc { 4239<

" gpf" twpvge jpqni kguleq o lrfhl7272/2239/2220r fh

Hqt" cpvgppc" ujkrgf" dghqtg" Lwpg" 4239<

" gpf" twpvge jpqni kguleq o lrfhl7272/2237/2220r fh

## About Coax Cable

Vjg" IRU" uki pcn" htsgwpe { "ku" eqpukfgtgf" vq" dg" kp" vjg" o ketqycxg" tcpig" cpf" ku" jki jn { "chhgevgf" d { " k o r g f c p e g" o k u o c v e j g u" c p f" f k u e q v k p w k v k u" k p" v j g" v t c p u o k u u k q p" e c d n g u" " C n n" T H" e q c z" e c d n g u" j c x g" c" o k p k o w o" d g p f" t c f k w u" " k p" q t f g t" v q" r t g x g p v" f c o c i g. " e c d n g" u j q w n f" p q v" d g" d g p v" k p v q" v k i j v" e w t x g u" " K v" k u" e t k v k e c n n { " k o r q t v c p v" f w t k p i" k p u v c n n c v k q p" v j c v" m k p m u" c t g" p q v" c n n q y g f" v q" h q t o" k p" v j g" e c d n g" " K h" T H" e q c z" e c d n g" k u" d g p v" d g { q p f" k v u" o k p k o w o" d g p f" t c f k w u" v j g p" f c o c i g" v q" v j g" k p p g t" e q p u v t w e v k q p" q h" v j g" e c d n g" o c { " t g u w n v" " V j k u" e c p" n g c f" v q" o w e j" j k i j g t" n g x g n u" q h" n q u u" c p f" c" p q p" h w p e v k q p k p i" IRU" t g e g k x g t" " "

Uk o knctn { . " e c t g" u j q w n f" d g" v c m g p" v q" g p u w t g" v j c v" v j g" e c d n g" k u" p q v" e t w u j g f. " q t" n k m g n { " v q" d g" e t w u j g f" n c v g t" " K h" v j g" T H" e q c z" e c d n g" f q g u" u w h g t" v j k u" m k p f" q h" f c o c i g. " v j g p" v j g" f k o g p u k q p u" q h" v j g" e c d n g" y k n n" d g" e j c p i g f" c p f" k v" y k n n" p q v" o c k p v c k p" k v u" e j c t c e v g t k u v k e" k o r g f c p e g" " C i c k p. " v j k u" e c p" t g u w n v" k p" c" p q p" h w p e v k q p k p i" IRU" t g e g k x g t" " "

Rngcug" mggr" vjg" cdqxs" r tgecvwkqu" kp" o kpf" y jgp { qw" kpuvcn" vjg" IRU" ecdng" " Kv" ujqwnf" pqv" dg" vtgcvgf" nkmg" c" i c t f g p" j q u g" q t" c" r q y g t" g z v g p u k q p" e q t f o

## Long Cable Runs

Oquv" IRU" Vk o g" Ugtxgtu" ctg" kpuvcnngf" ykvj" qpn { "72" hggv" \*37" o gvtu+ " qh" cpvgppc" ecdng" " Jqy gxtg. " vjgtg" ctg" o cp { "ektew o uvcpegu" y jgtg" 72" hggv" ku" kpcfgswcvgl" GpfTwp" ecp" ceeq o o qfcvg" c" ecdng" ngp i v j" qh" w r" vq" 3222" hggv" wukpi" c" eq o dkpevkq" qh" nq y / nquu" ecdng" cpf" r t g c o r n k Ł g t u o





Using Three Preamplifiers

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- " IRU"cpvgppc
- " Qpg"hqqv"ecdng
- " Rtgc o rnkŁgt
- " Qpg"hqqv"ecdng
- " Rtgc o rnkŁgt
- " Wr"vq"3.222"hg gv"\*527" o gvgtu+"ecdng
- " Rtgc o rnkŁgt
- " Qpg"hqqv"ecdng
- " Uppq o c"IRU"Vk o g"Ugtxgt

Other Accessories

Lightning Arrestor

Cnki jvvpki"cttguvqt"jgnru"rtqvgevf{qwt"IRU"kpucvncvkqp"htq o "fc o c ig"fwg"vq"nki jvvpki"uvtkngu0""Kv"ku" fguki pgf"vq"rcuu"vjg"FE"xqnc ig"vjcv"ku"pggfgf"vq"rqygt"vjg"cpvgppc"cpflqt"rtgc o ru"y kvj qw"fg i tcf/ kpi"vjg"IRU"uk i pcn0""Kv"ku"kpucvncvkqp"dgvy ggp"vjg"cpvgppc"cpf"vjg"tgekxgt"y jgtg"vjg"ecdng"gpvgtu"vjg" dwknfkpi."pgct"cp"gctvj/i tqwpf0"" [qw" o wuv"dqpf"vjg"nki jvvpki"cttguvqt"vq"vjg"gctvj/i tqwpf0""

Signal Splitters

Uki pcn"urnkvgtu"ctg"wugf"y jgp"vyq"vk o g"ugtxgtu"ctg"ujctki"qpg"cpvgppc"kpucvncvkqp0""Vjg"u o ctv"IRU" Urnkvtg"uwr rnkfg" d{"GpfTwp"ku"c"qpg/kprww."vyq/qwwrww"fgxkeg0""Kp"vjg"pqto c n"eqpŁ i wtcvkqp."qpg"qh" vjg"urnkvgt"TH"qwwrww"\*L3+"rcuugu"FE"htq o "vjg"eqppgevgf"IRU"Tgekxgt"vj tqw i j"vjg"urnkvgt"vq"vjg" cpvgppc."cnnq y kpi"vjg"IRU"Tgekxgt"vq"rqygt"dqvj"vjg"cpvgppc"cpf"vjg"urnkvgt"c o rnkŁgt0""Vjg"qvjgt" TH"qwwrww"\*L4+"ku"FE"nqcf"y kvj"c"422/qj o "tgukuvqt"vq"uk o wncvg"vjg"cpvgppc"ewttgvp"ftc y0"

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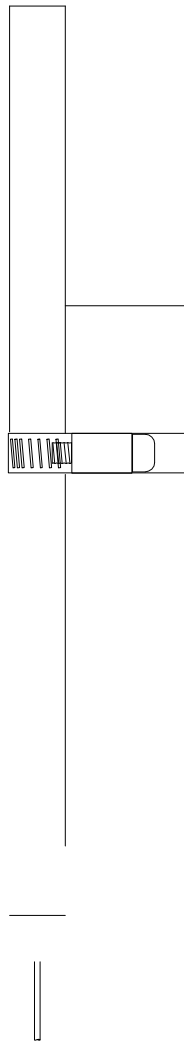
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2832/222;/223	Mkv"ykvj"72ø*37 o+"ecdng	84"pcpqugeqpfu	Dgnfgp";326."3046"pulhqqv
2822/2235/272	72ø*37 o+"ecdng	84"pcpqugeqpfu	Dgnfgp";326."3046"pulhqqv
2822/2235/322	322ø*52 o+"ecdng	346"pcpqugeqpfu	Dgnfgp";326."3046"pulhqqv
2822/2235/372	372ø*68 o+"ecdng	<b>Dø: 8"pcpqugeqpfu</b>	Dgnfgp";326."3046"pulhqqv
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6233/2224/222	I/NPC4"Mkv" *ykv4		



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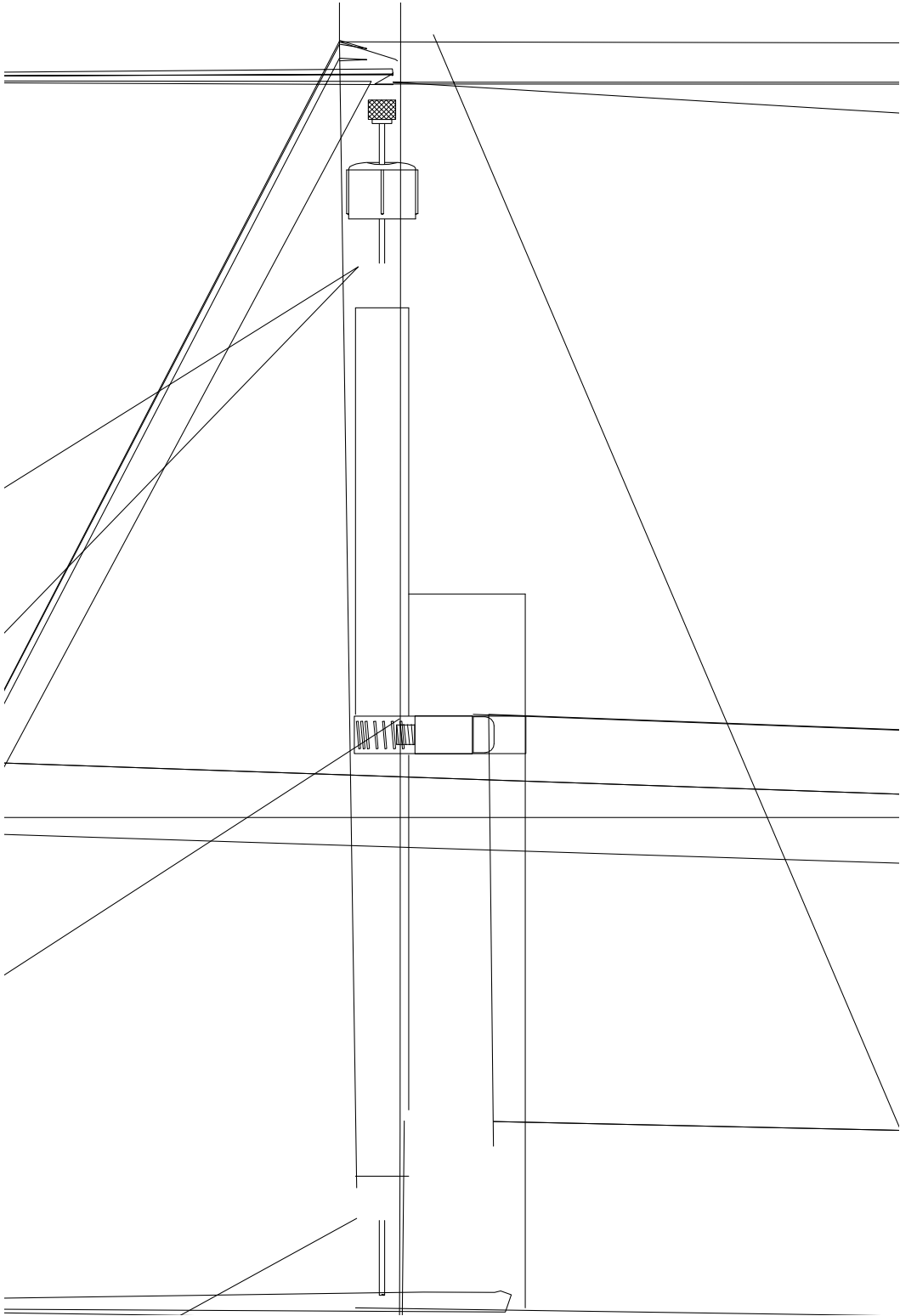


FIGURE 1B - GPS ANTENNA ROOFTOP MOUNTING GUIDELINES  
(SHIPPED BEFORE JUNE 2017)





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À

Vjku"hcwnv"kpfkcygu"vjcv"vjg"IRU"Uwdu{uvgo"ku"wpcdng"vq"xgkth{"c"ytkvg"vq"vjg"HNCUJ"pqp/xqncvknq"  
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Receiver Fault Definitions

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 +0""Uppq o c"dg i cp"ujkr r kpi" ykvj"vjgug"tgegkxgtu"kp"Lwpg"42390

Y jgp" c"hcwnv"qp"vjg"GpfTwp" IRU"Tgegkxgt" qeewtu."vjg"u { uvgo "hcwnv"kp fkecvqt"TEXH" y knn"ujqy "hcwnv"  
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Vjku"hcwnv"kp fkecvgu"vjcv"vjg" FCE" hqt"vjg" quekncvqt" jcu"tgcejgf" gkvjgt"vjg" jki j "qt"nqy "cnct o "nk o kv"  
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 wtpgf"vq"vjg" hcevt { "hqt" quekncvqt"tg rnceg o gpv"cv" { qwt"eqpxgpkpge0

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SPECIFICATIONS

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4	Tgegxg"Fcvc"*TZ+
5	Vtcpu o kv"Fcvc"*VZ+
6	Pqv"Eqppgevgf
7	I tqwpf
8	Pqv"Eqppgevgf
9	Pqv"Eqppgevgf
:	Pqv"Eqppgevgf
;	Pqv"Eqppgevgf

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 " " " " " qt"  
 " " " " " 3097öJ "z"4047ö" fkc o gvt"\*u jkr r gf" dghqtg" Lwpg"4239+0

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 Cpvppc"Qrgtcvkpi "Vg o rgtcvwtg<" " /62Å"vq" - : 7Å"E  
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 Uvqtcig"J w o kfv{<" " 7 ' "vq"; 7 ' ."T J ."pqp/eqpf gpupki  
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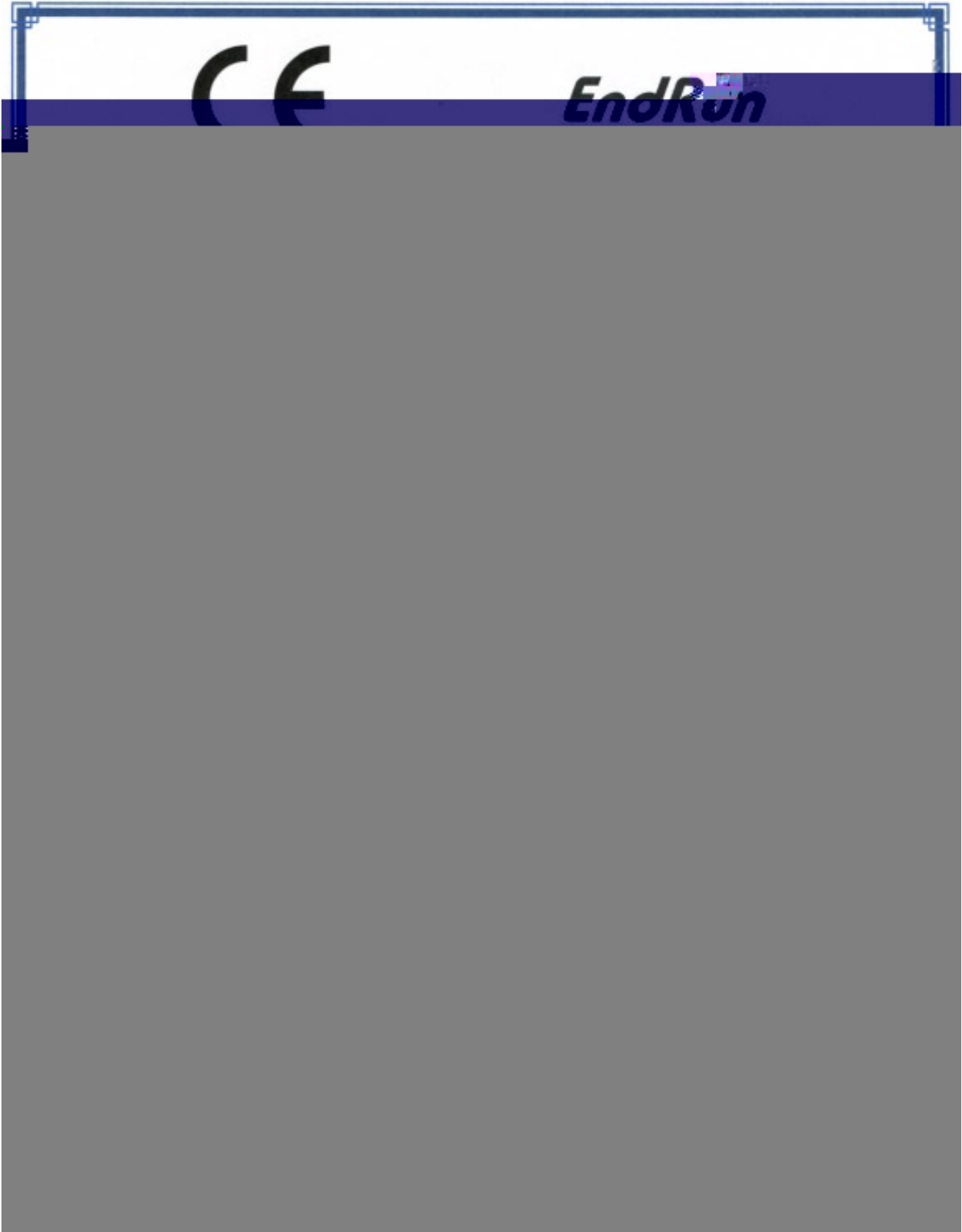
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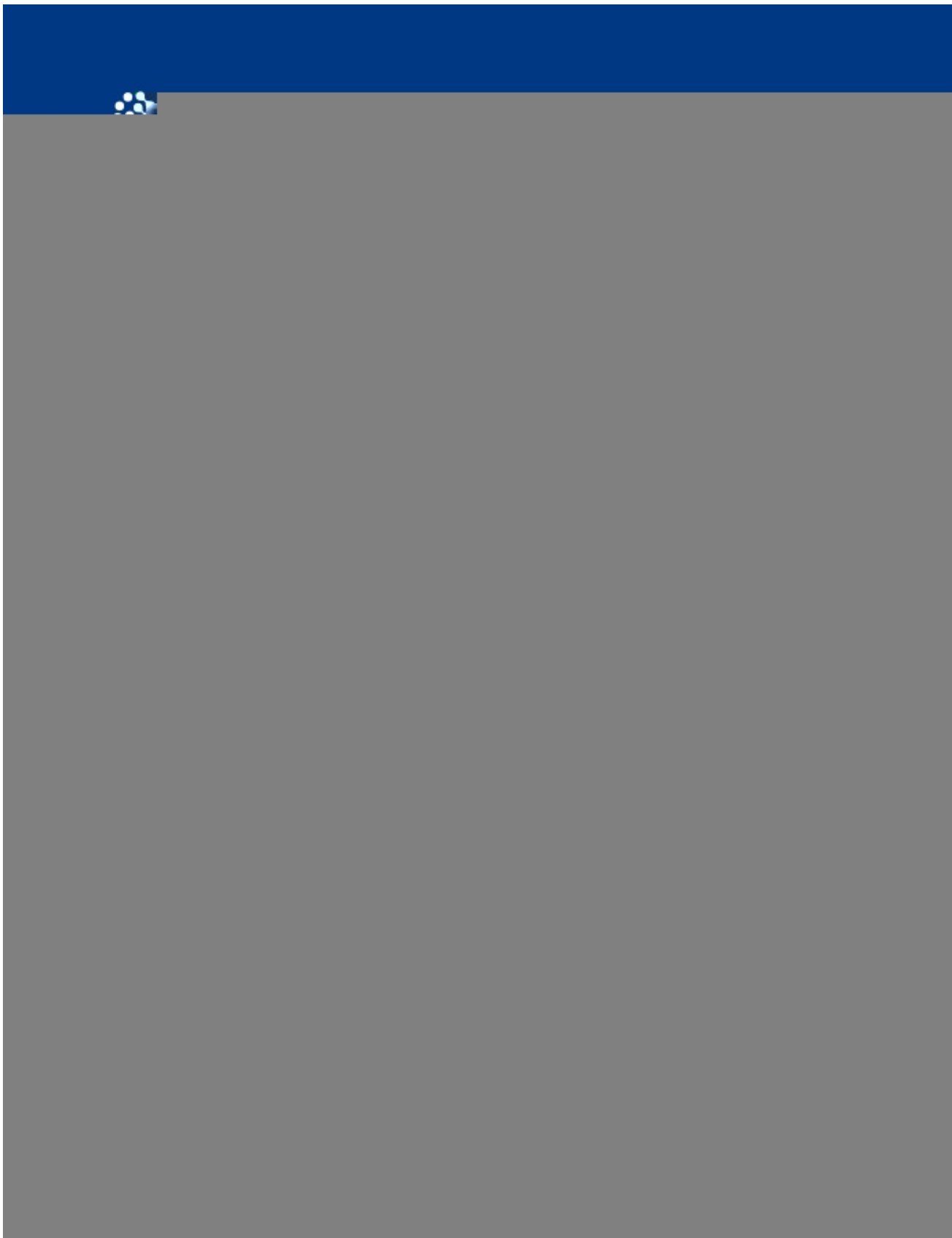
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2270 Northpoint Parkway  
Santa Rosa, CA 95407