



XIRGO

XT3182D

Product Manual

Revised December 19, 2019

Revision A01

TABLE OF CONTENTS

- 1. Functional Description** 6
- 2. Interfaces** 8
 - 2.1. LED Blink Pattern 8
- 3. Event Description and Default Mask** 9
 - 3.1. [6070] Wake on Software reset 9
 - 3.2. [6071] Wake on Motion Start 9
 - 3.3. [6072] Wake on Motion Stop 9
 - 3.4. [6074] Wake on Periodic Motion 9
 - 3.5. [6075] Wake on Periodic No-Motion 9
 - 3.6. [6112] System Version Report 9
 - 3.7. [6113] Image Capture 10
 - 3.8. [6114] Power Report Event 10
 - 3.9. [6115] Diagnostic Report Event 10
 - 3.10. [6116] Wake on Door Open 10
 - 3.11. [6117] Wake on Door Closed 10
 - 3.12. [6118] Wake on Periodic Door Open 10
 - 3.13. [6119] Wake on Periodic Door Closed 10
- 4. Parameters** 11
 - 4.1. AL (Altitude) 13
 - 4.2. AX Accelerometer X Value 13
 - 4.3. AY Accelerometer Y Value 13
 - 4.4. AZ Accelerometer Z Value 13
 - 4.5. BB Backup Battery Voltage 14
 - 4.6. BLECHK Total BLE Ad Scans Last Sleep 14
 - 4.7. BLEHIT Successful BLE Ad Scans Last Sleep 14
 - 4.8. BRNRST Brownout Resets 14

4.9. BV Battery Voltage 15

4.10. CQ (Cellular Signal Quality) 15

4.11. D (Date-Time) 15

4.12. DSA Door Sensor Version 16

4.13. EA External ADC Voltage 16

4.14. EV (Event Identifier) 16

4.15. GS (GPS Lock Status) 17

4.16. GSPT (GPS Speed) 17

4.17. HD (GPS Heading) 18

4.18. HIBRST Hibernate Resets 18

4.19. HP (GPS PDOP) 19

4.20. IFN Image File Name on Server 20

4.21. IG (Ignition Status) 20

4.22. LDSWERR Load Switch Voltage Errors 20

4.23. LDSWVOL Load Switch Voltage 21

4.24. LN (Longitude) 21

4.25. LT (Latitude) 21

4.26. MAINVOL Main Voltage (integer millivolts) 22

4.27. MI (Virtual Odometer GPS) 22

4.28. OT (Output State) 22

4.29. PM Last Reset Code 23

4.30. PSCA Psoc Application Version 23

4.31. PSCB Psoc Boot Version 23

4.32. PWRST Power-On Resets 23

4.33. SCA SC20 Application Version 24

4.34. SCOFFATT SC20 Power-Off Attempts 24

4.35. SCOFFERR SC20 Power-Off Errors 24

- 4.36. SCONATT SC20 Power-On Attempts 24
- 4.37. SCONERR SC20 Power-On Errors 25
- 4.38. SCS SC20 System Version 25
- 4.39. SEQ (Sequence Number) 25
- 4.40. SOLCUR Solar Current (integer magic.....) 26
- 4.41. SOLVOL Solar Voltage (integer millivolts) 26
- 4.42. SP Speed 26
- 4.43. SV (GPS Satellites) 27
- 4.44. SWRST Software Resets 27
- 4.45. T Time 27
- 4.46. UNRST Unknown Resets 27
- 4.47. WDRST Watchdog Resets 28
- 5. Server Commands 29**
 - 5.1. [1024] Image Capture FTP Configuration 29
 - 5.2. [7027] Image Capture Execute 29
 - 5.3. [7028] Clear Occupancy Data 29
 - 5.4. [9100] Pass-through Command 29
 - 5.5. [9101] Log Sync FTP Configuration 30
 - 5.6. [9102] Log Sync Execute 30
 - 5.7. [9103] Generic FTP Configuration 30
 - 5.8. [9104] Generic FTP Execute 31
 - 5.9. [9105] Update Backup APK 31
- 6. Subsystems 32**
 - 6.1. General Commands 32
 - 6.2. Phone Application Commands 32
 - 6.3. Phone GPS Commands 32
 - 6.4. Phone System Commands 32

6.5. Other Commands	32
6.6. Door Sensor	33
6.7. Monomo	34
6.8. SC20 GPIOs	34
7. Regulatory Statements	35
7.1. FCC	35
7.2. IC	36
7.3. CE	36
7.4. California Proposition 65 Warning:	37

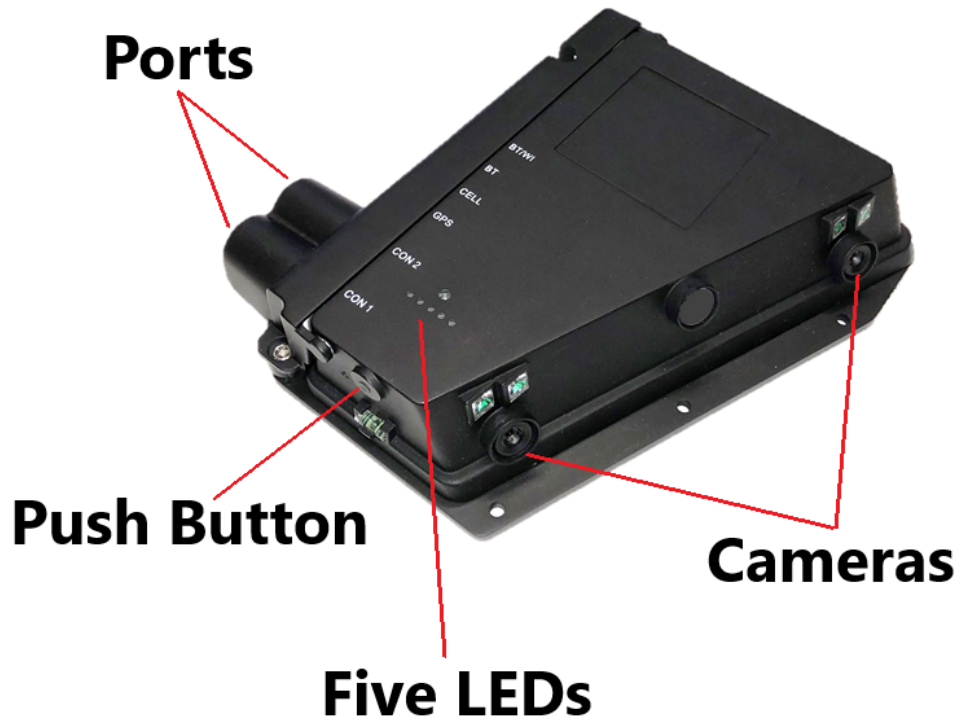
1. FUNCTIONAL DESCRIPTION

Xirgo’s XT3182D is a cargo occupancy sensor fusion platform consisting of two cameras and a Time-of-Flight ultrasonic sensor that provides improved cargo sensing capabilities where traditional ultrasonic-based cargo sensors fail to provide accurate cargo capacity utilization information.

By implementing direct 3D imaging, the XT3182D eliminates image noise from light and shadows increasing cargo measurement accuracy. The camera pair acts as a stereo vision sensor and the ultrasonic sensor provides short range Time-of-Flight data in case the stereo vision is blocked by very close cargo.

For qualitative review, “thumbnail” style low data cost trailer images are available for upload.

Mechanical	
Dimensions	6.25" x 8.81" x 1.75" (15.87 x 22.38 x 4.45 cm)
Case Material	PC-PBT
Operating Temperature	
Charge	-4 °F to 140 °F (-20 °C to 60 °C)
Discharge	-40 °F to 158 °F (-40 °C to 70 °C)
Power Specifications	
Internal Battery	10 Ah Battery
Opt. Addl. Battery	5 Ah Battery (15 Ah total)
GPS Specification	
Acquisition	-146dBm Cold -158dBm re-acquisition
Tracking Sensitivity	-160 dBm
Accuracy	2.5 meters at CEP-50%
TTF Cold Start	32 seconds
TTF Hot Start	2 seconds
Certifications	
FCC, IC, GCF, PTCRB, AT&T, Verizon, Rogers, T-Mobile, Bell*, Telus*	



2. INTERFACES

2.1. LED BLINK PATTERN

The LED numbers start from left (1) to right (5).

LED #	Red LED	Green LED	Blue LED
1	SC20 Pending Shutdown	Application Heartbeat	Kernel Filesystem Activity
2	SC20 Missing sims	Cell Data Connection	Cell Registered to a Tower
3	SC20 Camera Image Capture	Images Uploading	Images Processing
4	SC20 GPS Error	GPS Fix Acquired	GPS Getting fix
5	No communication with SC20	Communication with SC20	N/A



NOTE: A white, right-most LED indicates a device reset.

3. EVENT DESCRIPTION AND DEFAULT MASK

3.1. [6070] WAKE ON SOFTWARE RESET

Wake on Software Reset event is triggered by device power up or reset.

Default String | UID, EV#, D, T, LT, LN, AL, SP, HD, SV, HP, BV, CQ, MI, GS, EA, BB, PM, AX, AY, AZ, SEQ

3.2. [6071] WAKE ON MOTION START

Wake on Motion Start is triggered by exceeding the accelerometer threshold within a specified time window. The thresholds are configured with the !cs:56 command.

Default String | UID, EV#, D, T, LT, LN, AL, SP, HD, SV, HP, BV, CQ, MI, GS, EA, BB, PM, AX, AY, AZ, SEQ

3.3. [6072] WAKE ON MOTION STOP

Wake on Motion Stop is triggered when the device does not exceed the accelerometer threshold within a specified time window. The thresholds are configured with the !cs:56 command.

Default String | UID, EV#, D, T, LT, LN, AL, SP, HD, SV, HP, BV, CQ, MI, GS, EA, BB, PM, AX, AY, AZ, SEQ

3.4. [6074] WAKE ON PERIODIC MOTION

Wake on Periodic Motion event is triggered when the accelerometer remains above the motion threshold during a specified time window. The thresholds for the time window and accelerometer are configured with the !cs:56 command.

Default String | UID, EV#, D, T, LT, LN, AL, SP, HD, SV, HP, BV, CQ, MI, GS, EA, BB, PM, AX, AY, AZ, SEQ

3.5. [6075] WAKE ON PERIODIC NO-MOTION

Wake on Periodic No-Motion event is triggered when the accelerometer remains below the motion threshold during a specified time window. The thresholds for the time window and accelerometer are configured with the !cs:56 command

Default String | UID, EV#, D, T, LT, LN, AL, SP, HD, SV, HP, BV, CQ, MI, GS, EA, BB, PM, AX, AY, AZ, SEQ

3.6. [6112] SYSTEM VERSION REPORT

Reports firmware versions for the PSOC application, PSOC boot, SC20 application, SC20 system, and door sensor.

Before version DBz1.1178AA2.2 System Version was triggered on every reset.

After version DBz1.1178AA2.2 System Version is triggered on every wake.

Default String |UID, EV#, D, T, LT, LN, GS, PSCA, PSCB, SCA, SCS, DSA, LBA, SEQ

3.7. [6113] IMAGE CAPTURE

Image Capture is triggered when an image pair is successfully uploaded to the FTP server. This is configured with command 1024.

Default String |UID, EV#, D, T, LT, LN, GS, IFN, SEQ

3.8. [6114] POWER REPORT EVENT

Power Report is triggered on every wake.

Default String |UID, EV#, D, T, LT, LN, GS, BB, MAINVOL, SOLVOL, SOLCUR, LDSWVOL, SEQ

3.9. [6115] DIAGNOSTIC REPORT EVENT

Diagnostic Report is triggered on every wake.

Default String |UID, EV#, D, T, LT, LN, GS, SWRST, PWRST, UNRST, WDTRST, BRNRST, HIBRST, SCONATT, SCONERR, SCOFFATT, SCOFFERR, LDSWERR, BLEHIT, BLECHK, SEQ

3.10. [6116] WAKE ON DOOR OPEN

Triggered when door sensor is determined as open. Configured with command !cs:60.

Default String |UID, EV#, D, T, LT, LN, AL, SP, HD, SV, HP, BV, CQ, MI, GS, EA, BB, PM, AX, AY, AZ, SEQ

3.11. [6117] WAKE ON DOOR CLOSED

Triggered when door sensor is determined as closed. Configured with command !cs:60.

Default String |UID, EV#, D, T, LT, LN, AL, SP, HD, SV, HP, BV, CQ, MI, GS, EA, BB, PM, AX, AY, AZ, SEQ

3.12. [6118] WAKE ON PERIODIC DOOR OPEN

Triggered when door sensor is determined as open and has exceeded a time threshold. Configured with command !cs:60.

Default String |UID, EV#, D, T, LT, LN, AL, SP, HD, SV, HP, BV, CQ, MI, GS, EA, BB, PM, AX, AY, AZ, SEQ

3.13. [6119] WAKE ON PERIODIC DOOR CLOSED

Triggered when door sensor is determined as closed and has exceeded a time threshold. Configured with command !cs:60..

Default String |UID, EV#, D, T, LT, LN, AL, SP, HD, SV, HP, BV, CQ, MI, GS, EA, BB, PM, AX, AY, AZ, SEQ

4. PARAMETERS

Parameter	Range/Type	Description						
AL	Double	Integer tenths of meters above or below sea-level.						
AX	-2048 to 2048	Accelerometer X-force (mG).						
AY	-2048 to 2048	Accelerometer Y-force (mG).						
AZ	-2048 to 2048	Accelerometer Z-force (mG).						
BB	0 to 65535	Backup battery voltage.						
BLECHK	0 to 65535	Number of times scanned for BLE advertisements.						
BLEHIT	0 to 65535	Number of times a scan results in an advertisement found.						
BRNRST	0 to 255	Number of brownout resets.						
BV	0 to 65535	Battery voltage.						
CQ	INT	The CQ parameter indicates the received signal strength indication (RSSI) from the cellular modem. There are periods of time, such as the tower hand-off, when this value may not be valid for a short period of time.						
D	YYYY/MM/DD	Seconds since 00:00:00 January 1, 1970 UTC. A value of 0 indicates the current time is not known. This is displayed as a string of the date in the format indicated in the range/type column.						
DSA	N/A	Door sensor version.						
EA	0 to 65535	External ADC voltage.						
EV#	N/A	Event number.						
GS	0 or 1	Lock status: <table border="1" data-bbox="532 1058 1446 1178"> <thead> <tr> <th>Index</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Not locked.</td> </tr> <tr> <td>1</td> <td>Locked.</td> </tr> </tbody> </table>	Index	Description	0	Not locked.	1	Locked.
Index	Description							
0	Not locked.							
1	Locked.							
HD	0 to 3600	0 to 360 degrees device heading in tenths of a degree. 0 (or 360) degrees indicates a direction toward true North. 90 degrees indicates a direction toward true East. 180 degrees is true South. 270 degrees is true West.						
HIBRST	0 to 255	Number of hibernate resets.						
HP	Double	GPS PDOP in tenths. (DOP value, rating, and description?)						
IFN	N/A	Image file name uploaded to the FTP server.						
LDSWERR	0 to 65535	Number of times the load switch to the SC20 stayed above the voltage threshold before powering up.						
LDSWVOL	0 to 65535	Voltage on the load switch to the SC20.						
LN	-180 to 80	Decimal degrees of longitude multiplied by 1e6.						
LT	0 to 90	Decimal degrees of latitude multiplied by 1e6.						
MAINVOL	0 to 65535	External power voltage.						
MI	Double	Calculated distance in meters.						
OT	0 or 1	Output state:						

Parameter	Range/Type	Description																						
		<table border="1"> <thead> <tr> <th>Index</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Low</td> </tr> <tr> <td>1</td> <td>High</td> </tr> </tbody> </table>	Index	Description	0	Low	1	High																
Index	Description																							
0	Low																							
1	High																							
PM	1 to 10	Wake reason: <table border="1"> <thead> <tr> <th>Index</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Reset</td> </tr> <tr> <td>2</td> <td>GPIO</td> </tr> <tr> <td>3</td> <td>Motion</td> </tr> <tr> <td>4</td> <td>No motion</td> </tr> <tr> <td>5</td> <td>Motion periodic</td> </tr> <tr> <td>6</td> <td>No motion</td> </tr> <tr> <td>7</td> <td>Door open</td> </tr> <tr> <td>8</td> <td>Door close</td> </tr> <tr> <td>9</td> <td>Periodic</td> </tr> <tr> <td>10</td> <td>Door close periodic</td> </tr> </tbody> </table>	Index	Description	1	Reset	2	GPIO	3	Motion	4	No motion	5	Motion periodic	6	No motion	7	Door open	8	Door close	9	Periodic	10	Door close periodic
Index	Description																							
1	Reset																							
2	GPIO																							
3	Motion																							
4	No motion																							
5	Motion periodic																							
6	No motion																							
7	Door open																							
8	Door close																							
9	Periodic																							
10	Door close periodic																							
PSCA	N/A	Psoc application version																						
PSCB	N/A	Psoc boot version																						
PWRST	0 to 65535	Number of power-on resets																						
SCA	N/A	SC20 app version																						
SCOFFATT	0 to 65535	Number of power-off attempts.																						
SCOFFERR	0 to 65535	Number of SC20 power-off errors.																						
SCONATT	0 to 65535	Number of SC20 power-on attempts.																						
SCONERR	0 to 65535	Number of SC20 power-on errors.																						
SCS	N/A	System verison.																						
SEQ	0 to 255	Event sequence number.																						
SOLCUR	0 to 65535	Current provided by solar panel.																						
SOLVOL	0 to 65535	Voltage provided by solar panel.																						
SP	Double	Speed.																						
SV	INT	Number of Satellites used in the navigation solution.																						
SWRST	0 to 65535	Number of software resets.																						
T	HH:MM:SS	UTS time.																						
UNRST	0 to 65535	Number of unknown resets.																						
WDRST	0 to 255	Number of watchdog resets.																						

4.1. AL (ALTITUDE)

GPS Altitude. Specifies the distance from sea-level.

Parameter Data Presentation

AL

Parameter	Format	Description
AL	-90 to 90	Integer tenths of meters above or below sea-level.

4.2. AX ACCELEROMETER X VALUE

Data Presentation

AX

Parameter	Type	Description
AX		Accelerometer X-force.

4.3. AY ACCELEROMETER Y VALUE

Data Presentation

AY

Parameter	Type	Description
AY		Accelerometer Y-force

4.4. AZ ACCELEROMETER Z VALUE

Data Presentation

AZ

Parameter	Type	Description
AZ		Accelerometer Z-force

4.5. BB BACKUP BATTERY VOLTAGE

Data Presentation

BB

Parameter	Type	Description
BB		Backup battery voltage.

4.6. BLECHK TOTAL BLE AD SCANS LAST SLEEP

Data Presentation

BLECHK

Parameter	Type	Description
BLECHK		Number of times Scanned for BLE Advertisements.

4.7. BLEHIT SUCCESSFUL BLE AD SCANS LAST SLEEP

Data Presentation

BLEHIT

Parameter	Type	Description
BLEHIT		Number of times a scan results in an advertisement found.

4.8. BRNRST BROWNOUT RESETS

Data Presentation

BRNRST

Parameter	Type	Description
BRNRST		Number of brownout resets.

4.9. BV BATTERY VOLTAGE

Data Presentation

BV

Parameter	Type	Description
BV		Battery voltage.

4.10. CQ (CELLULAR SIGNAL QUALITY)

The CQ parameter indicates the received signal strength indication (RSSI) from the cellular modem. There are periods of time, such as tower hand-off, when this value may not be valid for a short period of time.

Parameter Data Presentation

CQ

Parameter	Type	Description
CQ	UINT8	The allowed range is 0 to 31. When the RF power level of the received signal is the highest possible, the value 31 is reported. When it is not known, not detectable or currently not available, 99 is returned.

4.11. D (DATE-TIME)

The D parameter provides UNIX epoch time; the number of seconds since the UNIX epoch. Seconds since 00:00:00 January 1, 1970 UTC.

Parameter Data Presentation

D

Parameter	Format	Description
D	YYYY/MM/DD	Seconds since 00:00:00 January 1, 1970 UTC. A value of 0 indicates that the current time is not known.

4.12. DSA DOOR SENSOR VERSION

Data Presentation

DSA

Parameter	Type	Description
DSA		Door sensor version.

4.13. EA EXTERNAL ADC VOLTAGE

Data Presentation

EA

Parameter	Type	Description
EA		External ADC voltage.

4.14. EV (EVENT IDENTIFIER)

The EV parameter identifies the event trigger which generated the record.

Parameter Data Presentation

EV

Parameter	Type	Description																
EV	STR8	8-bit string value.																
		<table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Ignition On / Trip Start / Engine On</td> </tr> <tr> <td>2</td> <td>Ignition Off / Trip End / Engine Off</td> </tr> <tr> <td>44</td> <td>ADC Periodic</td> </tr> <tr> <td>45</td> <td>Diagnostics1</td> </tr> <tr> <td>46</td> <td>Diagnostics2</td> </tr> <tr> <td>47</td> <td>Diagnostics3</td> </tr> <tr> <td>52</td> <td>Power Stage Transition</td> </tr> </tbody> </table>	Value	Description	1	Ignition On / Trip Start / Engine On	2	Ignition Off / Trip End / Engine Off	44	ADC Periodic	45	Diagnostics1	46	Diagnostics2	47	Diagnostics3	52	Power Stage Transition
Value	Description																	
1	Ignition On / Trip Start / Engine On																	
2	Ignition Off / Trip End / Engine Off																	
44	ADC Periodic																	
45	Diagnostics1																	
46	Diagnostics2																	
47	Diagnostics3																	
52	Power Stage Transition																	

4.15. GS (GPS LOCK STATUS)

GPS Lock Status.

Parameter Data Presentation

GS

Parameter	Type	Description														
GS	UINT8	Lock Status.														
		<table border="1"> <thead> <tr> <th>Status</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>None. Lock status unknown.</td> </tr> <tr> <td>1</td> <td>Locked. GPS is locked, but the result is filtered. This can mean it has not been locked for enough consecutive solutions or an accuracy figure of merit is unsatisfactory to consider this position LockedGood.</td> </tr> <tr> <td>2</td> <td>Unlocked. GPS solution is not locked.</td> </tr> <tr> <td>3</td> <td>LockedGood. GPS solution is locked and integrated.</td> </tr> <tr> <td>4</td> <td>Sleep. The GPS receiver is powered down.</td> </tr> <tr> <td>5</td> <td>Filtered. The response has been filtered.</td> </tr> </tbody> </table>	Status	Description	0	None. Lock status unknown.	1	Locked. GPS is locked, but the result is filtered. This can mean it has not been locked for enough consecutive solutions or an accuracy figure of merit is unsatisfactory to consider this position LockedGood.	2	Unlocked. GPS solution is not locked.	3	LockedGood. GPS solution is locked and integrated.	4	Sleep. The GPS receiver is powered down.	5	Filtered. The response has been filtered.
Status	Description															
0	None. Lock status unknown.															
1	Locked. GPS is locked, but the result is filtered. This can mean it has not been locked for enough consecutive solutions or an accuracy figure of merit is unsatisfactory to consider this position LockedGood.															
2	Unlocked. GPS solution is not locked.															
3	LockedGood. GPS solution is locked and integrated.															
4	Sleep. The GPS receiver is powered down.															
5	Filtered. The response has been filtered.															

4.16. GSPT (GPS SPEED)

GPS Speed. Speed from GPS measured in kilometers per hour.

Parameter Data Presentation

GSPT

Parameter	Type	Description
GSPT	UINT16	GPS speed in integer tenths or decimal with tenths precision.

4.17. HD (GPS HEADING)

GPS Heading. Navigation heading measured in tenths of degrees, e.g. a value of 1800 = 180.0 degrees.

Parameter Data Presentation

HD

Parameter	Type	Description
HD	INT16	0 to 360 degrees device heading in tenths of a degree. 0 or (360) degrees indicates a direction toward true North. 90 degrees indicates a direction toward true East. 180 degrees is true South and 270 degrees is true West.

4.18. HIBRST HIBERNATE RESETS

Data Presentation

HIBRST

Parameter	Type	Description
HIBRST		

4.19. HP (GPS PDOP)

GPS PDOP. Position (3-Dimensional) Dilution of Precision.

Parameter Data Presentation

HP

Parameter	Type	Description																					
HP	UINT8	PDOP in tenths.																					
		<table border="1"> <thead> <tr> <th>DOP Value</th> <th>Rating</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>< 10</td> <td>Ideal</td> <td>Highest possible confidence level used for applications demanding the highest possible precision.</td> </tr> <tr> <td>10-20</td> <td>Excellent</td> <td>At this confidence level, positional measurements are considered accurate enough to meet all but the most sensitive applications.</td> </tr> <tr> <td>20-50</td> <td>Good</td> <td>Represents the minimum appropriate level for making business decisions. Positional measurements could be used to make reliable in-route navigation suggestions to the user.</td> </tr> <tr> <td>50-100</td> <td>Moderate</td> <td>Positional measurements could be used for calculations, but the fix quality could still be improved. A more open view of the sky is recommended.</td> </tr> <tr> <td>100-200</td> <td>Fair</td> <td>Represents a low confidence level. Positional measurements should be discarded or used only to indicate a very rough estimate of the current location.</td> </tr> <tr> <td>200 – 255</td> <td>Poor</td> <td>At this level, measurements are inaccurate by as much as 300 meters with a 6-meter accurate device (50 DOP * 6 meters) and should be discarded.</td> </tr> </tbody> </table>	DOP Value	Rating	Description	< 10	Ideal	Highest possible confidence level used for applications demanding the highest possible precision.	10-20	Excellent	At this confidence level, positional measurements are considered accurate enough to meet all but the most sensitive applications.	20-50	Good	Represents the minimum appropriate level for making business decisions. Positional measurements could be used to make reliable in-route navigation suggestions to the user.	50-100	Moderate	Positional measurements could be used for calculations, but the fix quality could still be improved. A more open view of the sky is recommended.	100-200	Fair	Represents a low confidence level. Positional measurements should be discarded or used only to indicate a very rough estimate of the current location.	200 – 255	Poor	At this level, measurements are inaccurate by as much as 300 meters with a 6-meter accurate device (50 DOP * 6 meters) and should be discarded.
DOP Value	Rating	Description																					
< 10	Ideal	Highest possible confidence level used for applications demanding the highest possible precision.																					
10-20	Excellent	At this confidence level, positional measurements are considered accurate enough to meet all but the most sensitive applications.																					
20-50	Good	Represents the minimum appropriate level for making business decisions. Positional measurements could be used to make reliable in-route navigation suggestions to the user.																					
50-100	Moderate	Positional measurements could be used for calculations, but the fix quality could still be improved. A more open view of the sky is recommended.																					
100-200	Fair	Represents a low confidence level. Positional measurements should be discarded or used only to indicate a very rough estimate of the current location.																					
200 – 255	Poor	At this level, measurements are inaccurate by as much as 300 meters with a 6-meter accurate device (50 DOP * 6 meters) and should be discarded.																					

4.20. IFN IMAGE FILE NAME ON SERVER

Data Presentation

IFN

Parameter	Type	Description
IFN		Image file name uploaded to the FTP server

4.21. IG (IGNITION STATUS)

IG returns current ignition status.

Parameter Data Presentation

IG

Parameter	Type	Description
IG	UINT8	Number of output bytes.

Value	Description
0	None
1	Ignition On
2	Ignition OFF

4.22. LDSWERR LOAD SWITCH VOLTAGE ERRORS

Data Presentation

LDSWERR

Parameter	Type	Description
LDSWERR		

4.23. LDSWVOL LOAD SWITCH VOLTAGE

Data Presentation

LDSWVOL

Parameter	Type	Description
LDSWVOL		

4.24. LN (LONGITUDE)

GPS Longitude. Specifies the east-west position of a point on the Earth's surface. Longitude is an angle which ranges from 0 degrees at the prime meridian to 180 degrees (east or west).

Parameter Data Presentation

LN

Parameter	Format	Description
LN	- 180.00000– 180.00000	Decimal degrees of Longitude multiplied by 1e6.

4.25. LT (LATITUDE)

GPS Latitude. Specifies north-south position of a point on the Earth's surface. Latitude is an angle which ranges from 0 degrees at the equator to 90 degrees (north or south) at the poles.

Parameter Data Presentation

LT

Parameter	Format	Description
LT	-90.00000 – 90.00000	Decimal degrees of Latitude multiplied by 1e6.

4.26. MAINVOL MAIN VOLTAGE (INTEGER MILLIVOLTS)

Data Presentation

MAINVOL

Parameter	Type	Description
MAINVOL		

4.27. MI (VIRTUAL ODOMETER GPS)

MI provides a virtual odometer using GPS locations. The distance between waypoints is determined by both time (every 60 seconds) and heading change (+/- 15 degrees) and added to a virtual odometer accumulator.

Parameter Data Presentation

MI

Parameter	Type	Description
MI	UINT32	Calculated distance in meters.

4.28. OT (OUTPUT STATE)

OT is output state that is currently applied to the output pin.

Parameter Data Presentation

OT

Parameter	Type	Description						
OT	UINT8	Output state.						
		<table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Clear</td> </tr> <tr> <td>1</td> <td>Set</td> </tr> </tbody> </table>	Value	Description	0	Clear	1	Set
Value	Description							
0	Clear							
1	Set							

4.29. PM LAST RESET CODE

Data Presentation

PM

Parameter	Type	Description
-----------	------	-------------

PM		
----	--	--

4.30. PSCA PSOC APPLICATION VERSION

Data Presentation

PSCA

Parameter	Type	Description
-----------	------	-------------

PSCA		Psoc Application Version
------	--	--------------------------

4.31. PSCB PSOC BOOT VERSION

Data Presentation

PSCB

Parameter	Type	Description
-----------	------	-------------

PSCB		Psoc boot version
------	--	-------------------

4.32. PWRST POWER-ON RESETS

Data Presentation

PWRST

Parameter	Type	Description
-----------	------	-------------

PWRST		Number of power-on resets.
-------	--	----------------------------

4.33. SCA SC20 APPLICATION VERSION

Data Presentation

SCA

Parameter	Type	Description
-----------	------	-------------

SCA		
-----	--	--

4.34. SCOFFATT SC20 POWER-OFF ATTEMPTS

Data Presentation

SCOFFATT

Parameter	Type	Description
-----------	------	-------------

SCOFFATT		Number of SC20 Power-Off Attempts.
----------	--	------------------------------------

4.35. SCOFFERR SC20 POWER-OFF ERRORS

Data Presentation

SCOFFERR

Parameter	Type	Description
-----------	------	-------------

SCOFFERR		Number of SC20 Power-Off Errors.
----------	--	----------------------------------

4.36. SCONATT SC20 POWER-ON ATTEMPTS

Data Presentation

SCONATT

Parameter	Type	Description
-----------	------	-------------

SCONATT		Number of SC20 Power-On Attempts.
---------	--	-----------------------------------

4.37. SCONERR SC20 POWER-ON ERRORS

Data Presentation

SONERR

Parameter	Type	Description
SCONERR		Number of SC20 Power-On Errors.

4.38. SCS SC20 SYSTEM VERSION

Data Presentation

SCS

Parameter	Type	Description
SCS		System version...

4.39. SEQ (SEQUENCE NUMBER)

Sequence reports the event sequence number. The numbers are associated with a XOR_FRAME and is stored to non-volatile memory. This ensures sequence numbers are unique until the event log is reset, the device is power cycled, or 4 billion events have been read from non-volatile memory.

Parameter Data Presentation

SEQ

Parameter	Format	Description
SEQ	3-digit (000 to 255)	Event sequence number.

4.40. SOLCUR SOLAR CURRENT (INTEGER MAGIC.....)

Data Presentation

SOLCUR

Parameter	Type	Description
SOLCUR		

4.41. SOLVOL SOLAR VOLTAGE (INTEGER MILLIVOLTS)

Data Presentation

SOLVOL

Parameter	Type	Description
SOLVOL		

4.42. SP SPEED

Data Presentation

SP

Parameter	Type	Description
SP	- 180.00000 to 180.00000	

4.43. SV (GPS SATELLITES)

GPS Satellites.

Parameter Data Presentation

SV

Parameter	Type	Description
SV	UINT8	Number of satellites used in the navigation solution.

4.44. SWRST SOFTWARE RESETS

Data Presentation

SWRST

Parameter	Type	Description
SWRST		

4.45. T TIME

Data Presentation

T

Parameter	Format	Description
T	HH:MM:SS	UTC Time.

4.46. UNRST UNKNOWN RESETS

Data Presentation

UNRST

Parameter	Type	Description
UNRST		

4.47. WDRST WATCHDOG RESETS

Data Presentation

WDRST

Parameter	Type	Description
-----------	------	-------------

WDRST		
-------	--	--

5. SERVER COMMANDS

5.1. [1024] IMAGE CAPTURE FTP CONFIGURATION

Command Type	Syntax
EXEC	<p>Command</p> <p>+XT:1024,<IFTPIP>,<IFTPPP>,<IFTPU>,<IFTPPWD>,<IDIR></p> <p>Response</p> <p>\$\$<UID>,1024,<IFTPIP>,<IFTPPP>,<IFTPU>,<IFTPPWD>,<IDIR>##</p>

Parameter	Type	Description
UID		Device Unique ID
IFTPIP		Image FTP IP Address
IFTPPP		Image FTP Port
IFTPU		Image FTP User
IFTPPWD		Image FTP Password
IDIR		Image FTP Target Directory

5.2. [7027] IMAGE CAPTURE EXECUTE

Command Type	Syntax
EXEC	<p>Command</p> <p>+XT:7027</p> <p>Response</p> <p>\$\$<UID>,7027</p>

5.3. [7028] CLEAR OCCUPANCY DATA

Command Type	Syntax
EXEC	<p>Command</p> <p>+XT:7028</p> <p>Response</p> <p>\$\$<UID>,7028</p>

5.4. [9100] PASS-THROUGH COMMAND

Command Type	Syntax
EXEC	<p>Command</p> <p>+XT:9100</p> <p>Response</p> <p>\$\$<UID>,<CMD>,<MORESP></p>

Parameter	Type	Description
UID		Device Unique ID
CMD		Command to the M0
MORSP		Response string from the M0

5.5. [9101] LOG SYNC FTP CONFIGURATION

Command Type	Syntax
WRITE	<p>Command</p> <p>+XT:9101,<LFTPIP>,<LFTPP>,<LFTPU>,<LFTPWD>,<LDIR></p> <p>Response</p> <p>\$\$<UID>,9101,<LFTPIP>,<LFTPP>,<LFTPU>,<LFTPPWD>,<LDIR>##</p>

Parameter	Type	Description
UID		Device Unique ID
LFTPIP		Log FTP IP Address
LFTPP		Log FTP Port
LFTPU		Log FTP User
LFTPWD		Log FTP Password
LDIR		Log FTP Directory

5.6. [9102] LOG SYNC EXECUTE

Command Type	Syntax
EXEC	<p>Command</p> <p>+XT:9102</p> <p>Response</p> <p>\$\$<UID>,9102,<LOGCOUNT></p>

Parameter	Type	Description
UID		Device Unique ID
LOGCOUNT		Number of log files to be synced to the FTP server.

5.7. [9103] GENERIC FTP CONFIGURATION

Command Type	Syntax
WRITE	<p>Command</p> <p>+XT:9103,<FFTPIP>,<FFTPP>,<FFTPU>,<FFTPWD>,<FDIR></p> <p>Response</p> <p>\$\$<UID>,9103,<FFTPIP>,<FFTPP>,<FFTPU>,<FFTPWD>,<FDIR>##</p>

Parameter	Type	Description
UID		Device Unique ID
FFTPIP		File FTP IP Address
FFTPP		File FTP Port
FFTPU		File FTP User
FFTPWD		File FTP Password
FDIR		File FTP Directory

5.8. [9104] GENERIC FTP EXECUTE

Command Type	Syntax
EXEC	<p>Command +XT:9104,<FSRC></p> <p>Response \$\$<UID>,9104,<FSRC></p>

Parameter	Type	Description
UID		Device Unique ID
FSRC		Path to file on device that pushed to the FTP server.

5.9. [9105] UPDATE BACKUP APK

Command Type	Syntax
EXEC	<p>Command +XT:9105</p> <p>Response \$\$<UID>,9105</p>

6. SUBSYSTEMS

Delete this text and replace it with your own content.

6.1. GENERAL COMMANDS

Command	Description
!nde	Application debug enable.
!ndd	Application debug disable.
!nx	System reset.
!npcs	Phone configuration set.
!nbgm	BLE MAC get

6.2. PHONE APPLICATION COMMANDS

Command	Description
!npakas	Phone application keep awake set.
!npakac	Phone application keep awake clear.
!npakag	Phone application keep awake get.
!npaasg	Phone application active status get.

6.3. PHONE GPS COMMANDS

Command	Description
!npgnsg	Phone GPS nmea string get.
!npgnms	Phone GPS nmea mode set.
!npgnmc	Phone GPS nmea mode clear.
!npgnmg	Phone GPS nmea mode get.

6.4. PHONE SYSTEM COMMANDS

Command	Description
!npstms	Phone system test mode set.
!npstmc	Phone system test mode clear.
!npstmg	Phone system test mode get.
!npscnd	Phone system command.

6.5. OTHER COMMANDS

Command	Description
!mcs:27,[serial]	Set serial number/UID.
!npscnd:!nic	Kicks off an image capture.
!npscnd:!occ	Execute XVL occupancy job.
!npscnd:!dozs	Set doze mode.
!npscnd:!dozc	Clear doze mode.
!npcs	Set configuration.

6.6. DOOR SENSOR

6.6.1. Set Door Sensor mac Address

Command Type	Syntax
	<p>Command</p> <p>!mcs:25, <mac></p> <p>Response</p>

Parameter	Type	Description
mac	Hex String	mac is a 12 character hex string. E.g., "a4da32067f71"

6.6.2. Configure Door Sensor Wakes

Command Type	Syntax
	<p>Command</p> <p>!cs:60,<open_per>,<closed_per>,<flags>,<angle></p> <p>Response</p>

Parameter	Type	Description										
open_per		Periodic wake when door is open (seconds). Default value is 900 (15 minutes).										
closed_per		Periodic wake when door is closed (seconds). Default value is 21600 (6 hours).										
flags		Hex mask of wake events.										
		<table border="1"> <thead> <tr> <th>Index</th> <th>Descriptions</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Open event</td> </tr> <tr> <td>1</td> <td>Close event</td> </tr> <tr> <td>2</td> <td>Open periodic event</td> </tr> <tr> <td>3</td> <td>Closed periodic event</td> </tr> </tbody> </table>	Index	Descriptions	0	Open event	1	Close event	2	Open periodic event	3	Closed periodic event
Index	Descriptions											
0	Open event											
1	Close event											
2	Open periodic event											
3	Closed periodic event											
angle		The threshold for a closed door (degrees). Default value is 10.										

6.7. MONOMO

6.7.1. Configure Monomo Wakes

Command Type	Syntax
	<p>Command</p> <p>!cs:56,<mo_window>,<mo_hit>,<mo_per>,<nomo_window>,<nomo_hit>,<nomo_per>,<flags></p> <p>Response</p>

Parameter	Type	Description
mo_window		Window for a no-motion to motion transition.
mo_hit		Required percentage of motion samples within that window to cause the transition.
mo_per		Time in seconds for a periodic motion wake.
nomo_window		
nomo_hit		
nomo_per		
flags		Hex mask of wake events.

Index	Descriptions
0	Transition to motion
1	Transition to no motion
2	Motion periodic
3	No-motion periodic

6.8. SC20 GPIOs

GPIO	Set Command	Clear Command
Gps-Green	!npscnd:!is:69	!npscnd:!ic:69
GPS-Red	!npscnd:!is:89	!npscnd:!ic:89
IR1	!npscnd:!is:9	!npscnd:!ic:9
IR2	!npscnd:!is:10	!npscnd:!ic:10
IR3	!npscnd:!is:11	!npscnd:!ic:11
IR4	!npscnd:!is:95	!npscnd:!ic:95

7. REGULATORY STATEMENTS

7.1. FCC

This equipment with FCC-ID: GKM-XT3182D and IC-ID: 10281A-XT3182D, Model: XT3182D is subject to the Federal Communications Commission (FCC) and Industry Canada (IC) rules.

NOTICE:

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications made to this equipment not expressly approved by Xirgo Technologies, LLC may void the FCC authorization to operate this equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Radio frequency radiation exposure Information:

This equipment, XT3182D, complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated with minimum distance of 20cm between the XT3182D and your body. However, the external antenna of this product must be installed and operated with a minimum distance of at least 65cm between the antenna and your body.

7.2. IC

Antenna Statement

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Licence exempt

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. this device may not cause interference, and
2. this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

7.3. CE

The DOC (Declaration of Conformity) is either included in the packaging or can be found at the following link:

www.xirgotech.com

7.4. CALIFORNIA PROPOSITION 65 WARNING:



WARNING: This product can expose you to chemicals including Nickel (Metallic), which is known to the State of California to cause cancer and Bisphenol A (BPA), which is known to the State of California to cause birth defects or other reproductive harm.

For more information go to www.P65Warnings.ca.gov